M12 Motorway Groundwater Monitoring

Report 11 – April to September 2024

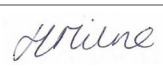
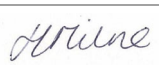
Transport for NSW

17 December 2024

GHD Pty Ltd ABN 39 008 488 373
133 Castlereagh Street, Level 15
Sydney, New South Wales 2000, Australia
T +61 2 9239 7100 | **F** +61 2 9239 7199 | **E** sydmail@ghd.com | **ghd.com**

Printed date	18/12/2024 8:59:00 AM
Last saved date	18 December 2024 8:56 AM
File name	C:\Users\aduval\Downloads\12554717_REP_M12 Motorway_Surface water Monitoring Report 11.docx
Author	Lia Saunders
Project manager	Henry Luo
Client name	Transport for NSW
Project name	M12 Motorway water quality and level monitoring services (contract number: 20.0000303606.0590)
Document title	M12 Motorway Groundwater Monitoring | Report 11 – April to September 2024
Document number	M12CDD-GHDA-ALL-EV-RPT-000035
Revision version	Rev 0
Project number	12554717

Document status

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	A	L. Saunders	N. Rosen		H. Milne		31/10/2024
S4	Rev 0	N. Rosen	H. Milne		H. Milne		17/12/2024

© GHD 2024
This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Acknowledgement of Country

GHD acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land, water and sky throughout Australia on which we do business. We recognise their strength, diversity, resilience and deep connections to Country. We pay our respects to Elders of the past, present and future, as they hold the memories, knowledges and spirit of Australia. GHD is committed to learning from Aboriginal and Torres Strait Islander peoples in the work we do.

Executive Summary

Background

The M12 Motorway (the project) is under construction between the M7 Motorway at Cecil Hills, and The Northern Road at Luddenham, covering approximately 16 kilometres (km). This construction will provide direct access between the Western Sydney International Airport (WSIA) at Badgerys Creek and Sydney's motorway network.

The Instrument of Approval granted by NSW Government Department of Planning, Industry and Environment in April 2021 stipulates conditions of approval for the M12 Motorway SSI 9364. Condition C17 of the approval requires the construction monitoring program for surface water quality and groundwater quality and levels (as approved by the Planning Secretary) to be implemented for the duration of construction.

Condition D9 of the approval requires the operational monitoring program for surface water quality and groundwater quality and levels to be implemented for the duration specified in the program.

– The amendment report submissions report states in Revised Environmental Management Measure (REMM) SWH06 that surface water monitoring will be carried out for a minimum of 12 months following the completion of construction.
– GW04 states that groundwater quality monitoring will be carried out for a minimum of six months following construction.

To meet these conditions of approval, GHD Pty Ltd (GHD) was engaged by Transport for New South Wales (TfNSW) to undertake the groundwater monitoring program for the M12 Motorway construction and operation project. This report summarises the construction phase of the groundwater monitoring program conducted between April and September 2024.

Scope of work

The scope of works undertaken to support the preparation of this report include:

– Monthly sampling of the redrilled monitoring wells (BH104R, BH107R, BH112R and BH145R) along the proposed project alignment over the six months. The analytical suite includes physiochemical parameters, nutrients, major anions and cations, metals, and hydrocarbons.
– Collation of groundwater level data from the same wells which includes data from manual gauging and data loggers.
– Collation of groundwater level data from the remaining monitoring wells which includes data from bi-monthly manual gauging and data loggers.

Summary of monitoring data

The groundwater analytical results for the six-month monitoring period (April to September 2024) indicated the following differences between the baseline and construction monitoring period:

– Field parameters
  - Increases in dissolved oxygen at BH104/BH104R, BH107/BH107R and BH112/BH112R.
  - Fluctuations in electrical conductivity and redox in all wells since monitoring has begun of replacement wells.
  - pH concentrations are tending more alkaline at BH104/BH104R, BH107/BH107R and BH112/BH112R.
– Major cations and anions
  - Decreases in sulfate concentrations at BH104/BH104R and BH107/BH107R and increases at BH112/BH12R after monitoring of replacement wells.
  - Major cations and anions in replacement wells are different from their original wells. BH104R has reduced calcium and magnesium and BH107R has increased in bicarbonate and carbonate ions towards a sodium bicarbonate type. BH112R has increased towards chloride and BH145R has increased towards calcium and magnesium.

– Nutrients
    - Increases in concentrations above the baseline at BH104/BH104R and BH112/BH112R and above the construction monitoring period for BH145R for ammonia, coinciding with monitoring of the replacement wells.
    - Increases in nitrate, total oxidised nitrogen (NOx), and total nitrogen above the baseline which are mostly reducing with each monitoring event after monitoring of replacement wells.
    - Fluctuating nitrite concentrations above the baseline since the beginning of the construction period at BH104/BH104R, BH107/BH107R and BH112/BH112R.
– Metals
    - Arsenic 80th percentile concentrations in the current and construction period were reported above the baseline in BH104/BH104R and BH112/BH112R. This may be attributable to increased concentrations coinciding with the monitoring of the replacement wells.
    - Iron 80th percentile concentrations in the current and construction monitoring periods were reported above the baseline 80th percentile at BH104/BH104R.
    - Exceedances of adopted criteria were eliminated following the application of hardness modified trigger values.
– Total Suspended Solids (TSS) and Total Dissolved Solids (TDS)
    - An increasing trend in TSS concentrations above the baseline at BH104/BH104R and BH112/BH112R, for the construction period which may be attributed to the monitoring of replacement wells. In the current period BH112/BH112R concentrations of TSS has decreased significantly and is below the baseline 80th percentile.
    - TDS concentrations in BH112/BH112R for the current and construction periods at the 80th percentile are above the baseline 80th percentile.

It is noted that there are differences in field parameters and laboratory analytical results between the original wells BH104, BH107, BH112, and BH145 with their replacements BH104R, BH107R, BH112R, and BH145R.

Summary of gauging data

– In the western area, groundwater levels in:
    - BH104R decreased by over two metres since monitoring of the replacement well began, after a slight increasing trend between October 2023 and March 2024, water level in BH104R slightly decreased over the current period.
    - BH107R remained relatively stable in the current period with a very slight decrease (less than 0.1 m), continuing an overall decreasing trend observed in BH107R since monitoring of the replacement well began.
    - BH112R remained relatively stable over the current period but appears to be continuing an overall slightly decreasing trend (with a change in water level of approximately one metre since monitoring of the replacement well began).
– In the central area, water levels in replacement well BH145R remained relatively stable over the current monitoring period. Gauging well BH219 water level increased by 0.28 m throughout April and June 2024 but no further monitoring data was retrieved due to destruction of the well from construction work in August 2024.
– In the eastern area, the water level in BH175 had an increasing trend, rising by 0.85 m during the monitoring period.
– This increasing trend observed in the central and eastern wells coincide with a period of increased rainfall, with water levels remaining within the historical range since monitoring began.

Conclusion

The measured groundwater quality parameters and the project analytical suite have provided further data to incorporate into the construction monitoring period percentiles. The reported concentration of analytes in the current monitoring period are broadly consistent with those reported in the baseline monitoring period, with noted increases in some field parameters, nutrients and metals concentrations. These changes have occurred with the replacements of the monitoring wells and therefore no management actions are required cumulating from this monitoring period. Furthermore, increases in water levels in the central and eastern groundwater wells appear to

occur simultaneously with a period of increased rainfall, while groundwater wells in the western area continued to show a slightly decreasing trend overall.

Contents

1. Introduction **4**
1.1 Background 4
1.2 Scope of work 5
1.3 Limitations 5
2. Project description **7**
2.1 Project identification 7
2.2 Historical land use summary 7
2.3 Environmental setting 7
3. Field program **9**
3.1 Workplace health and safety 9
3.2 Sampling dates 9
3.3 Summary of groundwater quality monitoring locations 9
3.4 Groundwater sampling methodology 10
3.4.1 Gauging 10
3.4.2 Purging 10
3.4.3 Sampling 11
3.5 Laboratory analytical schedule 11
3.5.1 Quality assurance / quality control (QA/QC) 13
4. Assessment methodology **14**
4.1 Data quality objectives 14
4.2 Basis for assessment 14
4.2.1 Water quality objectives 14
4.2.2 Relevant guidelines 14
4.2.3 Adopted assessment criteria 14
5. Data assessment **16**
5.1 Field measured groundwater quality parameters 16
5.1.1 Dissolved oxygen (DO) 16
5.1.2 Electrical conductivity (EC) 17
5.1.3 Redox conditions 18
5.1.4 pH 18
5.1.5 Temperature 19
5.2 Field observations 19
5.3 Laboratory analytical results 20
5.3.1 Major cations and anions 20
5.3.2 Nutrients 22
5.3.3 Metals 25
5.3.4 Hardness 30
5.3.5 Benzene, toluene, ethylbenzene, xylene, naphthalene (BTEXN) 31
5.3.6 Total recoverable hydrocarbons (TRH) 31
5.3.7 Polycyclic aromatic hydrocarbons (PAHs) 31
5.3.8 Speciated phenols 31
5.3.9 Total suspended solids (TSS) 31
5.3.10 Total Dissolved Solids (TDS) 32

6. Groundwater level monitoring 34
6.1 Schedule of groundwater well locations 34
6.2 Data collection and analysis methodology 35
6.3 Manual gauging 35
6.4 Results 36
7. Conclusions 37
8. References 38

Table index

Table 1 Project identification summary 7
Table 2 Environmental setting summary 7
Table 3 Groundwater quality monitoring locations 9
Table 4 EIS compliance of analytical schedule 12
Table 5 Summary statistics for dissolved oxygen 16
Table 6 Summary statistics for electrical conductivity 17
Table 7 Summary statistics for redox 18
Table 8 Summary statistics for pH 18
Table 9 Summary statistics for temperature 19
Table 10 Summary of groundwater observations during current monitoring period 20
Table 11 Summary statistics for ammonia 23
Table 12 Summary statistics for nitrate 23
Table 13 Summary statistics for nitrite 24
Table 14 Summary Statistics for total oxidised nitrogen 24
Table 15 Summary statistics for total nitrogen 25
Table 16 Summary statistics for total phosphorus 25
Table 17 Summary statistics for arsenic 26
Table 18 Summary statistics for cadmium 26
Table 19 Summary statistics for chromium 26
Table 20 Summary statistics for copper 27
Table 21 Summary statistics for iron 27
Table 22 Summary statistics for lead 27
Table 23 Summary statistics for manganese 28
Table 24 Summary statistics for mercury 28
Table 25 Summary statistics for nickel 28
Table 26 Summary statistics for zinc 29
Table 27 Exceptions to exceedances of adopted criteria following application of HMTVs 31
Table 28 Maximum and average concentration of total suspended solids in monitoring wells 32
Table 29 Summary statistics for total suspended solids 32
Table 30 Maximum and average concentration of total dissolved solids in monitoring wells 33
Table 31 Summary statistics for total dissolved solids 33
Table 32 Schedule of M12 groundwater level wells monitored by GHD from August 2022 to September 2024 34

Figure index

Figure 1	Piper plot for groundwater changes throughout the baseline monitoring period (July 2019 to July 2022)	21
Figure 2	Piper plot for groundwater changes throughout the construction monitoring period (August 2022 to September 2024)	21
Figure 3	Piper plot for groundwater changes throughout the current monitoring period (April 2024 to September 2024)	22

Appendices

Appendix A	Figure
Appendix B	Tables
Appendix C	Field Parameter Graphs
Appendix D	Boxplot Graphs
Appendix E	Calibration certificates
Appendix F	Quality assurance / Quality control program and assessment
Appendix G	Field sheets
Appendix H	Laboratory reports
Appendix I	Groundwater level plots

1. Introduction

GHD Pty Ltd (GHD) was engaged by Transport for New South Wales (TfNSW) to undertake the groundwater monitoring program for the M12 Motorway construction and operation project.

This biannual report is the eleventh for the monitoring program. This report (Report 11) provides details of the monitoring locations, sampling methodology, and results of the groundwater samples collected between April 2024 to September 2024.

This current monitoring period and six-monthly report sits under contract number 20.0000303606.0590.

1.1 Background

The M12 Motorway construction works area (the project) in Western Sydney covers approximately 16 kilometres (km). The project is under construction between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham. At the completion of the project, the M12 Motorway will provide direct access between the Western Sydney International Airport (WSIA) at Badgerys Creek and Sydney's motorway network.

The project has been determined to be a controlled action under Section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act) (EPBC 2018/8286) for significant impact to threatened species and communities (Section 18 and Section 18A of the EPBC Act). This requires assessment and approval from the Commonwealth Government. As part of the project approval conditions, Transport for NSW (TfNSW) are required to prepare and implement a groundwater monitoring program for the project. GHD was commissioned to undertake a groundwater monitoring program during pre-construction, construction, and operational stages of the project.

A groundwater quality and hydrology assessment report was previously prepared as part of the M12 Motorway Environmental Impact Statement (JAJV, 2019). A key part of this report included a dewatering assessment, to estimate potential groundwater inflows (seepage) and subsequent potential drawdown which could occur if road cuttings extend below the water table. The JAJV 2019 assessment concluded that the project had minimal potential for direct interaction with groundwater systems. The potential for interactions with groundwater systems was noted to be limited to one road cutting, approximately 1.5 km east of The Northern Road (the 'western cut'), and bridge footings where piles are drilled below the water table.

JAJV (2019) stated that groundwater quality at groundwater monitoring well BH104 was representative of the western cut, with initial sampling of this monitoring well indicating copper and zinc concentrations exceeding (ANZECC & ARMCANZ, 2000) trigger values for 95% protection of freshwater species. Groundwater quality from BH104 did not indicate a risk to human health, nor anticipated impacts from intercepted groundwater from the cut being discharged to surface water. Changes to water table levels in areas where bridge footings extend beneath the water table are qualitatively predicted to be minor and localised.

The Overarching Construction Environmental Management Plans (OCEMP) for the project was approved by the Department of Planning and Industry Environment (DPIE) in December 2021 (TfNSW, 2021).

Between April 2019 and July 2022, GHD monitored four groundwater monitoring wells in the pre-construction phase for the collection of baseline data. The collection of baseline data was completed in July 2022 as the pre-construction phase for the central and west packages, including the four groundwater wells, ended. Construction phase data has been collected from August 2022 onwards.

The groundwater monitoring program conducted to date can be summarised as follows:

– Baseline monitoring period:
    - Report 1: April 2019 to September 2019 (GHD, 2019)
    - Report 2: October 2019 to March 2020 (GHD, 2020)
    - Report 3: April 2020 to September 2020 (GHD, 2021a)
    - Report 4: October 2020 to March 2021 (GHD, 2021b)
    - Report 5: April 2021 to September 2021 (GHD, 2022a)

- Report 6: October 2021 to March 2022 (GHD, 2022b)

– Baseline / construction monitoring period:
  - Report 7: April 2022 to September 2022 (GHD, 2022c)
– Construction monitoring period:
  - Report 8: October 2022 to March 2023 (GHD, 2023a)
  - Report 9: April 2023 to September 2023 (GHD, 2023b)
  - Report 10: October 2023 to March 2024 (GHD, 2024)
  - Report 11 (this report): April 2024 to September 2024

1.2 Scope of work

For the duration of the pre-construction, construction, and operational phases, GHD is to undertake a monthly groundwater monitoring event at each of the monitoring locations within the project.

The pre-construction monitoring was to occur for a minimum of 12 months, followed by four years of construction monitoring on a stage-by-stage basis, followed by post-construction (operation) monitoring commencing at the opening of each stage.

The scope for the groundwater monitoring events undertaken within the project includes:

– Monthly sampling of four existing monitoring wells (BH104, BH107, BH112 and BH145) along the proposed project alignment including groundwater levels using an interface probe (IP) to determine presence of light non-aqueous phase liquid (LNAPL) and measure groundwater levels.
– Collection of samples from four existing monitoring wells (BH104, BH107, BH112 and BH145) using a micro-purge pump, employing low-flow sampling methodology to determine water quality and estimate flow direction.
– Bi-monthly (every second month) gauging of twenty-five existing monitoring wells along the project alignment using an interface probe (IP) to measure groundwater levels and downloading of the data loggers (if present).
– Collation and graphing of groundwater level data from all twenty-nine wells which includes data from manual gauging and data loggers.
– Preparation of one monitoring report every six months.

As the construction phase has progressed, samples are now collected from four re-drilled monitoring wells (BH104R, BH107R, BH112R and BH145R), and bi-monthly groundwater gauging is only conducted on the remaining three wells. However, as of August 2024 only two of the three bi-monthly groundwater gauging wells remain due to the well being destroyed by construction.

1.3 Limitations

This report has been prepared by GHD for Transport for NSW and may only be used and relied on by Transport for NSW for the purpose agreed between GHD and Transport for NSW as set out in section 1.2 of this report.

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

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

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

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

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

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

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

2. Project description

2.1 Project identification

A summary of available information pertaining to the project is presented in Table 1. A location plan of the project is provided in Figure 1, Appendix A

Table 1 Project identification summary

Information	Details
Description of the project	The M12 Motorway project alignment is approximately 16 km in length. This will extend between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham.
Local Government Area	Liverpool City Council for the eastern portion, up to Mamre Road Penrith City Council from Mamre Road
Local Land Use Zoning	**Liverpool LEP 2008** RU4 – primary production small lots **Fairfield LEP 2013:** RU4 – primary production small lots RU1 – primary production **Penrith LEP 2010:** RU4 – primary production small lots C2 – environmental conservation RU2 – rural landscape SP2 – classified road **State Environmental Planning Policy (Western Sydney Aerotropolis) 2020:** ENZ – environment and recreation ENT – enterprise SP2 – infrastructure **SEPP (Western Sydney Parklands) 2009:** Western Sydney Parklands
Land Use	The area where the project is occurring is currently used for agricultural, industrial, residential and rural purposes. Potentially contaminating activities within and / or next to the project include the SUEZ Kemps Resource Recovery Park, Brandown Quarry and general agricultural land use.
Surrounding Land Use	A range of land uses including industrial, commercial, residential, agriculture and landfill surround the project. Potentially contaminating activities outside of the project include the Hi-Quality Group Quarry and Sydney Recycling Park (located adjacent to the Hi-Quality Group Quarry). An Ampol service station is located approximately 300 metres north east of the project at 1163 Mamre Road, Kemps Creek. Regulation under the Contaminated Land Management (CLM) Act is not required.

2.2 Historical land use summary

A historical aerial photography review of the project and surrounding area was completed by JAJV (2019). The review indicated that the project and surrounding area has remained largely rural/agricultural and residential since the 1940s. Increased rural residential density in suburban pockets, and the number of commercial/industrial premises in Kemps Creek have been observed since the 1950s and 1960s until present-day.

2.3 Environmental setting

JAJV (2019) undertook a desktop review of the existing environment for the entire M12 Motorway construction footprint. A summary of this information is presented in Table 2.

Table 2 Environmental setting summary

Aspect	Description
Climate	The long-term average monthly rainfall for the project ranges between 33.1 millimetres (mm) in July to 107.9 mm in February, with an average annual rainfall of 728.1 mm (Badgerys Creek AWS, ID 067108) (BOM, 2024) Long-term maximum mean temperatures range between 17.6°C in July to 30.0°C in January, and minimum mean temperatures between 4.3°C in July to 17.2°C in January (Badgerys Creek AWS, ID 067108) (BOM, 2024). Further details of climate information are included in groundwater level monitoring of Section 6.4 and Appendix I.
Topography and drainage	The ground surface along the project ranges between reduced level (RL) 70 metres (m) Australian Height Datum (AHD) to RL 115 mAHD. The landscape comprises relatively flat terrain with low rising crests. Flat floodplains are present at South Creek and Kemps Creek. Low rolling hills are situated between the floodplain areas, typically comprising gentle rises and undulations with broad rounded crests. Based on the topography within the project, surface runoffs are expected to drain to nearby dams and creeks (i.e. Kemps Creek and South Creek), as well as infiltrating into subsurface soils across unsealed lands in the surrounding area.
Soil and landscapes	The project is primarily underlain by the Blacktown residual soil unit (Geological Survey of NSW, 1991). The South Creek and Kemps Creek areas are underlain by the South Creek fluvial soil landscape. The Blacktown residual soil landscape typically comprises of clayey soils over gently undulating crests. The soil unit can have moderately reactive, highly plastic subsoils and poor drainage. The South Creek fluvial soil comprises floodplains and drainage depressions of very deep layered clays and sands. These fluvial soils are prone to erosion and frequent flooding.
Acid sulfate soils (ASS)	The project is not covered by areas mapped in the Acid Sulfate Soil Risk Maps prepared by Department of Land and Water Conservation.
Geology	Majority of the project is underlain by two geological units, Bringelly Shale (Rwb) and Quaternary aged alluvial deposits (Qal) (Geological Survey of NSW, 1991). Bringelly Shale is the predominant geological unit for the project. Bringelly shale is described as comprising shale, carbonaceous claystone, laminite and rare coal. Bringelly Shale is the upper portion of the Wianamatta Group and the upper sedimentary sequence in the Sydney Basin with a thickness of typically 150 m. Quaternary aged alluvial deposits (Qal) are described as comprising quartz and lithic fluvial sand, silt and clay. These are present near South Creek and Kemps Creek.
Hydrology	The project crosses South Creek in the western portion and Kemps Creek in the eastern portion. Kemps Creek is a tributary of South Creek, joining approximately three kilometres north of Elizabeth Drive, which then flows north to discharge into the Hawkesbury River.
Hydrogeology	The underlying aquifers are dominated by shale, siltstone and other sedimentary basins. They have a low potential for groundwater movement and comprise salinity levels greater than 16,000 microsiemens per centimetre (µs/cm), being unsuitable for stock use (DPI, 2014). According to the manual groundwater gauging data collected during the baseline and construction monitoring periods (April 2019 to September 2024), groundwater levels within the project range between 34.84 mAHD (BH217, September 2022) and 114.07 mAHD (BH162, October 2022).

3. Field program

3.1 Workplace health and safety

GHD developed a site-specific health safety and environment (HSE) plan for the works as part of the overall commitment to provide a healthy and safe working environment for staff. All work was conducted with appropriate personal protection equipment (PPE).

The HSE plan included a site-specific job safety and environmental analysis detailing the step-by-step procedures of all aspects of the works and associated hazards and control measures to be implemented. The HSE plan was read by all GHD personnel, and feedback and discussion provided prior to the works commencing. A site-specific pre-start safety assessment was conducted each morning before commencing works.

3.2 Sampling dates

Groundwater sampling was conducted at accessible groundwater monitoring wells on the following dates:

– Event 61 – 11 and 12 April 2024
– Event 62 – 15 and 16 May 2024
– Event 63 – 6 and 12 June 2024
– Event 64 – 10 and 11 July 2024
– Event 65 – 6 and 7 August 2024
– Event 66 – 11 and 12 September 2024

A summary of the status of groundwater monitoring wells during this monitoring period, and previous monitoring events, is presented in Table B1, Appendix B.

3.3 Summary of groundwater quality monitoring locations

The locations for groundwater quality monitoring wells are summarised below in Table 3 and presented on Figure 1, Appendix A. These monitoring wells are located in the vicinity of the project and were chosen as they represent areas of relatively substantial road cuttings and therefore there is a higher potential for groundwater interception by the project alignment in these areas.

BH104R, BH107R, and BH112R were added to the monitoring program in December 2022 to replace monitoring wells BH104, BH107 and BH112 that were destroyed by the expansion of the construction footprint. BH145R was added to the monitoring program in April 2023 to replace well BH145 which had not been intersecting the groundwater aquifer.

Due to access restrictions of BH112R between December 2022 and May 2023, BH112R was redrilled for a second time in June 2023, and sampled for the first time in August 2023 after well development had occurred. BH144 was temporarily added to the program in November 2022 to provide additional monitoring data before it was destroyed in December 2022.

Table 3 Groundwater quality monitoring locations

Well ID	Latitude	Longitude	Package	Comment
BH104	-33.854952	150.7055015	West	Located on private property, access negotiated with landowner. Destroyed in December 2022.
BH104R	-33.854024	150.7056504	West	Located on TfNSW property. Installed and monitored from December 2022.

Well ID	Latitude	Longitude	Package	Comment
BH107	-33.854432	150.7146769	West	Located on private property, access negotiated with landowner. Destroyed in December 2022.
BH107R	-33.854092	150.7146021	West	Located on TfNSW property. Installed and monitored from December 2022.
BH112	-33.855866	150.7195004	West	Located on TfNSW property. Destroyed in December 2022.
BH112R	-33.855998	150.71932242	West	Located on TfNSW property. Originally installed in December 2022 but could not be sampled due to access restrictions. Redrilled and monitored from August 2023.
BH144	-33.879915	150.8229921	Central	Located on TfNSW property.
BH145	-33.880292	150.8253916	Central	Located in Sydney Parklands Reserve, negotiated access. Destroyed in April 2023. No longer monitored due to low water column.
BH145R	-33.855066	150.720140	Central	Located on TfNSW property. Installed and monitored from April 2023.

3.4 Groundwater sampling methodology

All fieldwork was conducted in general accordance with:

– Australian Standard 5667:1998 Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples (AS 5667.1:1998);
– Australian Standard 5667:1998 Water Quality – Sampling, Part 11: Guidance on the Sampling of Groundwaters (AS 566.11:1998); and
– GHD standard operating procedure for groundwater well sampling (GHD, 2015).

3.4.1 Gauging

Groundwater gauging and monitoring locations were gauged routinely on a monthly basis where possible. At each location, the well cap was removed, and time was allowed for the groundwater level to stabilise before any measurements were collected. The calibration certificates are provided in Appendix E. Groundwater gauging results are presented in Section 6.3.

A calibrated IP was used to measure the standing water level in metres below top of casing (mbTOC), and to determine whether LNAPL was present in the well. Measurements were taken to the nearest millimetre. The depth to the bottom of the well was also measured to determine the amount of water in the casing.

Water level meters (WLMs) are also present in most of the groundwater monitoring well locations associated with this project. This data is presented in Section 6. These groundwater wells are gauged and data downloaded every second month.

Whilst a number of these groundwater wells are located on private property, they are in the M12 alignment and access to these properties has changed as the construction phase progresses.

3.4.2 Purging

A micropurge and bladder-pump unit was used to purge and to draw a sample from the wells.

The monitoring wells were constructed with a three-metre screened casing from the bottom of the well. The pump was lowered to approximately one metre above the bottom of the well to ensure the pump inlet was within the screened interval.

A calibrated water quality meter was used to measure and record water quality parameters, including pH, electrical conductivity (EC), dissolved oxygen (DO), temperature, oxidation-reduction potential (redox) and standing water level (SWL) at regular intervals (e.g. every 2 to 5 minutes).

Descriptions of visual and olfactory characteristics, such as colour, turbidity, odour, and sheen were recorded along with SWL and field water quality parameters.

Water quality parameters were considered stable once three consecutive readings were obtained within the following ranges:

– ± 0.05 for pH
– ± 3% for EC
– ± 10% for DO
– ± 0.2 °C for temperature
– ± 10 mV for Eh.

Exceptions to this methodology occur when water quality parameters do not stabilise over a long period of time e.g., greater than one hour of purging, or due time constraints in the field. For example, this occurred on multiple occasions throughout the April to September 2024 monitoring events where all parameters except DO were stable. These exceptions are noted on the field sheets provided in Appendix G.

Additionally, due to malfunction of the micropurge pump, groundwater samples at BH145R were collected by bailer during the July 2024 event. This resulted in insufficient water volume to achieve stabilisation of the field parameters. Field sheets forBH145R are provided in Appendix G.

Calibration certificates for the monitoring equipment used are provided in Appendix E.

3.4.3 Sampling

Groundwater samples were transported on ice and submitted to ALS (primary laboratory) and Eurofins (secondary laboratory), both National Association of Testing Authorities (NATA) Australia accredited laboratories, under Chain of Custody (CoC) procedures (presented in Appendix H). A maximum of four primary samples were collected during each sampling event. The NEPM (NEPC, 2013) states that split samples should be collected at a rate of one per 20 primary samples. As such, one intra-laboratory duplicate and one inter-laboratory duplicate sample were collected per event as part of the current groundwater monitoring period between April 2024 and September 2024.

3.5 Laboratory analytical schedule

All samples were analysed by ALS Environmental (primary) and Eurofins (secondary), NATA accredited laboratories. The analytical schedule for groundwater is presented in Table B4, Appendix B, and summarised below.

Groundwater samples were submitted for laboratory analysis including:

– Dissolved heavy metals (arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, and zinc).
– Total recoverable hydrocarbons (TRH).
– Benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN).
– Nutrients (including ammonia, nitrate, nitrite, total nitrogen, total phosphorus and reactive phosphorus).
– Total dissolved solids (TDS).
– Total suspended solids (TSS).
– Major anions and cations with alkalinity (chloride, sulphate, sodium, potassium, magnesium, calcium, carbonate and bicarbonate).
– Total hardness as CaCO3.

Groundwater samples are submitted for laboratory analysis annually include:

– Polyaromatic hydrocarbons (PAH) (only in January 2024).
– Phenols (only in January 2024).

The laboratory analytical schedule is consistent with the groundwater monitoring indicator requirements as stated in the EIS (JAJV, 2019). The OCEMP (TfNSW, 2021) includes PAH and phenols which are not usually analysed in the program due to consistent non-detections in the baseline period. These analytes are sampled once a year to confirm that they remain non detect (undertaken in January 2024), to meet the requirements of the OCEMP as per the recommendations in Report 9. The additional analysis of total hardness was to allow the adjustment of threshold criteria for metals based on hardness data.

Table 4 depicts the differing analytical suites employed over the course of the monitoring program.

Table 4 EIS compliance of analytical schedule

Sampling event	Compliant with required EIS monitoring indicators?	Additional analyte analysis?
Report 1 (GHD, 2019) Event 1 to Event 6 (April to September 2019)	Mostly yes – Did not sample for iron (dissolved), manganese (dissolved), TDS or TSS	Additionally sampled for PAH, phenols, OCP, OPP, fungicides
Report 2 (GHD, 2020) Event 7 to Event 12 (October 2019 to March 2020)		
Report 3 (GHD, 2021a) Event 13 – April 2020 Event 14 – May 2020		
Report 3 (GHD, 2021a) Event 15 – June 2020	No samples collected	
Report 3 (GHD, 2021a) Event 16 – July 2020 Event 17 – August 2020 Event 18 – September 2020	Yes	No
Report 4 (GHD, 2021b) Events 19 to 24 (October 2020 to March 2021)	Yes (however no samples collected at BH107 and BH112 in November 2020 due to access restrictions)	Hardness as $CaCO_3$
Report 5 (GHD, 2022a) Events 25 to 30 (April to September 2021)	Yes	Hardness as $CaCO_3$
Report 6 (GHD, 2022b) Events 31 to 36 (October 2021 to March 2022)	Yes	Hardness as $CaCO_3$, PAH and phenols during January, February and March 2022 events
Report 7 (GHD, 2022c) Events 37 – 42 (April 2022 to September 2022)	Mostly Yes – unable to sample in April due to weather conditions.	Hardness as $CaCO_3$
Report 8 (GHD, 2023a) Events 43 – 48 (October 2022 to March 2023)	Yes (however no samples collected at BH112R between December 2022 and March 2023, and BH107R in January 2023, due to access restrictions)	Hardness as $CaCO_3$
Report 9 Events 49 – 54 (April 2023 to September 2023)	Yes (no samples collected at BH112R between March and July 2023, and BH107R in June 2023, due to access restrictions)	Hardness as $CaCO_3$
Report 10 Events 55 – 60 (October 2023 to March 2024)	Yes	Hardness as $CaCO_3$ in all events. PAH and phenols in January 2024
Report 11 Events 61 – 66 (April 2024 to September 2024)	Yes	Hardness as $CaCO_3$

3.5.1 Quality assurance / quality control (QA/QC)

A review of the field and laboratory QA/QC performance from the investigation is presented in Appendix F. It is considered the analytical dataset collected during this monitoring period can be relied on for interpretation and assessment of background groundwater conditions in the vicinity of the project.

4. Assessment methodology

4.1 Data quality objectives

Data Quality Objectives (DQO) have been established for this groundwater report and are detailed in Appendix F. DQOs have been established to ensure the investigation is undertaken in a way that supports the collection and reporting of reliable data on which to base the investigation.

Data quality indicators (DQIs) have also been established to assess the usability of the data to allow decisions to be made with confidence. These are presented in Appendix F.

4.2 Basis for assessment

4.2.1 Water quality objectives

The key water quality objective of the M12 Motorway project was to determine baseline groundwater conditions within the project boundary prior to construction, supporting the development of a groundwater monitoring program and management plan during construction and operation of the project. This included forming site-specific water quality guidelines applicable for subsequent assessment. The plans and programs will likely be used to form conditions of approval under Part 5.1 of the *Environmental Planning and Assessment Act 1979.*

In order to achieve this, the framework in The Australian and New Zealand Environment Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC & ARMCANZ, 2000) water quality guidelines are adopted to guide the conservation of ambient water quality. These guidelines provide recommended trigger values that have been applied to understand the current health of the waterways and key indicators of concern. These guidelines should be regarded as highly conservative in relation to the current condition of the sampling locations.

4.2.2 Relevant guidelines

The framework for the contamination assessment made herein, was developed in accordance with guidelines “made or approved”, by the NSW EPA under Section 105 of the *Contaminated Land Management Act, 1997*. These guidelines include, but are not limited to the following:

– Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000).
– Consultants Reporting on Contaminated Land: Contaminated Land Guidelines, NSW EPA (NSW EPA, 2020).
– National Environmental Protection (Assessment of Site Contamination) Amendment Measure NEPM, National Environment Protection Council, NEPC (NEPC, 2013).
– NHMRC & NRMMC (2018) Australian Drinking Water Guidelines 6, 2011 (version 3.7 updated in January 2022) (NHMRC & NRMMC, 2011).
– NSW EPA, Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (NSW EPA, 2015).

4.2.3 Adopted assessment criteria

To assess and understand baseline groundwater quality conditions, assessment criteria have been adopted from ANZECC & ARMCANZ, 2000 (updated in 2018), NEPM (NEPC, 2013) and NHMRC & NRMMC (2011, v3.7 updated in 2022).

GHD conducted a search of existing registered groundwater bore records in the vicinity of the project area using the Bureau of Meteorology’s Australian Groundwater Explorer (BOM, 2024); accessed 1 October 2024, and identified four non-monitoring groundwater wells within 1000 m of the project area. These groundwater wells were identified as being used for commercial/industrial use, exploration, and water supply, stock and/or domestic purposes. The health screening level (HSL) for commercial/industrial were applied (HSL D) to represent the

proposed land use. As three wells used for water extraction purposes were identified within 1000 m of the project area, the Australian Drinking Water Guidelines (ADWG) (NHMRC & NRMMC, 2011) have been selected as the screening criteria protective of human health.

Health screening levels (HSL) for petroleum hydrocarbons

The NEPM (NEPC, 2013) provides guidance relating to the assessment of vapour risks from petroleum hydrocarbons. HSLs for petroleum hydrocarbons for commercial/industrial land use (HSL D) have been adopted for the groundwater assessment to characterise the risk posed to future commercial users of the project area by potential hydrocarbon vapour intrusion.

Groundwater Investigation Levels (GIL) for human health

As previously stated, ADWG v3.7, updated in January 2022 (NHMRC & NRMMC, 2011) health criteria have been adopted as a conservative approach to characterise the risk posed to users of the project area and potential off-site drinking water users by contaminants of potential concern (CoPC) via direct contact with groundwater. Drinking water criteria were considered due to the presence of four groundwater wells located within a 1000 m radius of the project area used for non-monitoring purposes.

Ecological assessment criteria

Ecological assessment criteria for the groundwater assessment has been considered due to the close proximity of numerous fresh water bodies throughout the project area, of which there is potential for groundwater to migrate. As such, the following guidelines were adopted for the protection of local freshwater systems.

– ANZG (2018) Freshwater – 95% level of species protection (slightly to moderately disturbed systems)
– ANZECC (2000) – Lowland Rivers (NSW Coastal Rivers)
– ANZECC (2000) – Stock Watering

These criteria were selected as it is possible for plants and/or freshwater bodies to come into contact with groundwater. Assessment criteria for slightly to moderately disturbed systems was considered to be appropriate, as the project area is neither undisturbed systems of high ecological value, nor highly disturbed systems with no to low ecological value.

5. Data assessment

5.1 Field measured groundwater quality parameters

Groundwater quality parameters measured in the field during the baseline monitoring period are summarised in Table B5, Appendix B, the construction monitoring period to date in Table B6, Appendix B, and the current monitoring period in Table B7, Appendix B. The field purging sheets are included in Appendix G.

Summary statistics of field parameters for all baseline monitoring events (April 2019 – July 2022), all construction monitoring events (August 2022 to March 2024), and the current monitoring events (April 2024 to October 2024) were calculated for sampling wells BH104/BH104R, BH107/BH107R, BH112/BH112R, and BH145R. A comparison of results between BH145 and BH145R is not included as BH145 was not installed correctly. This is based on less than one metre of groundwater recorded in BH145 with water in the well suspected to be from surface runoff infiltration.

These summary statistics included the 80th percentile concentrations of the field parameters, which can be used to define site-specific conditions during the pre-construction phase of the works. These summary statistics are presented in Sections 5.1.1 to 5.1.5 below. As of Report 10, calculation and comparison of the 20th percentiles are no longer included, with exception of those for DO, EC and pH as the low 20th percentile values pose a risk. This is due to consideration that for the majority of analytes and/or parameters, the 80th percentile is the main calculation of value for comparison due to a higher concentration of the analytes being the risk driver between each phase of works and the overall purposes of the M12 water monitoring program.

It is noted that the construction period summary statistics for BH112R do not include monitoring rounds between December 2022 to July 2023 where the well was inaccessible or was not yet available for groundwater sampling as the redrilled monitoring well had not been developed.

Graphs presenting the field parameters at each location since the beginning of the monitoring program are presented in Figures 1 to 5, Appendix C. It is noted that missing data points observed in Figures 1 to 5, Appendix C, are the result of field parameters unable to be collected due to access restrictions and/or insufficient water in well locations (see Table B1, Appendix B). The box plots are provided in Appendix D.

It is noted that there are differences in field parameters and laboratory analytical results between the old wells BH104, BH107, BH112, and BH145 with their replacements BH104R, BH107R, BH112R, and BH145R.

5.1.1 Dissolved oxygen (DO)

The 20th and 80th percentile DO concentrations calculated for the current and construction monitoring periods compared to the baseline monitoring period are presented in Table 5 below. Variations in DO concentrations across sampling locations and sampling events are presented in Figure 1, Appendix C. Boxplot comparisons between baseline and construction DO concentrations are presented in Figure 1, Appendix D.

Table 5 Summary statistics for dissolved oxygen

Dissolved Oxygen (mg/L)									
Phase:	**Current Monitoring Period**			**Construction Monitoring Period**			**Baseline Monitoring Period**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	**0.050**	**0.220**	26	**0.080**	1.200	34	0.372	2.058
BH107 / BH107R	6	0.670	0.940	24	**0.506**	**4.738**	31	0.670	3.530
BH112 / BH112R	6	**0.180**	0.570	18	**0.248**	**3.656**	29	0.558	2.926
BH145R	6	0.190	**2.030**	18	0.046	0.464	-	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R and BH112/BH112R: sits outside the baseline data (i.e. either below the 20th baseline percentile or above the 80th baseline percentile).

2. **BOLD** for BH145R: sits outside the construction data (i.e. either below the 20th construction percentile or above the 80th construction percentile).

The comparison of calculated percentiles for DO monitoring data in each well for the current and construction monitoring periods are summarised as follows:

– Current period:
  - BH104/BH104R: the 20th and 80th percentiles are below the 20th baseline percentile.
  - BH112/BH112R: the 20th percentile is below the baseline 20th percentile.
  - BH145R: the current period 80th percentile is above the construction 80th percentile.
– Construction period:
  - BH104/BH104R, BH107/BH107R and BH112/BH112R: all 20th percentiles are below the baseline 20th percentiles.
  - BH107/BH107R and BH112/BH112R: 80th percentiles are above the baseline 80th percentile.

The above comparison DO monitoring data indicates that all construction period 20th and 80th percentiles sit outside the baseline data for BH107/BH107R and BH112/BH112R. Meanwhile the 20th percentile for BH104/BH104R sits outside the baseline data (but 80th percentile sits within). Construction period measurements above the baseline in BH104/BH104R and BH107/BH107R may be attributed to increased DO results recorded since May 2023, and in BH112/BH112R, since August 2023.

5.1.2 Electrical conductivity (EC)

The 20th and 80th percentile EC concentrations calculated for the current and construction monitoring periods compared to the baseline monitoring period are presented in Table 6 below. Variations in EC concentrations across sampling locations and sampling events are presented in Figure 2, Appendix C. Boxplot comparisons between baseline and construction EC concentrations are presented in Figure 2, Appendix D.

Table 6 Summary statistics for electrical conductivity

Electrical Conductivity (µs/cm)									
Phase:	**Current Monitoring Period**			**Construction Monitoring Period**			**Baseline Monitoring Period**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	**6865**	**7707**	26	**6865**	**9152**	34	10442	16921
BH107 / BH107R	6	**3123**	**3367**	24	**3022**	**3568**	31	4654	9375
BH112 / BH112R	6	**13369**	**14698**	18	8083	**14939**	29	6479	12590
BH145R	6	15145	15664	18	13083	16871	-	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R and BH112/BH112R: sits outside the baseline data (i.e. either below the 20th baseline percentile or above the 80th baseline percentile).

2. **BOLD** for BH145R: sits outside the construction data (i.e. either below the 20th construction percentile or above the 80th construction percentile).

The comparison of calculated percentiles for EC monitoring data in each well for the current and construction monitoring periods are summarised as follows:

– Current period:
  - BH104/BH104R and BH107/BH107R the 20th and 80th percentiles sit below the baseline 20th percentile.
  - BH112R the 20th and 80th percentiles sit above the baseline 80th percentile.
– Construction period:
  - BH104/BH104R and BH107/BH107R: similar to the current period, the 20th and 80th percentiles sit below the baseline 20th percentile.
  - BH112/BH112R: the 80th percentile is above the 80th baseline percentile.

The above comparison for EC monitoring data indicates that all current period and the majority of construction period 20th and 80th percentiles sit outside the baseline data for BH104/BH104R, BH107/BH107R and

BH112/BH112R. The exceedances of the baseline percentiles in BH112/BH112R may be attributed to the limited size of the construction period data set in comparison to BH104/BH104R and BH107/BH107R.

EC measurements in BH112/BH112R increased by an order of magnitude after the replacement well BH112R was monitored for the first time in August 2023, where these concentrations have since remained elevated. Conversely in BH104/BH104R and BH107/BH107R, EC measurements have decreased since the monitoring of replacement wells BH104R and BH107R.

5.1.3 Redox conditions

The calculated redox measurements at the 80th percentile for the current and construction monitoring periods compared to the baseline monitoring period are presented in Table 7 below. Variations in redox concentrations across sampling locations and sampling events are presented in Figure 3, Appendix C. Boxplot comparisons between baseline and construction redox concentrations are presented in Figure 3, Appendix D.

Table 7 Summary statistics for redox

Redox (mV)						
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	140.20	26	237.20	34	272.08
BH107 / BH107R	6	261.50	24	**308.70**	31	291.40
BH112 / BH112R	6	298.10	18	**316.72**	29	301.18
BH145R	6	**163.30**	18	138.96	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

3. Redox is corrected for standard hydrogen electrode (SHE) by adding 205 mV to YSI redox potential reading

Redox monitoring data from the current monitoring period indicates that 80th percentile measurements are below the baseline 80th percentile measurements in BH104/BH104R, BH107/BH107R and BH112/BH112R. Redox monitoring data from the construction monitoring period indicates that 80th percentiles for BH107/BH107R and BH112/BH112R are above the baseline 80th percentiles. For BH145R, the 80th percentile for the current monitoring period exceeds the construction monitoring period 80th percentile.

It should be noted all redox measurements throughout the construction monitoring period and baseline period do not appear to show a trend.

5.1.4 pH

The 20th and 80th percentile pH values calculated for the current and construction monitoring periods compared to the baseline monitoring period are presented in Table 8 below. Variations in pH concentrations across sampling locations and sampling events are presented in Figure 4, Appendix C. Boxplot comparisons between baseline and construction pH concentrations are presented in Figure 4, Appendix D.

Table 8 Summary statistics for pH

pH									
Phase:	**Current Monitoring Period**			**Construction Monitoring Period**			**Baseline Monitoring Period**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	**6.76**	**6.82**	26	6.66	**6.84**	34	6.20	6.70
BH107 / BH107R	6	**6.98**	**7.11**	24	**6.97**	**7.33**	31	6.57	6.91
BH112 / BH112R	6	6.55	6.61	18	6.55	**6.89**	29	6.45	6.71
BH145R	6	6.56	6.67	18	6.53	6.77	-	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R and BH112/BH112R: sits outside the baseline data (i.e. either below the 20th baseline percentile or above the 80th baseline percentile).

2. **BOLD** for BH145R: sits outside the construction data (i.e. either below the 20th construction percentile or above the 80th construction percentile).

The comparison of calculated percentiles for pH monitoring data in each well for the current and construction monitoring periods are summarised as follows:

– Current period:
  - BH104/BH104R and BH107/BH107R the 20th and 80th percentiles are above the baseline 80th percentiles
  - BH145R: the 20th and 80th percentiles are within the construction 20th and 80th percentiles.
– Construction period:
  - BH104/BH104R: the 80th percentile is above the baseline 80th percentiles
  - BH107/BH107R the 20th and 80th percentiles are above the baseline 80th percentile.

The exceedances of the baseline 80th percentile in BH104/BH104R, BH107/BH107R and BH112/BH112R may be attributed to the increasing pH concentrations across these wells which has occurred as part of a trend that began in approximately February 2022, during the baseline monitoring period.

5.1.5 Temperature

The 80th percentile groundwater temperature values calculated for the current and construction monitoring periods compared to the baseline monitoring period are presented in Table 9 below. Variations in pH concentrations across sampling locations and sampling events are presented in Figure 5, Appendix C. Boxplot comparisons between baseline and construction groundwater temperature concentrations are presented in Figure 5, Appendix D.

Table 9 Summary statistics for temperature

Temperature (°C)						
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	19.9	26	19.9	34	20.1
BH107 / BH107R	6	19.7	24	19.9	31	20.2
BH112 / BH112R	6	19.9	18	**21.2**	29	20.2
BH145R	6	**20.1**	18	19.8	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Groundwater temperature data for the current monitoring period indicates that the current period 80th percentile is above the construction 80th percentile in BH145R. In addition, the construction 80th percentile for BH112/BH112R was above the baseline 80th percentile. In general, these exceedances are minor and may be attributed to warm weather conditions over the course of the current monitoring period (April 2024 to September 2024), or the limited size of the construction data set in comparison to the baseline data set, particularly in BH112/BH112R and BH145R.

5.2 Field observations

During groundwater purging, observations of visual and olfactory characteristics of the groundwater, such as colour, turbidity, odour, and sheen, were recorded alongside SWL and water quality measurements (as presented in Table B7, Appendix B). LNAPL was not detected in any of the sampled wells during the baseline and construction monitoring periods.

As discussed in Section 6, the measured SWL at monitoring well locations were relatively consistent across the monitoring period at BH107R, BH112R and BH145R with a slight decrease occurring at BH104R and BH145R and

some decrease at BH112R. As discussed in Section 5.1 and tabulated in Table B8, Appendix B, fluctuations in pH, temperature, oxidation / reduction potential, dissolved oxygen and electrical conductivity measurements were recorded across the monitoring period.

The observations for each well sampled during the current monitoring period are summarised in Table 10 below. Observations from all sampling events are provides in Tables B5 to B7, Appendix B.

Table 10 Summary of groundwater observations during current monitoring period

Well ID	Observations during current monitoring period (October 2023 to March 2024)
BH104R	Generally clear or with a pale yellow or grey tinge and slightly cloudy, no sheen and no odour except a sulphuric odour noted in July, August and September 2024.
BH107R	Clear or with a slightly cloudy appearance (April and August 2024), no odour or sheen.
BH112R	Clear, no odour or sheen.
BH145R	Clear or pale yellow or grey tinge (July and August 2024), though a slightly cloudy appearance was noted in August 2024, no odour or a slight sulphuric odour (July and September 2024), no sheen.

5.3 Laboratory analytical results

The laboratory analytical results of groundwater samples for the current monitoring period are tabulated in Table B4, Appendix B. All baseline results are tabulated in Table B2, Appendix B, and all construction results are tabulated in Table B3, Appendix B. Laboratory reports are provided in Appendix H. The analytical results of the current monitoring period were compared against relevant assessment criteria (as discussed in 4.2.3). A summary of CoPC exceedances and statistical summaries where exceedances of adopted assessment criteria occurred is presented below.

5.3.1 Major cations and anions

The major ions for each groundwater monitoring well are characterised graphically using a Piper diagram which can be used to identify whether the water quality at each location has changed over time. Piper diagrams for the baseline monitoring period are presented in Figure 1, the construction monitoring period to date in Figure 2, and the current monitoring period in Figure 3.

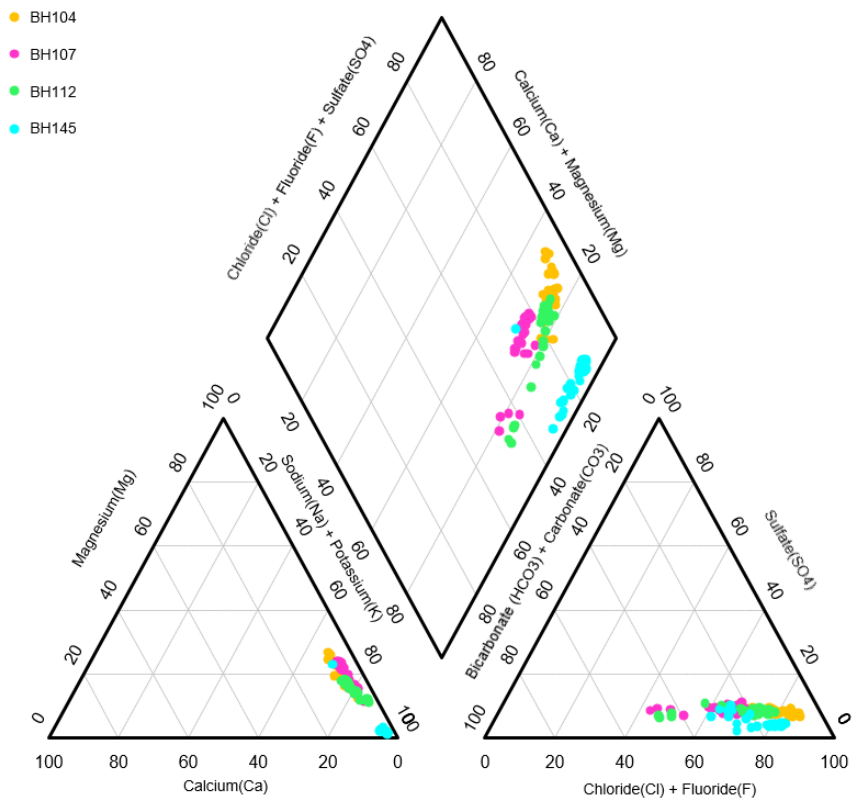


Figure 1 *Piper plot for groundwater changes throughout the baseline monitoring period (July 2019 to July 2022)*

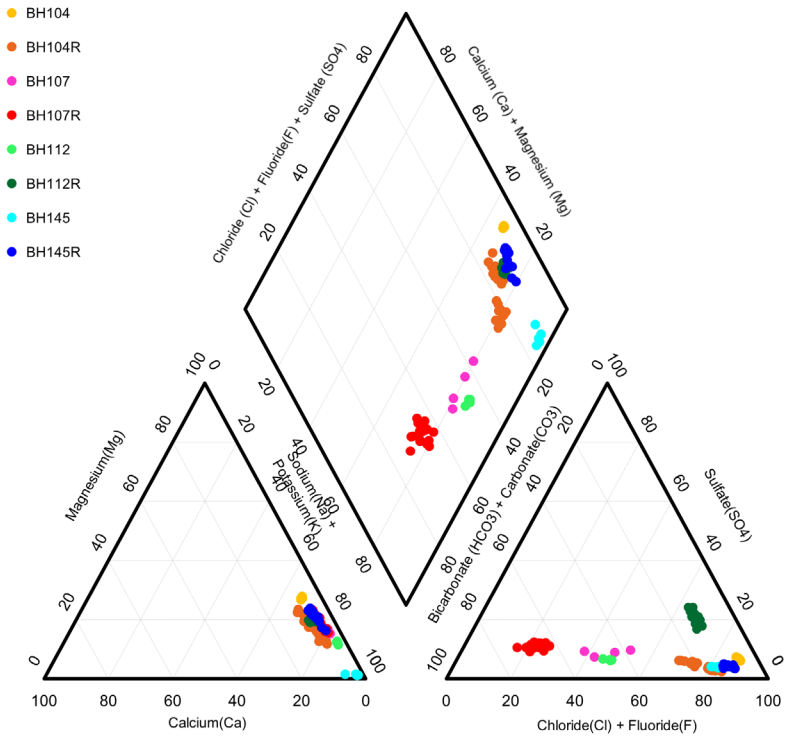


Figure 2 *Piper plot for groundwater changes throughout the construction monitoring period (August 2022 to September 2024)*

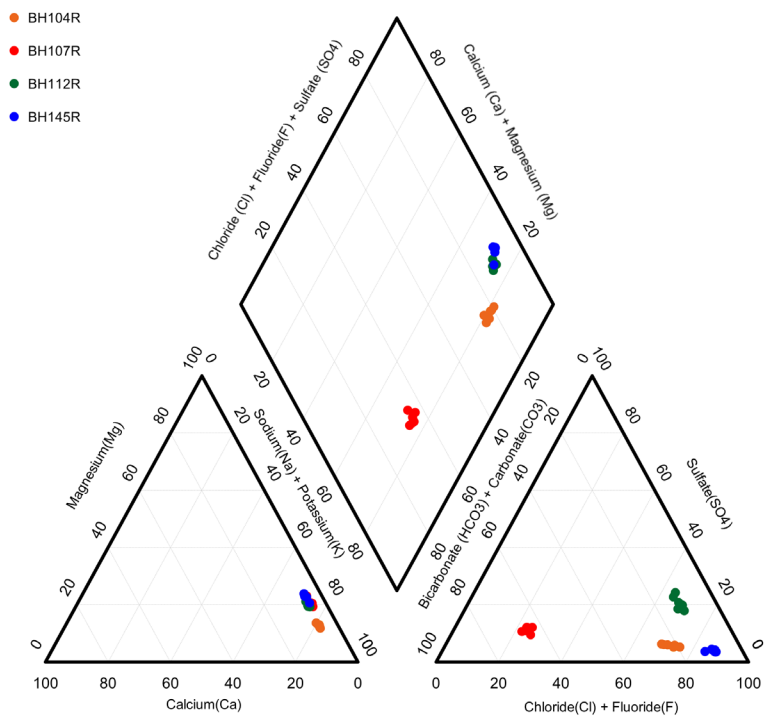


Figure 3 *Piper plot for groundwater changes throughout the current monitoring period (April 2024 to September 2024)*

In the baseline period, all monitoring wells recorded groundwater dominated by sodium chloride, resembling marine water composition. This may be due to the underlying shale and fluvial clay deposits (former marine origins). BH145 recorded a higher sodium chloride concentration when compared to the western wells BH104, BH107 and BH112. The western wells recorded higher calcium and magnesium concentrations when compared to eastern well BH145.

In the construction period, it can be observed from Figure 2 that major cations and anions in replacement wells are different from their original wells. In the current period, Figure 3 presents that BH104R, BH112R and BH145R recorded groundwater dominated by sodium chloride, and BH107R recorded groundwater dominated by sodium bicarbonate. In BH107R the dominant compound change between the baseline period and current period is attributable to the lower concentrations of sodium and chloride and bicarbonate concentration in the replacement well compared to the original well. In BH145R, major ion concentrations are considerably higher than the original well indicating a difference in groundwater chemistry.

BH107R is more indicative of freshwater than the other monitoring wells and has a varied physiochemical profile compared to the other groundwater wells, this may be due to the monitoring well installation. The installation was based on the original install for BH107, however the lithology is slightly different and the filter pack for the screen is within the unconsolidated residual soils allowing fresh water infiltration from the surface into the well. Whereas all the other monitoring wells the screen and filter packs are wholly within the consolidated bedrock.

5.3.2 Nutrients

All groundwater samples reported concentrations above the LOR for at least one nutrient compound in the current monitoring period.

Comparisons between summary statistics for nutrient concentrations in monitoring wells for sampling events throughout the baseline monitoring period (April 2019 to July 2022), the construction monitoring period (August 2022 to September 2024), and the current monitoring period (April 2024 to September 2024) are provided in Table 11 to Table 16.

Boxplots comparisons between the baseline monitoring period and the construction monitoring period for ammonia, nitrate, total oxidised nitrogen (as N), total nitrogen, and total phosphorus are provided in Figures 6 to 10, Appendix D.

Table 11 Summary statistics for ammonia

Ammonia (mg/L)						
Adopted criterion	ANZG 2018 – 95% Freshwater: 0.090 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	**1.810**	26	**1.700**	35	0.328
BH107 / BH107R	6	0.040	24	**0.148**	32	0.070
BH112 / BH112R	6	**2.570**	18	**2.534**	32	1.978
BH145R	6	**2.300**	18	2.206	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Construction and current period 80th percentiles for ammonia were above the baseline 80th percentile in BH104/BH104R and BH112/BH112R. In BH107/BH107R, only the construction 80th percentile is above the baseline 80th percentile. In BH145R, the current period 80th percentile is slightly above the construction 80th percentile.

This increase in concentrations above the baseline can be attributed to the drilling of the replacement wells. It is noted that the current period 80th percentile concentration in BH107R is similar to the baseline 80th percentile indicating that the concentration has slowly reduced over time.

Table 12 Summary statistics for nitrate

Nitrate (mg/L)						
Adopted criterion	ANZG 2018 – 95% Freshwater: 2.40 mg/L					
	ADWG 2011 – Health: 11.29 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.010	26	0.050	35	0.122
BH107 / BH107R	6	2.300	24	**3.110**	32	2.484
BH112 / BH112R	6	0.400	18	1.210	32	1.922
BH145R	6	**0.040**	18	0.016	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Construction period 80th percentiles for nitrate are above the baseline 80th percentile in BH107/BH107R, with current period 80th percentile concentrations above the construction period 80th percentile in BH145R. The increase in concentrations above the baseline at BH107/BH107R for the construction period is attributed to significant increases in BH107 between May 2022 and November 2022. These started at the end of the baseline period and therefore not attributed to the construction of the project. The concentrations of nitrate in the replacement well (BH107R) were significantly lower and are reflected in the statistics for the current period.

Table 13 Summary statistics for nitrite

Nitrite (mg/L)						
Adopted criterion	ADWG 2011 – Health: 11.29 mg/L					
	ANZECC 2000 – Stock Watering: 9.1 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.010	26	**0.020**	35	0.010
BH107 / BH107R	6	0.010	24	**0.026**	32	0.020
BH112 / BH112R	6	**0.050**	18	**0.250**	32	0.018
BH145R	6	0.010	18	0.010	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

In BH112/BH112R, current and construction period 80th percentiles are above the baseline 80th percentile. In BH104/BH104R and BH107/BH107R, only the construction period 80th percentiles are above the baseline 80th percentiles.

Nitrite concentrations in BH104/BH104R and BH107/BH107R have been fluctuating at levels above the baseline since the beginning of the construction period. Since monitoring of the redrilled well BH112R, nitrite concentrations have been steadily decreasing from 2 mg/L (August 2023) to 0.02 mg/L (March 2024), suggesting that nitrite concentrations may eventually stabilise within baseline concentrations.

Table 14 Summary Statistics for total oxidised nitrogen

Nitrogen (Total Oxidised) (as N) (mg/L)						
Adopted criterion	ANZECC 2000 – Lowland Rivers: 0.04 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.010	26	0.060	35	0.122
BH107 / BH107R	6	2.300	24	**3.110**	32	2.534
BH112 / BH112R	6	0.450	18	1.904	32	1.922
BH145R	6	**0.040**	18	0.020	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Construction period 80th percentiles for total oxidised nitrogen are above the baseline 80th percentile in BH107/BH107R, with current period 80th percentile concentrations above the construction period in BH145R.

The increase in concentrations above the baseline at BH107/BH107R is attributed to significant increases in BH107 between May 2022 and November 2022, with concentrations in the replacement well (BH107R) significantly lower. For the current monitoring period, the concentration of total oxidised nitrogen is decreasing in BH107R as the 80th percentile is below the construction 80th percentile, indicating a decreasing trend.

Table 15 Summary statistics for total nitrogen

Total Nitrogen (mg/L)						
Adopted criterion	ANZECC 2000 – Lowland Rivers: 0.35 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	**2.100**	26	**2.500**	35	1.26
BH107 / BH107R	6	2.600	24	**4.160**	32	3.08
BH112 / BH112R	6	3.400	18	**4.560**	32	3.84
BH145R	6	**3.000**	18	2.420	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Construction and current period 80th percentiles for total nitrogen are above the baseline 80th percentile in BH104/BH104R. Furthermore, construction period 80th percentiles are above baseline 80th percentiles only for BH107/BH107R and BH112/BH112R. Current period 80th percentile concentration is above the construction 80th percentile at BH145R.

The increase in construction period concentrations above the baseline at BH104/BH104R and BH107/BH107R is attributed to significant increases in BH104 and BH107 between May 2022 and November 2022, with concentrations in replacement wells significantly lower. Since monitoring of the redrilled well BH112R, total nitrogen concentrations have been steadily decreasing.

Table 16 Summary statistics for total phosphorus

Total Phosphorus (mg/L)						
Adopted criterion	ANZECC 2000 – Lowland Rivers: 0.025 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.100	26	**0.180**	35	0.108
BH107 / BH107R	6	0.040	24	0.112	32	0.222
BH112 / BH112R	6	0.140	18	0.338	32	0.432
BH145R	6	0.070	18	0.102	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Construction period 80th percentiles for total phosphorus are above the baseline 80th percentile in BH104/BH104R.The increase in construction period concentrations above the baseline at BH104/BH104R is attributed to increases recorded since monitoring began in the replacement well. Total phosphorus has been reduced at all locations during the current monitoring period.

5.3.3 Metals

Comparisons between summary statistics for metal concentrations in monitoring wells for sampling events throughout the baseline monitoring period (April 2019 to July 2022), the construction monitoring period (August 2022 to September 2024), and current monitoring period (April 2023 to September 2024) are provided in Table 17 to Table 26. Boxplot comparisons between the baseline monitoring period and the construction monitoring period for copper and manganese are provided in Figures 11 and 12, Appendix D.

Table 17 Summary statistics for arsenic

Arsenic (mg/L)						
Adopted criterion	ADWG 2011 – Health: 0.01 mg/L					
	ANZG 2018 – 95% Freshwater: 0.013 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	**0.003**	26	**0.003**	35	0.001
BH107 / BH107R	6	0.001	24	0.001	32	0.001
BH112 / BH112R	6	**0.003**	18	**0.007**	32	0.001
BH145R	6	0.004	18	0.008	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Table 18 Summary statistics for cadmium

Cadmium (mg/L)						
Adopted criterion	ADWG 2011 – Health: 0.002 mg/L					
	ANZG 2018 – 95% Freshwater: 0.0002 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.0001	26	0.0001	35	0.0001
BH107 / BH107R	6	0.0001	24	0.0001	32	0.0001
BH112 / BH112R	6	0.0001	18	0.0001	32	0.0001
BH145R	6	0.0001	18	0.0001	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Table 19 Summary statistics for chromium

Chromium (mg/L)						
Adopted criterion	ANZG 2018 – 95% Freshwater: 0.001 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.001	26	0.001	35	0.001
BH107 / BH107R	6	0.001	24	0.001	32	0.001
BH112 / BH112R	6	0.001	18	0.001	32	0.001
BH145R	6	0.001	18	0.001	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Table 20 Summary statistics for copper

Copper (mg/L)						
Adopted criterion	ANZG 2018 – 95% Freshwater: 0.0014 mg/L					
	ADWG 2011 – Health: 2 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.001	26	0.002	35	0.0276
BH107 / BH107R	6	0.002	24	0.005	32	0.0324
BH112 / BH112R	6	0.006	18	0.007	32	0.0328
BH145R	6	0.001	18	0.001	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Table 21 Summary statistics for iron

Iron (mg/L)						
Adopted criterion	None					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	**1.43**	26	**1.38**	24	1.05
BH107 / BH107R	6	0.05	24	0.05	23	0.16
BH112 / BH112R	6	0.05	18	0.05	23	0.18
BH145R	5	3.03	17	4.33	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Table 22 Summary statistics for lead

Lead (mg/L)						
Adopted criterion	ANZG 2018 – 95% Freshwater: 0.0034 mg/L					
	ADWG 2011 – Health: 0.01 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.001	26	0.001	35	0.001
BH107 / BH107R	6	0.001	24	0.001	32	0.001
BH112 / BH112R	6	0.001	18	0.001	32	0.001
BH145R	6	0.001	18	0.001	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Table 23 Summary statistics for manganese

Manganese (mg/L)						
Adopted criterion	ANZG 2018 – 95% Freshwater: 1.9 mg/L					
	ADWG 2011 – Health: 0.5 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.103	26	0.250	24	0.6990
BH107 / BH107R	6	0.006	24	0.079	23	0.5016
BH112 / BH112R	6	0.094	18	0.124	23	0.2658
BH145R	5	0.180	17	0.351	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Table 24 Summary statistics for mercury

Mercury (mg/L)						
Adopted criterion	ANZG 2018 – 95% Freshwater: 0.0006 mg/L					
	ADWG 2011 – Health: 0.001 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.0001	26	0.0001	35	0.0001
BH107 / BH107R	6	0.0001	24	0.0001	32	0.0001
BH112 / BH112R	6	0.0001	18	0.0001	32	0.0001
BH145R	6	0.0001	18	0.0001	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Table 25 Summary statistics for nickel

Nickel (mg/L)						
Adopted criterion	ANZG 2018 – 95% Freshwater: 0.011 mg/L					
	ADWG 2011 – Health: 0.02 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.0010	26	0.0080	35	0.1054
BH107 / BH107R	6	0.0010	24	0.0032	32	0.0696
BH112 / BH112R	6	0.0060	18	0.0132	32	0.1162
BH145R	6	0.0020	18	0.0152	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Table 26 Summary statistics for zinc

Zinc (mg/L)						
Adopted criterion	ANZG 2018 – 95% Freshwater: 0.008 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	0.0080	26	0.0120	35	0.0962
BH107 / BH107R	6	0.0130	24	0.0146	32	0.0848
BH112 / BH112R	6	0.0330	18	0.0274	32	0.1276
BH145R	6	**0.0080**	18	0.0076	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Current and construction period 80th percentiles for the majority of metals were below the baseline 80th percentile, with the exception of the following:

– Arsenic: current and construction period 80th percentile concentrations were reported above the baseline in BH104/BH104R and BH112/BH112R. This may be attributable to increased concentrations coinciding with the monitoring of the replacement wells, where arsenic concentrations in BH112R and BH145R have been steadily decreasing since first being monitored.
– Iron: current and construction 80th percentile concentrations were reported above the baseline in BH104/BH104R. This may be attributed to higher concentrations recorded since the installation of BH104R, with concentrations since the monitoring of replacement wells above the maximum recorded concentrations in the baseline period.

The majority of groundwater samples collected during the current monitoring period reported heavy metal concentrations below the LOR and/or adopted assessment criteria. The reported concentrations and exceedances are discussed below.

– **Arsenic (filtered):** All groundwater samples reported arsenic concentrations below the adopted criteria.
– **Cadmium (filtered):** All groundwater samples reported cadmium concentrations below the laboratory LOR (0.0001 mg/L) and adopted criteria.
– **Chromium (filtered)**: All groundwater samples reported chromium concentrations below the LOR (0.001 mg/L) and the adopted criteria.
– **Copper (filtered)**: Exceedances of the adopted ANZG ecological criterion (0.0014 mg/L) for copper were reported in the following groundwater samples:
  - BH104R in June 2024 (0.003 mg/L) and GWDUP2 interlaboratory duplicate sample in September 2024 (0.002 mg/L). It is noted that the primary sample at BH104R in September 2024 reported a copper concentration below the LOR.
  - BH107R in majority of events (maximum 0.003 mg/L), with the exception of primary samples in April 2024 and August 2024. It is noted that the duplicate sample in April 2024 (GWDUP2) did exceed the ANZG ecological criterion (0.002 mg/L) while in August 2024 (GWDUP1) was below the LOR.
  - BH112R in all events (maximum 0.008 mg/L).

  All other concentrations remained below or equal to the LOR. All reported concentrations remained below human health and stock watering criteria.
– **Iron (filtered)**: All groundwater samples in BH104R and BH145R for the current monitoring period reported iron concentrations above the LOR and BH107R were below the LOR. The majority of iron concentrations for BH112R were also below the LOR, except for the August 2024 event which reported 0.3 mg/L. The maximum concentration reported was in BH145R in August 2024 (3.13 mg/L). There are no adopted assessment criteria for iron.

- **Lead (filtered)**: The majority of groundwater samples reported lead concentrations below the LOR (0.001 mg/L), with the exception of BH112R in August 2024 which reported 0.001 mg/L which was below all adopted criteria.
- **Manganese (filtered)**: All groundwater samples reported manganese concentrations above the LOR. The maximum concentration reported was in BH145R in April 2024 (0.238 mg/L). There were no exceedances of the human health or ecological criterion.
- **Mercury (filtered)**: All groundwater samples reported mercury concentrations below the LOR (0.0001 mg/L) and all adopted assessment criteria.
- **Nickel (filtered)**: All groundwater samples in BH112R and the majority of groundwater samples in BH107R, BH104R and BH145R reported nickel concentrations at or above the LOR (0.001 mg/L). The following locations reported concentrations above the adopted human health (0.02 mg/L) and/or ANZG ecological (0.011 mg/L) assessment criteria:
  - BH104R in August 2024 (0.011 mg/L). It is noted that the duplicate sample (GWDUP2) at BH104R in August 2024 reported a nickel concentration (0.010 mg/L) below the adopted human health and ANZG ecological assessment criteria.
  - BH112R in August 2024 (0.048 mg/L).
  - BH145R in August 2024 (0.024 mg/L).

  All reported concentrations were below the stock watering criteria.
- **Zinc (filtered)**: The following samples reported concentrations above the ANZG ecological criterion (0.008 mg/L).
  - BH104R in July and August 2024 (maximum 0.018 mg/L). It is noted that the duplicate sample (GWDUP1) at BH104R in July 2024 reported a zinc concentration below the LOR.
  - BH107R between April and August 2024 (maximum 0.017 mg/L). It is noted that the primary sample at BH107R in April 2024 reported a zinc concentration (0.006 mg/L) below the adopted human health and ANZG ecological assessment criteria. Furthermore, the duplicate sample (GWDUP1) in August 2024 reported a zinc concentration below the LOR.
  - BH112R in all events (maximum 0.042 mg/L)
  - BH145R in May to August 2024 (maximum 0.015 mg/L). It is noted that the primary sample at BH145R in June 2024 reported a zinc concentration below the LOR.

5.3.4 Hardness

(ANZECC & ARMCANZ, 2000) stated that the toxicity of certain heavy metals in freshwater reduces with increasing hardness. As such, hardness-modified trigger values (HMTV) were derived for selected metals exceeding ecological criteria (cadmium, chromium, lead, nickel and zinc) during the baseline and current monitoring period using guidance by ANZECC & ARMCANZ (2000). This provides a more accurate assessment of risk to ecological receptors. It is noted that HMTV algorithms are not able to be applied to iron and manganese.

Exceedances of adopted criteria were eliminated following the application of HMTVs for cadmium, chromium, lead, nickel and zinc, with the exceptions summarised in Table 27. No exceedances were detected during the current monitoring period (April 2024 to September 2024). Exceedances still exist as copper HMTV are not able to be derived by this method.

Table 27 Exceptions to exceedances of adopted criteria following application of HMTVs

Metal	Well ID	Events
Chromium	BH145	January 2021
Nickel	BH104R/BH104R	March 2022
	BH107/BH107R	March 2022
	BH112/BH112R	May 2021 March 2022
	BH145	September 2020 November 2020 December 2020 March 2021
Zinc	BH107/BH107R	December 2021 January 2022 March 2023
	BH112/BH112R	December 2021
	BH145	All monitoring events between September 2020 and February 2023, with the exception of October 2021

This indicates that the toxicity of metals within all groundwater monitoring wells is being reduced due to the presence of hard water during the current monitoring round. It is noted that continual exceedances of the zinc HMTV at BH145 were eliminated once BH145R was installed and monitored from April 2023.

Hardness-modified trigger values and associated heavy metal concentrations for all monitoring events are presented in Table B8, Appendix B.

5.3.5 Benzene, toluene, ethylbenzene, xylene, naphthalene (BTEXN)

The majority of groundwater samples collected in the current monitoring period reported concentrations of BTEXN below the laboratory LOR and adopted criteria. One exceedance of the adopted human health criteria of 1 µg/L was reported for benzene at BH145R in July 2024.

5.3.6 Total recoverable hydrocarbons (TRH)

All groundwater samples collected in the current monitoring period reported concentrations of TRH below the laboratory LOR and adopted criteria.

5.3.7 Polycyclic aromatic hydrocarbons (PAHs)

No samples were analysed for PAHs during this monitoring round.

5.3.8 Speciated phenols

No samples were analysed for speciated phenols during this monitoring round.

5.3.9 Total suspended solids (TSS)

All groundwater samples reported TSS concentrations above the laboratory LOR of 5 mg/L for total suspended solids (TSS) and the adopted lowland rivers criterion (ANZECC, 2000). This parameter has been analysed from July 2020 onwards. Table 28 presents the maximum and average concentrations of TSS over the baseline monitoring period (July 2020 to July 2022), compared to the construction monitoring period (August 2022 to September 2024), and current monitoring period (April 2024 to October 2024) for each monitoring well.

Table 28 Maximum and average concentration of total suspended solids in monitoring wells

Total Suspended Solids (mg/L)						
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	Maximum	Average	Maximum	Average	Maximum	Average
BH104 / BH104R	89	65	405	116	219	48
BH107 / BH107R	28	22	1890	208	1910	271
BH112 / BH112R	115	51	2710	526	8780	937
BH145R	464	110	464	94	-	-

Average concentrations were above the baseline average for the current monitoring period in BH104R only, with groundwater well BH145R reporting higher maximum and average concentrations than other monitoring wells. The highest concentration in the current monitoring period was reported in BH145R in July 2024 (464 mg/L).

Comparisons between summary statistics for TSS concentrations in monitoring wells for sampling events throughout the baseline monitoring period, the construction monitoring period, and the current monitoring period (April 2024 to September 2024) are provided in Table 29.

Table 29 Summary statistics for total suspended solids

Total Suspended Solids (mg/L)						
Adopted criterion	ANZECC 2000 – Lowland Rivers (NSW coastal rivers): 6 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	**72**	26	**144**	24	61
BH107 / BH107R	6	27	24	252	23	275
BH112 / BH112R	6	51	18	**1198**	23	726
BH145R	6	53	18	106	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Construction period 80th percentiles for BH104/BH104R and BH112/BH112R exceed the baseline period 80th percentiles for TSS, with the current period 80th percentile at BH104/BH104R also above the baseline.

Construction period exceedances above the baseline at BH104/BH104R are attributed to increased concentrations in replacement well BH104R compared to BH104. TSS concentrations in BH104/BH104R since reinstatement have fluctuated between 100 mg/L and 405 mg/L. Exceedances above the baseline at BH112/BH112R can be attributed to increased concentrations between June 2022 and January 2023, with concentrations in the replacement well significantly lower.

5.3.10 Total Dissolved Solids (TDS)

All samples in the current monitoring period reported TDS concentrations above the laboratory LOR (10 mg/L). Ecological and human health criteria are generally not applied to total dissolved solids as it is an aesthetic issue; however, the ADWG (NHMRC & NRMMC, 2011) states that concentrations exceeding 1200 mg/L are regarded as unacceptable drinking water. All samples exceeded this limit. Table 29 presents the maximum and average concentrations of TDS over the baseline monitoring period (July 2020 to July 2022), compared to the construction monitoring period (August 2022 to September 2024), and current monitoring period (April 2024 to September 2024) for each monitoring well.

Table 30 Maximum and average concentration of total dissolved solids in monitoring wells

Total Dissolved Solids (mg/L)						
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	Maximum	Average	Maximum	Average	Maximum	Average
BH104 / BH104R	4910	4695	16500	6605	15400	8374
BH107 / BH107R	2330	2235	3200	2378	6360	4753
BH112 / BH112R	10400	9972	11400	8421	8470	6093
BH145R	11100	9500	14500	9846	-	-

Groundwater concentrations at BH112R and BH145R reported higher maximum concentrations an order of magnitude higher than BH104R and BH107R. The highest concentration in the current monitoring period was reported in BH145R in September 2024 (11,100 mg/L).

Table 31 Summary statistics for total dissolved solids

Total Suspended Solids (mg/L)						
Adopted criterion	ANZECC 2000 – Lowland Rivers (NSW coastal rivers): 6 mg/L					
Phase:	**Current Monitoring Period**		**Construction Monitoring Period**		**Baseline Monitoring Period**	
Location ID	N	80th %ile	N	80th %ile	N	80th %ile
BH104 / BH104R	6	4860	26	5450	24	9778
BH107 / BH107R	6	2270	24	2698	23	6210
BH112 / BH112R	6	**10100**	18	**10520**	23	8290
BH145R	6	10800	18	11580	-	-

Notes: 1. **BOLD** for BH104/BH104R, BH107/BH107R, BH112/BH112R: sits above the baseline data for the 80th baseline percentile.

2. **BOLD** for BH145R: sits above the construction data for the 80th construction percentile.

Current and construction period 80th percentiles are above the baseline 80th percentile in BH112/BH112R.

Exceedances above the baseline in the construction period for BH112/BH112R are attributed to increased TDS concentrations recorded between May 2022 and November 2022, with concentrations reducing after the monitoring of replacement well BH112R in August 2023. The current period increases in 80th percentile can be attributed to increased TDS concentrations recorded between April and July 2024.

6. Groundwater level monitoring

6.1 Schedule of groundwater well locations

As defined in C71, addendum 2 of the GHD proposal (GHD, 2021c), GHD would monitor groundwater levels from the four groundwater sampling locations (BH104, BH107, BH112, BH145) on a monthly basis and twenty-five existing groundwater monitoring wells on a bimonthly basis (every second month) during the construction monitoring phase. Newly installed replacement sampling wells BH104R, BH107R, BH112R, and BH145R are monitored monthly during the construction phase, depending on accessibility, as the original four wells have been decommissioned. Groundwater level monitoring is conducted manually using a dip-meter and using water level meters (WLM) installed in the wells. Some wells could not be monitored for groundwater level due to inaccessible wells, destroyed wells, or damaged WLMs.

The schedule of wells required to be sampled is listed in Table 32 below, and notes if the scheduled wells were successfully monitored. Remaining groundwater wells have water level meters (WLM) mounted to the underside of the well caps unless noted in the Table. This ensures data processing is as accurate as possible.

Table B1, Appendix B identifies the wells successfully gauged and wells that were not monitored due to inaccessibly or decommissioning, including the month they were last gauged.

Table 32 Schedule of M12 groundwater level wells monitored by GHD from August 2022 to September 2024

Installed by	Well ID	Package	RL (m, AHD)	Manual gauging data	WLM data	Well Status
JAJV	BH102	West	92.19	No	No	Destroyed
JAJV	BH104	West	101.11	No	No	Destroyed
JBS&G	BH104R	West	100.269	Yes	Yes	Monitoring Well
JAJV	BH105	West	92.7	No	No	Destroyed
JAJV	BH107	West	94.63	No	No	Destroyed
JBS&G	BH107R	West	95.566	Partial	Yes	Monitoring Well
JAJV	BH112	West	93.78	No	No	Destroyed
ADE	BH112R	West	93.663	Partial	Partial	Monitoring Well
JAJV	BH117	West	65.05	No	No	Destroyed
JAJV	BH119	West	54.0	No	No	Destroyed
JAJV	BH129	Central	49.12	No	No	Destroyed
JAJV	BH134	Central	57.94	No	No	Destroyed
JAJV	BH135	Central	60.55	No	No	Destroyed
JAJV	BH139	Central	101.1	No	No	Destroyed
JAJV	BH144	Central	113.5	No	No	Destroyed
JAJV	BH145	Central	116.3	No	No	Destroyed
MMGEO	BH145R	Central	113.153	Yes	Yes	Monitoring Well
JAJV	BH150	Central	109.5	No	No	Destroyed
JAJV	BH155	East	121.6	Yes	No[1]	Destroyed
JAJV	BH162	East	118.62	Yes	Yes	Destroyed after Oct 2023
JAJV	BH170	East	92.41	No	No	Unable to locate
JAJV	BH175	East	80.34	Yes	No	Gauging Well
JAJV	BH202	West	49.53	No	No	Destroyed

Installed by	Well ID	Package	RL (m, AHD)	Manual gauging data	WLM data	Well Status
JAJV	BH204	West	50.24	No	No	Destroyed
JAJV	BH207	West	40.03	No	No	Destroyed
JAJV	BH209	West	39.36	No	No	Destroyed
JAJV	BH211	Central	37.72	No	No	Destroyed
JAJV	BH215	Central	37.77	No	No	Destroyed
JAJV	BH217	Central	40.49	No	No	Destroyed
JAJV	BH219	Central	44.46	Yes	Yes	Destroyed after June 2024
JAJV	BH221	Central	45.24	No	No	Destroyed
JAJV	BH223	Central	46.26	No	No	Destroyed
JAJV	BH227	Central	Unknown	No	No	Destroyed

[1] BH155 did not have a logger as it was dry

6.2 Data collection and analysis methodology

The methodology to collect the groundwater level data is indicatively as follows:

1. Remove gatic cover and well cap. The WLM is removed from the groundwater well during this process.
2. A manual reading of the standing water level is collected using a calibrated interface probe (IP). This is done to ensure reliability of the data collected with the WLM. Measurements are taken to the nearest millimetre.
3. The data from the WLM is then downloaded to the commercially available relevant computer software package “HOBOware Pro”, “Levelogger” or “Win-Situ”. The data is collected as absolute pressure (kPa).
4. WLM is replaced into the groundwater well and gatic cover secured.
5. Data is then processed against the atmospheric pressure data and converted to 1 meter of water column (mH_2O). It is then plotted against groundwater well RL and plotted.

6.3 Manual gauging

Manual gauging results reported during the current monitoring period (April to September 2024) are presented in Table B9, Appendix B.

Depth to groundwater for the current monitoring period (April 2024 to September 2024) ranged between 81.608 m AHD (BH112R, September 2024) and 102.013 m AHD (BH145R, July 2024) in the four monitoring wells.

Groundwater elevation to Australian Height Datum (AHD) is lowest at BH112R and highest at BH104R for the group of monitoring wells BH104/BH104R, BH107/BH107R and BH112/BH112R. These wells are located on a linear alignment and therefore triangulation for groundwater flow is unable to be determined. However, based on the local topography the groundwater flow is likely to flow in a north-east direction. BH145R is located east of the other wells and there are no other wells nearby to determine groundwater flow. However, based on the local topography groundwater is likely to flow towards the south in this area.

The approximate groundwater elevation of the gauging wells with results from the current monitoring round are plotted in Appendix I.

Groundwater levels obtained by manual reading across the monitoring and gauging wells throughout the current monitoring period are summarised as follows:

– BH104R: decreased by approximately 0.39 m.
– BH107R, BH112R and BH145R: remained relatively stable.
– BH175 increased by approximately 0.85 m.
– BH219 increased by approximately 0.28 m (April to June 2024)

6.4 Results

Manual gauging data is presented in Table B9, Appendix B, and groundwater level plots are presented in Appendix I.

The groundwater level monitoring results are presented on RL vs time plots. A secondary axis shows daily rainfall data downloaded from the Bureau of Meteorology website for the Badgerys Creek AWS Station (ID 067108) which is located approximately 4 km southeast of the western project area (BH104/BH104R, BH107/BH107R and BH112/BH112R) and approximately 9 km west of the eastern project area (BH145/BH145R). It is noted that for the current monitoring period five wells have WLM data within the current monitoring period (April 2024 to September 2024) and one well with WLM data within the partial monitoring period (April to June 2024). The remaining wells, as outlined in Table 32, have either been destroyed or were inaccessible, as noted in Table B1, Appendix B.

In the western area, only the groundwater quality monitoring wells remain out of all gauging wells. The groundwater levels in these wells are summarised as follows:

BH104R steadily decreased from December 2022 to July 2023, and between July 2023 and August 2023, the water level dropped approximately 1.2 m. Between August 2023 and November 2023, the water level remained relatively stable and has been slightly increasing with an increase of approximately 0.6 m from November 2023 to March 2024. From April to September 2024 water levels remain relatively stable with a slight overall decreasing trend.

BH107R remained relatively stable though with a very slight decrease (less than 0.1 m), continuing an overall decreasing trend observed in BH107R since it was installed in December 2022. Water levels in BH107R remained above screen throughout the current monitoring period.

BH112R remained relatively stable although does continue an overall slightly decreasing trend with a change in water level of approximately one metre from the first measurement in August 2023 to the most recent measurement in September 2024.

In the central area, water levels in replacement well BH145R remained relatively stable over the current monitoring period. BH145, which was decommissioned in April 2023, only had a small amount of water column within the well when monitored during previous monitoring rounds and had slow to no recharge once the water was removed and, therefore, the groundwater levels in BH145 are not indicative of the surrounding area. Gauging well BH219 increased by 0.28 m throughout April to June 2024, likely due to increases in rainfall across the project area during this period. However no further gauging or monitoring data was collected from August 2024 as the well was destroyed during construction work at an adjacent project. All other gauging wells in the central area have been destroyed.

In the eastern area, water levels in BH175 had an increasing trend, rising by 0.85 m during the monitoring period. The increase in the current monitoring period disrupted the previous decreasing trend from September 2022 to March 2024. However, recent water levels are still within range of historical water levels recorded since May 2019 to present and coincide with increases in rainfall across the project area between April and July 2024. All other gauging wells in the eastern area have been destroyed or were unable to be located.

7. Conclusions

The measured groundwater quality parameters and the project analytical suite have provided further data to incorporate into the construction monitoring period percentile values. The reported field parameters and concentration of analytes in the current monitoring period are broadly consistent with those reported in the baseline monitoring period, with noted increases in some field parameters, nutrients and metals concentrations. Changes in groundwater chemistry were noted as BH107R was dominated by sodium bicarbonate in the current monitoring period, while BH104R, BH112R and BH145R are dominated by sodium chloride. These changes have occurred with the replacements of the monitoring wells and therefore no management actions are required cumulating from this monitoring period.

As the data reported in the redrilled monitoring wells of BH104R, BH107R, BH112R, and BH145R are not similar to the original monitoring wells data (both for construction and baseline), a full comparison of the dataset has not been provided.

8. References

ANZECC & ARMCANZ. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Canberra: Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ.

ANZECC. (2000). *Criteria for lowland rivers (NSW coastal rivers).*

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

BOM. (2024). Australian Groundwater Explorer. Bureau of Meterology. Retrieved from Australian Groundwater Explorer: http://www.bom.gov.au/water/groundwater/explorer/

BOM. (2024). *Climate Data Online Long-term Rainfall and Temperature - Station ID 067108.* Bureau of Meteorology.

CPB Georgiou JV. (2023). Appendix C Construction Soil and Water Monitoring Program M12 Motorway West April 2023 Rev 01. *Construction Environmental Management Plan Appendix B8 Construction Soil and Water Management Sub-plan M12 Motorway West April 2023 Rev 01*.

DPI. (2014, April). Water for livestock: interpreting water quality tests. Department of Primary Industries.

Geological Survey of NSW. (1991). *Penrith 1:100,000 Geological Series Sheet 9030.*

GHD. (2015). *Standard Operating Procedure (SOP) for groundwater well sampling.*

GHD. (2019). *M12 Motorway Groundwater Monitoring Six Monthly Report 1 - April to September 2019.*

GHD. (2020). *M12 Motorway Groundwater Monitoring Report 2 – April 2019 to March 2020.*

GHD. (2021a). *M12 Motorway Groundwater Monitoring Six Monthly Report 3 - April to September 2020.*

GHD. (2021a). *M12 Motorway Groundwater Monitoring Six Monthly Report 3 - April to September 2020.*

GHD. (2021b). *M12 Motorway Groundwater Monitoring Six Monthly Report 4 - October 2020 to March 2021.*

GHD. (2021c). *Development - Western Parkland City M12 Motorway Project. Water quality and level monitoring services. Contract number 20.0000303606.0590.*

GHD. (2022a). *M12 Motorway Groundwater Monitoring Report 5 – April 2021 to September 2021.*

GHD. (2022b). *M12 Motorway Groundwater Monitoring, Report 6 - October 2021 to March 2022. Transport for NSW.*

GHD. (2022c). *M12 Motorway Groundwater Monitoring Six Monthly Report 7 - April to September 2022.*

GHD. (2023a). *M12 Motorway Groundwater Monitoring Six Monthly Report 8 - October 2022 to March 2023.* Sydney: GHD Pty Ltd.

GHD. (2024). *M12 Motorway Groundwater Monitoring Six Monthly Report 9 - April 2023 to September 2023.* Sydney: GHD Pty Ltd.

JAJV. (2018a). *M12 Motorway Concept Design and Environmental Impact Statement: Surface Water and Hydrology Assessment Report. Report prepared for Roads and Maritime Services by Jacobs Arcadis Joint Venture.* Sydney, NSW.

JAJV. (2018b). *M12 Motorway Concept Design and Environmental Impact Statement: Contamination Factual Report. Report prepared for Roads and Maritime Services by Jacobs Arcadis Joint Venture.* Sydney, NSW.

JAJV. (2018c). *M12 Motorway Concept Design and Environmental Impact Statement: Groundwater Assessment. Report prepared for Roads and Maritime Services by Jacobs Arcadis Joint Venture.* Sydney, NSW.

JAJV. (2019). *M12 Motorway Concept Design and Environmental Impact Statement - Groundwater quality and hydrology assessment report. Report prepared for Roads and Maritime Services by Jacobs Arcadis Join Venture.*

JAJV. (2019). *M12 Motorway Environmental Impact Statement. Report prepared for Roads and Maritime Services by Jacobs Arcadis Join Venture.* Sydney NSW.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM).* National Environmental Protection Council (NEPC).

NEPC. (2013). *National Environmental Protection (Assessment of Site Contamination) Measure.* National Environment Protection Council.

NHMRC & NRMMC. (2011). *Australian Drinking Water Guidelines 6 (version 3.5 updated in August 2018) - Health and Recreation criteria.*

NSW EPA. (2015). *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997.*

NSW EPA. (2020). *Consultants Reporting on Contaminated Land Guidelines: Contaminated Land Guidelines.* Parramatta: NSW Environment Protection Authority (EPA).

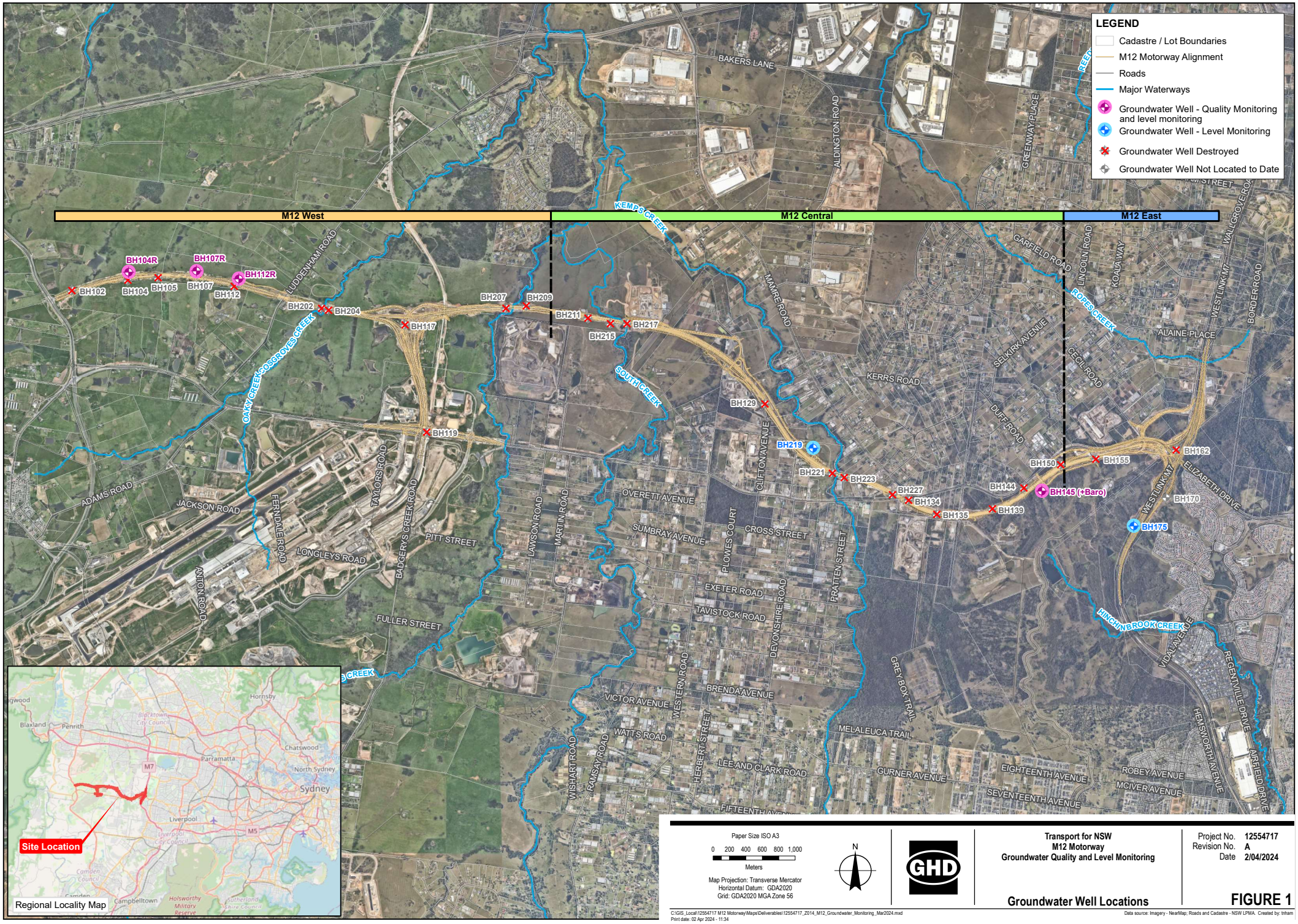
Seymour Whyte. (2023). Appendix B Construction Soil and Water Monitoring Program M12 Motorway – Central August 2023, Rev E. *Construction Environmental Management Plan Appendix B4 Construction Soil and Water Management Sub-plan M12 Motorway – Central July 2023, Rev E*.

TfNSW. (2021). *Overarching Construction Environmental Management Plan, Appendix B4.* Sydney: NSW Government. Retrieved from https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-9364-PA-46%2120211220T053303.892%20GMT

Appendices

Appendix A

Figure



Paper Size ISO A3

0 200 400 600 800 1,000

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

N

GHD

Transport for NSW
M12 Motorway
Groundwater Quality and Level Monitoring

Project No. 12554717
Revision No. A
Date 2/04/2024

Groundwater Well Locations

FIGURE 1

C:\GIS_Local\12554717 M12 Motorway\Maps\Deliverables\12554717_Z014_M12_Groundwater_Monitoring_Mar2024.mxd
Print date: 02 Apr 2024 - 11:34

Data source: Imagery - NearMap; Roads and Cadastre - NSW LPMA. Created by: tnham

Appendix B

Tables

		Well ID	Event 1 April 2019	Event 2 May 2019	Event 3 June 2019	Event 4 July 2019	Event 5 August 2019	Event 6 September 2019	Event 7 October 2019	Event 8 November 2019	Event 9 December 2019	Event 10 January 2020	Event 11 February 2020	Event 12 March 2020	Event 13 April 2020	Event 14 May 2020	Event 15 June 2020
Package	West	BH102															
		BH104			No access												No access
		BH104R															
		BH105															
		BH107	No access	No access	No access	Bailer						No access	Parameters[1]	No access			No access
		BH107R															
		BH112	No access	No access	No access	Bailer						No access	Parameters[1]	No access		Bailer	No access
		BH112R															
		BH117															
		BH119															
		BH202															
		BH204															
		BH207															
		BH209															
	Central	BH129															
		BH134															
		BH135															
		BH139															
		BH144															
		BH145	No access	No access		Bailer	Bailer	Bailer	Bailer	No access	Bailer	No access	No access	No access	No access		No access
		BH145R															
		BH150															
		BH211															
		BH215															
		BH217															
		BH219															
		BH221															
		BH223															
		BH227															
	East	BH155															
		BH162															
		BH170															
		BH175															

Well sampled
Not sampled
Not required

Not located - Attempts to locate well for sampling or sample was made
No access - due to property restrictions and/or wet weather
[1] Insufficient water to collect groundwater sample
[2] No field parameters collected due to insufficient water

Package		Well ID	Event 16 July 2020	Event 17 August 2020	Event 18 September 2020	Event 19 October 2020	Event 20 November 2020	Event 21 December 2020	Event 22 January 2021	Event 23 February 2021	Event 24 March 2021	Event 25 April 2021	Event 26 May 2021	Event 27 June 2021	Event 28 July 2021	Event 29 August 2021	Event 30 September 2021
	West	BH102															
		BH104															
		BH104R															
		BH105															
		BH107					No access										
		BH107R															
		BH112					No access										
		BH112R															
		BH117															
		BH119															
		BH202															
		BH204															
		BH207															
		BH209															
	Central	BH129															
		BH134															
		BH135															
		BH139															
		BH144															
		BH145		Bailer					Bailer[2]	Bailer[2]			[1,2]	Bailer[2]	Bailer[2]	No access	Bailer[2]
		BH145R															
		BH150															
		BH211															
		BH215															
		BH217															
		BH219															
		BH221															
		BH223															
		BH227															
	East	BH155															
		BH162															
		BH170															
		BH175															

Well sampled
Not sampled
Not required

Not located - Attempts to locate well for sampling or sample was made
No access - due to property restrictions and/or wet weather
[1] Insufficient water to collect groundwater sample
[2] No field parameters collected due to insufficient water

		Well ID	Event 31 October 2021	Event 32 November 2021	Event 33 December 2021	Event 34 January 2022	Event 35 February 2022	Event 36 March 2022	Event 37 April 2022	Event 38 May 2022	Event 39 June 2022	Event 40 July 2022	Event 41 August 2022	Event 42 September 2022	Event 43 October 2022	Event 44 November 2022	Event 45 December 2022
Package	West	BH102															
		BH104								Bailer							Destroyed
		BH104R															
		BH105															Destroyed
		BH107								Bailer	Bailer	Bailer	Bailer	Bailer			Destroyed
		BH107R															
		BH112								Bailer	Bailer	Bailer	Bailer	Bailer			Destroyed
		BH112R															No access
		BH117											No access		No access		Destroyed
		BH119											No access		No access		Destroyed
		BH202															Destroyed
		BH204											No access		No access		Destroyed
		BH207											No access		Not located		Destroyed
		BH209															Destroyed
	Central	BH129															Destroyed
		BH134															
		BH135											Not located				Destroyed
		BH139											Not located		Not located		Destroyed
		BH144															Destroyed
		BH145	Bailer[2]	Bailer[2]	Bailer[2]	Bailer[2]	Bailer[2]	Bailer[2]		Bailer	Bailer[2]	Bailer	Bailer[2]	Bailer[2]	Bailer	Bailer	Bailer[2]
		BH145R															
		BH150											No access				Destroyed
		BH211															Destroyed
		BH215											Not located		Not located		Destroyed
		BH217											No access				Destroyed
		BH219											No access		Not located		
		BH221											No access		Destroyed		
		BH223											No access		Destroyed		
		BH227											No access		Destroyed		
	East	BH155															
		BH162											No access				
		BH170											No access		Not located		Not located
		BH175											No access				

Well sampled
Not sampled
Not required

Not located - Attempts to locate well for sampling or sample was made
No access - due to property restrictions and/or wet weather
[1] Insufficient water to collect groundwater sample
[2] No field parameters collected due to insufficient water

Package		Well ID	Event 46 January 2023	Event 47 February 2023	Event 48 March 2023	Event 49 April 2023	Event 50 May 2023	Event 51 June 2023	Event 52 July 2023	Event 53 August 2023	Event 54 September 2023	Event 55 October 2023	Event 56 November 2023	Event 57 December 2023	Event 58 January 2024	Event 59 February 2024	Event 60 March 2024
West		BH102				Destroyed											
		BH104															
		BH104R															
		BH105															
		BH107															
		BH107R	No access					No access									
		BH112															
		BH112R	No access	No access	No access	No access	No access			Bailer							
		BH117															
		BH119															
		BH202															
		BH204															
		BH207															
		BH209															
Central		BH129															
		BH134			Destroyed												
		BH135															
		BH139															
		BH144															
		BH145	Bailer[2]	Bailer[2]	Bailer[2]	Not required											
		BH145R								Bailer							
		BH150															
		BH211															
		BH215															
		BH217															
		BH219															
		BH221															
		BH223															
		BH227															
East		BH155												Destroyed			
		BH162												Destroyed			
		BH170		Not located		Not located		Not located		Not located		Not located		Not located		Not located	
		BH175															

Well sampled
Not sampled
Not required

Not located - Attempts to locate well for sampling or sample was made
No access - due to property restrictions and/or wet weather
[1] Insufficient water to collect groundwater sample
[2] No field parameters collected due to insufficient water

Package		Well ID	Event 61 April 2024	Event 62 May 2024	Event 63 June 2024	Event 64 July 2024	Event 65 August 2024	Event 66 September 2024
Central	West	BH102						
		BH104						
		BH104R						
		BH105						
		BH107						
		BH107R						
		BH112						
		BH112R						
		BH117						
		BH119						
		BH202						
		BH204						
		BH207						
		BH209						
	Central	BH129						
		BH134						
		BH135						
		BH139						
		BH144						
		BH145						
		BH145R				Bailer[2]		
		BH150						
		BH211						
		BH215						
		BH217						
		BH219					Not located	Destroyed
		BH221						
		BH223						
		BH227						
	East	BH155						
		BH162						
		BH170	Not located		Not located		Not located	
		BH175						

Well sampled
Not sampled
Not required

Not located - Attempts to locate well for sampling or sample was made
No access - due to property restrictions and/or wet weather
[1] Insufficient water to collect groundwater sample
[2] No field parameters collected due to insufficient water

						Inorganics			Acidity & Alkalinity					Major Ions													Minor Ions		Nutrients								
						Electrical conductivity (lab)	Total Dissolved Solids	Total Suspended Solids	Alkalinity (Carbonate as CaCO3)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Hardness as CaCO3 (Filtered)	Calcium	Calcium (Filtered)	Magnesium	Magnesium (Filtered)	Potassium	Potassium (Filtered)	Sodium	Sodium (Filtered)	Chloride	Sulfate	Sulfate (Filtered)	Cations Total	Anions Total	Ionic Balance	Bicarbonate ion (HCO3-)	Carbonate ion	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total Oxidised) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Reactive Phosphorus as P	Phosphate total (P)	Phosphorus (Total)
						µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL						10	10	5	1	1	1	1	1	0.5	1	0.5	1	0.5	1	0.5	1	1	2	1	0.01	0.01	0.01	1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)																							500[#1]	500[#1]						11.29[#2]	0.91[#3]							
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)						**200**		**6**																					**0.01165[#4]**				**0.04**	**0.35**		**0.008**		**0.025**
ANZECC 2000 - Stock Watering							*5000[#5]*							*1000*	*1000*								*1000*	*1000*							*90[#6]*	*9.1[#7]*						
ANZG (2018) - FW - 95% (updated 26 July 2021)																												0.9[#9]	2.4[#10]								
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																					
2-4m																																					
4-8m																																					
>8m																																					
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																	
M12 - West	BH104	16-Jul-19	BH104	Normal	ES1922192	-	-	-	<1	-	<1	914	-	-	240	-	517	-	27	-	3,120	5,600	-	842	191	194	0.74	914	-	**0.09**	0.09	<0.01	**0.09**	**0.6**	0.5	<0.01	-	**0.22**
		20-Aug-19	BH104	Normal	ES1926460	-	-	-	<1	-	<1	932	-	-	240	-	565	-	28	-	3,360	5,870	-	882	205	202	0.68	932	-	**0.05**	0.07	0.04	**0.11**	<0.2[#1]	<0.2[#1]	<0.01	-	<0.02[#1]
		24-Sep-19	BH104	Normal	ES1930997	-	-	-	<1	-	<1	973	-	-	205	-	542	-	28	-	3,240	6,070	-	810	196	208	2.73	973	-	**0.02**	0.04	0.01	**0.05**	**0.4**	0.3	<0.01	-	**0.05**
		22-Oct-19	BH104	Normal	ES1934707	-	-	-	<1	-	<1	1,030	-	-	245	-	581	-	27	-	3,360	6,010	-	678	207	204	0.64	1,030	-	**0.1**	0.03	<0.01	0.03	<0.2[#1]	<0.2[#1]	<0.01	-	0.02
		07-Nov-19	BH104	Normal	ES1936840	-	-	-	<1	-	<1	1,180	-	-	280	-	584	-	29	-	3,380	6,160	-	706	210	212	0.53	1,180	-	**0.28**	0.02	<0.01	0.02	**0.6**	0.6	<0.01	-	**0.16**
		12-Dec-19	BH104	Normal	ES1941279	-	-	-	<1	-	<1	1,030	-	-	287	-	624	-	30	-	3,560	6,700	-	892	221	228	1.52	1,030	-	**0.15**	0.09	0.02	**0.11**	<0.2[#1]	<0.2[#1]	<0.01	-	**0.03**
		16-Jan-20	BH104	Normal	ES2001376	-	-	-	<1	-	<1	1,080	-	-	248	-	562	-	35	-	3,430	6,520	-	747	209	221	2.87	1,080	-	**0.11**	0.1	<0.01	**0.1**	<0.5[#1]	<0.5[#1]	<0.01	-	**0.27**
		18-Feb-20	BH104	Normal	ES2005577	-	-	-	<1	-	<1	603	-	-	87	-	167	-	14	-	1,190	1,920	-	326	70.2	73	1.95	603	-	**0.24**	1.17	<0.05[#1]	**1.17**	**2.4**	1.2	<0.02[#1]	-	**0.07**
		12-Mar-20	SD01	Interlab_D	707829	-	-	-	<10	-	<20	810	-	96	-	190	-	17	-	1,600	-	3,400	420	-	-	-	-	810	-	**0.11**	1.6	0.03	**1.6**	**2.6**	1	<0.01	0.06	-
		12-Mar-20	BD01	Field_D	ES2008731	-	-	-	<1	-	<1	704	-	-	103	-	182	-	16	-	1,580	2,670	-	395	89.2	97.6	4.47	704	-	**0.03**	1.09	0.04	**1.13**	**1.9**	0.8	<0.01	-	**0.04**
			BH104	Normal	ES2008731	-	-	-	<1	-	<1	727	-	-	103	-	182	-	16	-	1,580	2,700	-	393	89.2	98.9	5.11	727	-	<0.01	1.09	0.04	**1.13**	**2.1**	1	<0.01	-	**0.05**
		23-Apr-20	BH104	Normal	ES2013858	-	-	-	-	-	<1	1,090	-	-	159	-	321	-	22	-	2,320	3,980	-	586	136	146	3.69	1,090	<1	**0.02**	0.12	<0.01	**0.12**	**0.4**	0.3	<0.01	-	<0.02[#1]
		19-May-20	BH104	Normal	ES2017191	-	-	-	-	-	<1	1,010	-	-	178	-	381	-	23	-	2,710	4,620	-	675	159	164	1.81	1,010	<1	<0.1[#1]	0.13	<0.01	**0.13**	<0.2[#1]	<0.2[#1]	<0.01	-	<0.02[#1]
		30-Jul-20	BH104	Normal	ES2026408	-	*6,030*	**52**	-	-	<1	821	-	-	114	-	231	-	16	-	1,740	3,040	-	436	101	111	4.92	821	<1	**0.25**	0.02	<0.01	0.02	**0.8**	0.8	-	-	**0.08**
		11-Aug-20	BH104	Normal	ES2027951	-	3,250	**14**	-	-	<1	690	-	-	67	-	112	-	11	-	1,050	1,270	-	275	58.5	55.3	2.79	690	<1	<0.01	0.03	<0.01	0.03	**0.5**	0.5	-	-	0.02
		10-Sep-20	BD01	Field_D	ES2032115	-	*7,430*	<5	-	-	<1	1,030	-	-	141	-	286	-	20	-	2,160	3,650	-	511	125	134	3.52	1,030	<1	**0.08**	0.07	<0.01	**0.07**	**0.4**	0.3	-	-	**0.03**
			BH104	Normal	ES2032115	-	*7,380*	**6**	-	-	<1	1,000	1,550	-	141	-	292	-	20	-	2,270	3,650	-	477	130	133	0.97	1,000	<1	**0.09**	0.05	<0.01	**0.05**	**0.4**	0.3	-	-	0.02
		09-Oct-20	BD01	Field_D	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH104	Normal	ES2035519	-	*8,930*	**20**	-	-	<1	1,200	1,610	-	175	-	285	-	20	-	2,150	4,190	-	612	126	155	10.2	1,200	<1	**0.09**	0.09	<0.01	**0.09**	<0.2[#1]	<0.2[#1]	-	-	**0.04**
		13-Nov-20	BH104	Normal	ES2040330	-	*9,380*	**19**	-	-	<1	1,160	2,020	-	212	-	363	-	24	-	2,570	4,240	-	586	153	155	0.69	1,160	<1	<0.1[#1]	0.12	<0.01	**0.12**	0.3	0.2	-	-	0.02
		08-Dec-20	BH104	Normal	ES2043799	-	*10,200*	**68**	-	-	<1	1,340	2,090	-	206	-	382	-	23	-	2,720	4,580	-	630	161	169	2.57	1,340	<1	**0.6**	0.01	<0.01	0.01	**1.5**	1.5	-	-	**0.08**
			M12GW_DUP	Field_D	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14-Jan-21	BH104	Normal	ES2101242	-	*9,510*	**24**	-	-	<1	1,430	1,900	-	232	-	322	-	21	-	2,260	4,640	-	603	137	172	11.4	1,430	<1	**0.32**	<0.01	<0.01	<0.01	**1**	1	-	-	**0.06**
			M12GWDUP	Field_D	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Feb-21	BH104	Normal	ES2104999	-	*9,630*	**48**	-	-	<1	1,130	2,110	-	194	-	394	-	25	-	2,790	4,400	-	601	164	159	1.51	1,130	<1	**0.59**	0.05	<0.01	**0.05**	**1.2**	1.2	-	-	**0.14**
			M12GWDUP	Field_D	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH104	Normal	ES2108508	-	*10,100*	**32**	-	-	<1	1,290	2,190	-	226	-	394	-	26	-	2,760	4,950	-	686	164	180	4.44	1,290	<1	**0.31**	0.04	<0.01	**0.04**	**0.4**	0.4	-	-	**0.04**
			M12GWDUP	Field_D	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH104	Normal	ES2112804	-	4,350	**22**	<1	768	<1	768	833	-	96	-	144	-	14	-	1,260	1,740	-	322	71.8	71.1	0.47	-	-	**0.19**	0.06	<0.01	**0.06**	**0.7**	0.6	-	-	**0.04**
			M12GWDUP	Field_D	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04-May-21	BH104	Normal	ES2116634	-	*7,190*	**21**	<1	987	<1	987	1,490	-	151	-	271	-	20	-	2,040	3,280	-	526	119	123	1.7	-	-	**0.06**	0.08	<0.01	**0.08**	**0.7**	0.6	-	-	**0.06**
			M12GWDUP	Field_D	ES2116634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH104	Normal	ES2121745	-	*8,490*	**42**	<1	957	<1	957	1,860	-	176	-	344	-	24	-	2,540	4,010	-	552	148	144	1.53	-	-	**0.26**	0.04	<0.01	**0.04**	**0.5**	0.5	-	-	**0.04**
			M12GWDUP	Field_D	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH104	Normal	ES2125048	-	*8,860*	**57**	<1	1,040	<1	1,040	1,860	-	201	-	330	-	23	-	2,520	3,940	-	548	147	143	1.4	-	-	**0.36**	0.01	<0.01	0.01	**0.6**	0.6	-	-	**0.06**
			M12GWDUP	Field_D	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-21	BH104	Normal	ES2129596	-	*8,770*	**21**	<1	1,200	<1	1,200	1,910	-	206	-	340	-	23	-	2,570	4,200	-	632	151	156	1.62	-	-	**0.13**	0.04	<0.01	**0.04**	<0.2[#1]	<0.2[#1]	-	-	<0.02[#1]
			M12GWDUP	Field_D	ES2129596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH104	Normal	ES2131753	-	*8,660*	**36**	<1	1,170	<1	1,170	1,590	-	165	-	286	-	22	-	2,260	3,830	-	519	131	142	4.24	-	-	**0.21**	0.01	<0.01	0.01	0.3	0.3	-	-	**0.03**
			M12GWDUP	Field_D	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH104	Normal	ES2137338	-	*8,650*	**138**	<1	1,130	<1	1,130	1,860	-	199	-	330	-	23	-	2,620	4,120	-	595	152	151	0.15	-	-	**0.38**	0.02	<0.01	0.02	**0.7**	0.7	-	-	**0.14**
		15-Oct-21	GWDUP1	Field_D	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH104	Normal	ES2140334	-	*8,530*	**78**	<1	1,090	<1	1,090	1,680	-	169	-	306	-	23	-	2,380	3,970	-	616	138	146	3.12	-	-	**0.17**	0.37	0.01	**0.38**	**0.8**	0.4	-	-	**0.04**
			GWDUP1	Field_D	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH104	Normal	ES2144782	-	*6,720*	**50**	<1	626	<1	626	1,400	-	153	-	248	-	21	-	2,000	3,380	-	464	116	118	0.83	-	-	**0.25**	0.06	<0.01	**0.06**	**0.9**	0.8	-	-	**0.08**
			GWDUP1	Field_D	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH104	Normal	ES2201179	-	*7,860*	**99**	<1	1,000	<1	1,000	1,470	-	151	-	266	-	19	-	2,190	4,130	-	566	125	148	8.44	-	-	**0.39**	0.06	<0.01	**0.06**	**1**	0.9	<0.01	-	**0.1**
			GWDUP1	Field_D	ES2201179	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	GWDUP2	Interlab_D	863166	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH104	Normal	ES2204606	-	4,380	**45**	<1	860	<1	860	637	-	72	-	111	-	12	-	1,190	1,750	-	313	64.8	73.1	6	-	-	**0.56**	0.01	<0.01	0.01	**1.2**	1.2	<0.01	-	**0.14**
		18-Mar-22	BH104	Normal	ES2209694	-	4,710	**219**	<1	916	<1	916	645	-	72	-	113	-	15	-	1,350	2,120	-	315	72	84.7	8.08	-	-	**0.52**	<0.01	<0.01	<0.01	**1.8**	1.8	<0.01	-	**0.14**
		25-May-22	BH104	Normal	ES2218210	-	*10,000*	**30**	<1	778	<1	778	2,540	-	237	-	473	-	28	-	2,420	4,960	-	709	157	170	4.12	-	-	**0.02**	1.94	<0.01	**1.94**	**2.8**	0.9	<0.01	-	**0.07**
		27-Jun-22	GWDUP2	Interlab_D	901087	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH104	Normal	ES2222571	-	*14,000*	**10**	<1	880	<1	880	3,730	-	288	-	732	-	30	-	3,580	7,220	-	913	231	240	1.94	-	-	<0.1[#1]	4.13	<0.01	**4.13**	**4.1**	<0.5[#1]	<0.01	-	**0.1**
		20-Jul-22	GWDUP2	Interlab_D	907459	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH104	Normal	ES2225656	-	*15,400*	<5	<1	894	<1	894	3,540	-	287	-	685	-	28	-	3,200	6,970	-	767	211	230	4.5	-	-	**0.09**	5.19	0.04	**5.23**	**6.2**	1	<0.01	-	**0.03**

						Inorganics			Acidity & Alkalinity					Major Ions													Minor Ions		Nutrients								
						Electrical conductivity (lab)	Total Dissolved Solids	Total Suspended Solids	Alkalinity (Carbonate as CaCO3)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Hardness as CaCO3 (Filtered)	Calcium	Calcium (Filtered)	Magnesium	Magnesium (Filtered)	Potassium	Potassium (Filtered)	Sodium	Sodium (Filtered)	Chloride	Sulfate	Sulfate (Filtered)	Cations Total	Anions Total	Ionic Balance	Bicarbonate ion (HCO3-)	Carbonate ion	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total Oxidised) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Reactive Phosphorus as P	Phosphate total (P)	Phosphorus (Total)
						µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL						10	10	5	1	1	1	1	1	0.5	1	0.5	1	0.5	1	0.5	1	1	2	1	0.01	0.01	0.01	1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)																							500[#1]	500[#1]						11.29[#2]	0.91[#3]							
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)						**200**		**6**																					**0.01165**[#4]			**0.04**	**0.35**		**0.008**		**0.025**
ANZECC 2000 - Stock Watering							*5000*[#5]							*1000*	*1000*								*1000*	*1000*						*90*[#6]	*9.1*[#7]							
ANZG (2018) - FW - 95% (updated 26 July 2021)																													0.9[#9]	2.4[#10]							
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																					
2-4m																																					
4-8m																																					
>8m																																					
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																
M12 - West	BH107	18-Jul-19	BH107	Normal	ES1922601	-	-	-	<1	-	<1	1,520	-	-	148	-	240	-	36	-	2,200	2,400	-	460	124	108	6.96	1,520	-	**0.07**	0.07	<0.01	**0.07**	**0.7**	0.6	<0.01	-	**0.23**
		20-Aug-19	BH107	Normal	ES1926460	-	-	-	<1	-	<1	1,350	-	-	115	-	322	-	34	-	1,820	1,980	-	437	112	91.9	9.96	1,350	-	0.01	0.05	<0.01	**0.05**	**0.6**	0.5	<0.01	-	**0.25**
		24-Sep-19	BH107	Normal	ES1930997	-	-	-	<1	-	<1	1,490	-	-	102	-	312	-	34	-	1,800	2,780	-	500	110	119	3.79	1,490	-	**0.05**	0.07	<0.01	**0.07**	**1.9**	1.8	<0.01	-	**0.19**
		22-Oct-19	BH107	Normal	ES1934707	-	-	-	<1	-	<1	1,610	-	-	114	-	325	-	34	-	1,900	2,690	-	411	116	117	0.28	1,610	-	**0.02**	<0.01	0.04	**0.04**	<0.1	<0.1	<0.01	-	<0.01
		07-Nov-19	BH107	Normal	ES1936840	-	-	-	<1	-	<1	1,480	-	-	128	-	316	-	34	-	1,850	2,790	-	513	114	119	2.24	1,480	-	**0.04**	0.04	<0.01	**0.04**	0.2	0.2	<0.01	-	**0.09**
		12-Dec-19	BH107	Normal	ES1941279	-	-	-	<1	-	<1	1,430	-	-	125	-	333	-	37	-	1,900	2,800	-	498	117	118	0.29	1,430	-	**0.11**	0.1	<0.01	**0.1**	<0.2[#1]	<0.2[#1]	<0.01	-	<0.02[#1]
		20-Feb-20	BH107	Normal	ES2005947	-	-	-	<1	-	<1	1,440	-	-	110	-	309	-	33	-	1,820	2,610	-	470	111	112	0.56	1,440	-	**0.1**	0.18	<0.01	**0.18**	**0.5**	0.3	<0.01	-	<0.02[#1]
		23-Apr-20	BH107	Normal	ES2013858	-	-	-	-	-	<1	1,710	-	-	134	-	319	-	34	-	1,810	2,680	-	450	112	119	2.84	1,710	<1	**0.05**	0.1	<0.01	**0.1**	<0.2[#1]	<0.2[#1]	<0.01	-	<0.02[#1]
		21-May-20	BH107	Normal	ES2017665	-	-	-	-	-	<1	1,620	-	-	123	-	338	-	34	-	1,950	2,980	-	496	120	127	2.88	1,620	<1	**0.04**	0.05	<0.01	**0.05**	<0.1	<0.1	<0.01	-	**0.03**
		30-Jul-20	BH107	Normal	ES2026408	-	*5,300*	**100**	-	-	<1	1,520	-	-	89	-	257	-	29	-	1,500	2,320	-	387	91.6	104	6.29	1,520	<1	**0.06**	0.15	<0.01	**0.15**	**0.4**	0.2	-	-	**0.08**
		11-Aug-20	BH107	Normal	ES2027951	-	*5,860*	**46**	-	-	<1	1,440	-	-	114	-	301	-	31	-	1,730	2,470	-	504	106	109	1.13	1,440	<1	**0.04**	0.06	<0.01	**0.06**	<0.2[#1]	<0.2[#1]	-	-	<0.02[#1]
		10-Sep-20	BH107	Normal	ES2032115	-	*6,180*	**40**	-	-	<1	1,420	1,650	-	118	-	329	-	34	-	1,870	2,760	-	418	115	115	0.11	1,420	<1	**0.07**	0.05	<0.01	**0.05**	<0.2[#1]	<0.2[#1]	-	-	0.02
		09-Oct-20	BH107	Normal	ES2035519	-	*6,340*	**56**	-	-	<1	1,600	1,530	-	131	-	293	-	30	-	1,670	2,850	-	473	104	122	8.02	1,600	<1	**0.04**	0.11	<0.01	**0.11**	<0.2[#1]	<0.2[#1]	-	-	**0.05**
		08-Dec-20	BH107	Normal	ES2043799	-	*6,230*	**36**	-	-	<1	1,750	1,600	-	121	-	316	-	33	-	1,760	2,650	-	460	109	119	4.31	1,750	<1	**0.06**	0.04	<0.01	**0.04**	0.2	0.2	-	-	<0.02[#1]
		14-Jan-21	BH107	Normal	ES2101242	-	*5,730*	**72**	-	-	<1	1,590	1,500	-	113	-	295	-	32	-	1,640	2,740	-	454	102	118	7.45	1,590	<1	**0.06**	0.08	<0.01	**0.08**	**0.4**	0.3	-	-	**0.07**
		11-Feb-21	BH107	Normal	ES2104999	-	*6,360*	**16**	-	-	<1	1,610	1,650	-	117	-	329	-	33	-	1,880	2,720	-	472	116	119	1.36	1,610	<1	**0.06**	0.13	<0.01	**0.13**	0.2	0.1	-	-	0.02
		10-Mar-21	BH107	Normal	ES2108508	-	*6,240*	**12**	-	-	<1	1,580	1,570	-	121	-	307	-	34	-	1,740	2,800	-	476	108	120	5.52	1,580	<1	**0.06**	0.12	<0.01	**0.12**	<0.2[#1]	<0.2[#1]	-	-	<0.02[#1]
		07-Apr-21	BH107	Normal	ES2112804	-	4,210	**18**	<1	1,170	<1	1,170	997	-	76	-	196	-	24	-	1,260	1,530	-	326	75.3	73.3	1.36	-	-	**0.03**	0.55	0.02	**0.57**	**0.7**	0.1	-	-	<0.01
		03-May-21	BH107	Normal	ES2116634	-	3,800	**252**	<1	1,240	<1	1,240	926	-	64	-	186	-	26	-	1,160	1,360	-	307	69.6	69.5	0.07	-	-	<0.01	2.86	<0.01	**2.86**	**3.5**	0.6	-	-	**0.1**
		08-Jun-21	BH107	Normal	ES2121745	-	*5,030*	**166**	<1	1,500	<1	1,500	1,280	-	88	-	258	-	32	-	1,590	1,740	-	366	95.6	86.7	4.9	-	-	**0.06**	2.34	0.01	**2.35**	**2.8**	0.5	-	-	**0.13**
		07-Jul-21	BH107	Normal	ES2125048	-	*5,250*	**38**	<1	1,520	<1	1,520	1,230	-	97	-	239	-	29	-	1,490	1,980	-	375	90.1	94	2.15	-	-	**0.02**	2.91	0.02	**2.93**	**3.2**	0.3	-	-	**0.04**
		13-Aug-21	BH107	Normal	ES2129596	-	*5,440*	**27**	<1	1,700	<1	1,700	1,400	-	115	-	271	-	30	-	1,670	2,190	-	411	101	104	1.38	-	-	**0.03**	2.73	0.01	**2.74**	**3**	0.3	-	-	**0.03**
		01-Sep-21	BH107	Normal	ES2131753	-	*6,230*	**1,910**	<1	1,620	<1	1,620	1,260	-	96	-	247	-	31	-	1,520	2,450	-	397	92	110	8.78	-	-	**0.21**	0.14	<0.01	**0.14**	**1.1**	1	-	-	**0.42**
		15-Oct-21	GWDUP2	Interlab_D	833147	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH107	Normal	ES2137338	-	*5,670*	**1,420**	<1	1,630	<1	1,630	1,290	-	96	-	256	-	30	-	1,600	2,380	-	416	96.2	108	5.94	-	-	**0.21**	0.31	<0.01	**0.31**	**2.3**	2	-	-	**1**
		08-Nov-21	BH107	Normal	ES2140334	-	4,940	**42**	<1	1,640	<1	1,640	1,180	-	87	-	234	-	35	-	1,440	1,860	-	388	87.1	93.3	3.43	-	-	**0.02**	2.52	0.06	**2.58**	**3.1**	0.5	-	-	0.02
		08-Dec-21	GWDUP2	Interlab_D	849475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH107	Normal	ES2144782	-	*5,200*	**22**	<1	955	<1	955	1,230	-	92	-	243	-	29	-	1,500	1,810	-	411	90.6	78.7	7.02	-	-	**0.03**	2.23	0.06	**2.29**	**2.9**	0.6	-	-	0.02
		13-Jan-22	BH107	Normal	ES2201179	-	2,040	**642**	<1	609	<1	609	376	-	30	-	73	-	12	-	572	820	-	138	32.7	38.2	7.73	-	-	**0.05**	0.87	0.02	**0.89**	**2.9**	2	<0.01	-	**0.45**
		10-Feb-22	BH107	Normal	ES2204606	-	3,990	**34**	<1	1,140	<1	1,140	806	-	59	-	160	-	22	-	1,160	1,410	-	307	67.1	68.9	1.33	-	-	<0.01	0.93	0.02	**0.95**	**1.2**	0.3	<0.01	-	**0.03**
		18-Mar-22	BH107	Normal	ES2209694	-	1,050	**290**	<1	409	<1	409	131	-	13	-	24	-	10	-	319	320	-	61	16.8	18.5	4.86	-	-	**0.13**	1.71	0.02	**1.73**	**3.3**	1.6	<0.01	-	**0.24**
			GWDUP1	Field_D	ES2209694	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH107	Normal	ES2218210	-	3,040	**715**	<1	1,360	<1	1,360	543	-	41	-	107	-	25	-	926	781	-	221	51.8	53.8	1.93	-	-	<0.01	11.2	<0.01	**11.2**	**13.8**	2.6	**0.01**	-	**0.08**
		27-Jun-22	BH107	Normal	ES2222571	-	2,930	**104**	<1	1,350	<1	1,350	569	-	45	-	111	-	22	-	1,110	902	-	228	60.2	57.2	2.61	-	-	0.01	11.5	<0.01	**11.5**	**14**	2.5	<0.01	-	**0.32**
		20-Jul-22	BH107	Normal	ES2225656	-	2,260	**172**	<1	1,090	<1	1,090	366	-	28	-	72	-	18	-	709	569	-	155	38.6	41	3.05	-	-	**0.22**	8.95	<0.01	**8.95**	**11.2**	2.2	<0.01	-	**0.08**
	BH112	18-Jul-19	BH112	Normal	ES1922601	-	-	-	<1	-	<1	1,200	-	-	159	-	253	-	37	-	2,310	3,440	-	553	130	132	0.89	1,200	-	**1.45**	0.32	0.1	**0.42**	**5.2**	4.8	<0.01	-	**1.92**
		20-Aug-19	BH112	Normal	ES1926460	-	-	-	<1	-	<1	1,150	-	-	169	-	280	-	41	-	2,390	3,360	-	457	136	127	3.49	1,150	-	**1.43**	0.06	<0.01	**0.06**	**4.6**	4.5	<0.01	-	**1.5**
		25-Sep-19	BH112	Normal	ES1931244	-	-	-	<1	-	<1	1,240	-	-	179	-	294	-	40	-	2,420	3,720	-	548	139	141	0.61	1,240	-	**2.08**	0.06	0.06	**0.12**	**2.4**	2.3	<0.01	-	**0.19**
		22-Oct-19	BH112	Normal	ES1934707	-	-	-	<1	-	<1	1,620	-	-	174	-	324	-	42	-	2,570	3,580	-	488	148	144	1.61	1,620	-	**2.12**	0.07	<0.01	**0.07**	**2.8**	2.7	<0.01	-	**0.4**
		07-Nov-19	BH112	Normal	ES1936840	-	-	-	<1	-	<1	1,520	-	-	192	-	327	-	43	-	2,560	3,650	-	599	149	146	1.07	1,520	-	**2.16**	0.08	<0.01	**0.08**	**3**	2.9	<0.01	-	**0.44**
		12-Dec-19	BH112	Normal	ES1941279	-	-	-	<1	-	<1	1,330	-	-	204	-	338	-	44	-	2,660	4,100	-	647	155	156	0.28	1,330	-	**2.03**	0.1	<0.01	**0.1**	**2.3**	2.2	<0.01	-	<0.02[#1]
		20-Feb-20	BH112	Normal	ES2005947	-	-	-	<1	-	<1	1,390	-	-	169	-	319	-	40	-	2,460	3,640	-	610	143	143	0.15	1,390	-	**2.17**	0.06	<0.01	**0.06**	**2.6**	2.5	**0.24**	-	**0.33**
		21-Apr-20	BH112	Normal	ES2013464	-	-	-	-	-	<1	1,510	-	-	177	-	321	-	40	-	2,540	3,720	-	623	147	148	0.45	1,510	<1	**2.07**	0.13	<0.01	**0.13**	**2.7**	2.6	<0.01	-	<0.05[#1]
		21-May-20	BH112	Normal	ES2017665	-	-	-	-	-	<1	1,520	-	-	186	-	338	-	41	-	2,640	4,080	-	631	153	158	1.8	1,520	<1	**1.73**	0.45	0.01	**0.46**	**2.5**	2	<0.01	-	**0.44**
		30-Jul-20	BH112	Normal	ES2026408	-	*8,470*	**581**	-	-	<1	1,540	-	-	188	-	318	-	39	-	2,470	4,120	-	615	144	160	5.2	1,540	<1	**1.93**	1.65	0.03	**1.68**	**4.3**	2.6	-	-	**0.18**
		13-Aug-20	BH112	Normal	ES2028325	-	*8,120*	**238**	-	-	<1	1,450	-	-	173	-	317	-	40	-	2,490	3,780	-	663	144	149	1.82	1,450	<1	**1.99**	0.27	0.04	**0.31**	**2.3**	2	-	-	**0.14**
		10-Sep-20	BH112	Normal	ES2032115	-	*8,150*	**259**	-	-	<1	1,560	1,740	-	166	-	322	-	40	-	2,500	3,780	-	533	144	149	1.48	1,560	<1	**1.74**	0.48	<0.01	**0.48**	**3.2**	2.7	-	-	**0.09**
		09-Oct-20	BH112	Normal	ES2035519	-	*8,310*	**293**	-	-	<1	1,360	1,640	-	190	-	284	-	36	-	2,220	3,920	-	621	130	151	7.24	1,360	<1	**1.31**	0.94	<0.01	**0.94**	**3**	2.1	-	-	**0.13**
		08-Dec-20	BH112	Normal	ES2043799	-	*8,370*	**101**	-	-	<1	1,630	1,700	-	176	-	306	-	39	-	2,440	3,790	-	592	141	152	3.66	1,630	<1	**1.82**	0.43	<0.01	**0.43**	**2.3**	1.9	-	-	<0.02[#1]
		14-Jan-21	BH112	Normal	ES2101242	-	*8,030*	**429**	-	-	<1	1,450	1,720	-	158	-	321	-	38	-	2,620	4,240	-	595	149	161	3.78	1,450	<1	**1.83**	0.2	<0.01	**0.2**	**2.3**	2.1	-	-	**0.21**
		11-Feb-21	BH112	Normal	ES2104999	-	*8,260*	**413**	-	-	<1	1,310	1,700	-	161	-	316	-	39	-	2,470	3,720	-	594	142	143	0.35	1,310	<1	**1.58**	0.59	0.01	**0.6**	**2.4**	1.8	-	-	**0.17**
		10-Mar-21	BH112	Normal	ES2108508	-	*8,390*	**288**	-	-	<1	1,370	1,710	-	183	-	304	-	40	-	2,460	4,010	-	628	142	154	3.85	1,370	<1	**1.7**	0.37	0.01	**0.38**	**2.1**	1.7	-	-	**0.13**
		07-Apr-21	BH112	Normal	ES2112804	-	2,970	**90**	<1	921	<1	921	402	-	44	-	71	-	19	-	919	974	-	248	48.5	51	2.55	-	-	**0.31**	1.59	0.07	**1.66**	**2.3**	0.6	-	-	**0.03**
		04-May-21	BH112	Normal	ES2116634	-	*5,080*	**823**	<1	1,310	<1	1,310	792	-	78	-	145	-	28	-	1,510	2,020	-	413	82.2	91.8	5.48	-	-	**0.69**	2.02	0.05	**2.07**	**3.6**	1.5	-	-	**0.32**
		08-Jun-21	BH112	Normal	ES2121745	-	4,790	**512**	<1	1,170	<1	1,170	804	-	78	-	148	-	30	-	1,580	1,580	-	339	85.6	75	6.58	-	-	**0.76**	2.78	0.02	**2.8**	**4.2**	1.4	-	-	**0.15**
		07-Jul-21	BH112	Normal	ES2125048	-	*5,390*	**1,470**	<1	1,140	<1	1,140	825	-	93	-	144	-	27	-	1,560	2,060	-	374	85	88.7	2.09	-	-	**1.23**	1.53	<0.01	**1.53**	**4.1**	2.6	-	-	**0.7**
		13-Aug-21	BH112	Normal	ES2129596	-	*5,540*	**128**	<1	1,420	<1	1,420	972	-	109	-	170	-	29	-	1,790	2,610	-	424	98	111	6.12	-	-	**1.19**	1.95	<0.01	**1.95**	**3.4**	1.5	-	-	**0.06**
		01-Sep-21	BH112	Normal	ES2131753	-	*6,200*	**158**	<1	1,290	<1	1,290	957	-	103	-	170	-	32	-	1,700	2,500	-	410	93.9	105	5.5	-	-	**0.94**	1.81	<0.01	**1.81**	**3**	1.2	-	-	**0.04**
		15-Oct-21	BH112	Normal	ES2137338	-	*8,340*	**52**	<1	1,090	<1	1,090	1,690	-	177	-	304	-	22	-	2,350	4,040	-	584	137	148	3.96	-	-	**0.03**	0.13	<0.01	**0.13**	<0.5[#1]	<0.5[#1]	-	-	<0.05[#1]

						Inorganics			Acidity & Alkalinity					Major Ions												Minor Ions		Nutrients								
						Electrical conductivity (lab)	Total Dissolved Solids	Total Suspended Solids	Alkalinity (Carbonate as CaCO3)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Hardness as CaCO3 (Filtered)	Calcium	Calcium (Filtered)	Magnesium	Magnesium (Filtered)	Potassium	Potassium (Filtered)	Sodium	Sodium (Filtered)	Chloride	Sulfate	Sulfate (Filtered)	Cations Total	Anions Total	Ionic Balance	Bicarbonate ion (HCO3-)	Carbonate ion	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total Oxidised) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Reactive Phosphorus as P	Phosphate total (P)	Phosphorus (Total)
						µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL						10	10	5	1	1	1	1	1	0.5	1	0.5	1	0.5	1	0.5	1	1	2	1	0.01	0.01	0.01	1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)																							500[#1]	500[#1]						11.29[#2]	0.91[#3]							
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)						**200**		**6**																					**0.01165**[#4]			**0.04**	**0.35**		**0.008**		**0.025**
ANZECC 2000 - Stock Watering							*5000*[#5]							*1000*	*1000*								*1000*	*1000*						*90*[#6]	*9.1*[#7]							
ANZG (2018) - FW - 95% (updated 26 July 2021)																													0.9[#9]	2.4[#10]							
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																					
2-4m																																					
4-8m																																					
>8m																																					
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																
M12 - West	BH112	08-Nov-21	BH112	Normal	ES2140334	-	*6,300*	**329**	<1	1,260	<1	1,260	1,180	-	124	-	211	-	41	-	2,000	2,800	-	486	112	114	1.19	-	-	**0.76**	2.15	<0.01	**2.15**	**3.4**	1.2	-	-	**0.11**
		08-Dec-21	BH112	Normal	ES2144782	-	*6,380*	**273**	<1	1,040	<1	1,040	1,210	-	129	-	216	-	34	-	2,030	3,230	-	502	113	122	3.8	-	-	**1.03**	1.97	0.01	**1.98**	**3.6**	1.6	-	-	**0.15**
		13-Jan-22	GWDUP2	Interlab_D	856978	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH112	Normal	ES2201179	-	*6,700*	**134**	<1	1,260	<1	1,260	1,180	-	118	-	214	-	33	-	1,950	3,320	-	522	109	130	8.6	-	-	**1.01**	2.07	<0.01	**2.07**	**3.9**	1.8	<0.01	-	**0.24**
		10-Feb-22	BH112	Normal	ES2204606	-	*7,220*	**81**	<1	1,270	<1	1,270	1,340	-	131	-	245	-	36	-	2,110	3,400	-	552	119	133	5.3	-	-	**0.55**	4.4	<0.01	**4.4**	**5.3**	0.9	<0.01	-	**0.05**
			GWPDUP1	Field_D	ES2204606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	GWDUP2	Interlab_D	874238	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH112	Normal	ES2209694	-	2,890	**3,790**	<1	1,220	<1	1,220	364	-	32	-	69	-	19	-	891	815	-	182	46.5	51.2	4.75	-	-	**0.1**	0.2	<0.01	**0.2**	**2.6**	2.4	<0.01	-	**1.35**
		25-May-22	BH112	Normal	ES2218210	-	2,310	**8,780**	<1	947	<1	947	286	-	22	-	56	-	14	-	712	631	-	120	37	39.2	2.86	-	-	**0.1**	0.23	<0.01	**0.23**	**3.6**	3.4	<0.01	-	**2.3**
		27-Jun-22	BH112	Normal	ES2222571	-	1,920	**154**	<1	1,010	<1	1,010	264	-	20	-	52	-	12	-	741	588	-	123	37.8	39.3	1.96	-	-	**0.04**	0.33	<0.01	**0.33**	**0.5**	0.2	<0.01	-	**0.26**
		20-Jul-22	BH112	Normal	ES2225656	-	2,000	**2,180**	<1	933	<1	933	251	-	18	-	50	-	10	-	651	550	-	100	33.6	36.2	3.8	-	-	**0.03**	0.51	<0.01	**0.51**	**0.8**	0.3	<0.01	-	**0.13**
M12 - Central	BH145	13-Jun-19	BH145	Normal	ES1918214	-	-	-	<1	-	<1	841	-	-	46	-	23	-	8	-	1,840	2,520	-	183	84.4	91.7	4.13	841	-	**2.86**	13.4	4.49	**17.9**	**24.2**	6.3	<0.01	-	**0.31**
		17-Jul-19	BH145	Normal	ES1922407	-	-	-	<1	-	<1	854	-	-	44	-	20	-	9	-	1,840	2,370	-	153	84.1	87.1	1.75	854	-	**2.84**	8.24	4.86	**13.1**	**17.1**	4	<0.01	-	**0.41**
		21-Aug-19	BH145	Normal	ES1926628	-	-	-	<1	-	<1	785	-	-	62	-	24	-	10	-	1,980	2,370	-	168	91.4	86	3.05	785	-	**3**	17.1	5.66	**22.8**	**29.2**	6.4	**0.01**	-	**0.19**
		26-Sep-19	BH145	Normal	ES1931491	-	-	-	<1	-	<1	865	-	-	67	-	30	-	11	-	2,180	2,800	-	215	101	101	0.09	865	-	**3.34**	43.7	6.28	**50**	**54**	4	<0.01	-	**0.18**
		23-Oct-19	BH145	Normal	ES1934911	-	-	-	<1	-	<1	849	-	-	77	-	34	-	11	-	2,260	3,000	-	212	105	106	0.37	849	-	**3.55**	35.3	*10.5*	**45.8**	**55.1**	9.3	<0.01	-	**2.35**
		12-Dec-19	BH145	Normal	ES1941279	-	-	-	<1	-	<1	908	-	-	85	-	39	-	13	-	2,500	3,320	-	212	116	116	0.14	908	-	**2.69**	47.3	6.68	**54**	**68**	14	<0.01	-	**4.65**
		21-May-20	BH145	Normal	ES2017665	-	-	-	-	-	<1	670	-	-	22	-	11	-	6	-	1,240	1,460	-	105	56.1	56.8	0.59	670	<1	**0.72**	28.3	8	**36.3**	**38**	1.7	<0.01	-	**0.1**
		30-Jul-20	BD01	Field_D	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH145	Normal	ES2026408	-	2,770	**815**	-	-	<1	494	-	-	21	-	16	-	4	-	822	1,030	-	149	38.2	42	4.74	494	<1	**1.81**	16.8	1.79	**18.6**	**24.8**	6.2	-	-	**0.31**
		13-Aug-20	BH145	Normal	ES2028325	-	3,220	**470**	-	-	<1	782	-	-	29	-	16	-	6	-	1,160	1,220	-	216	53.4	54.5	1.08	782	<1	**2.83**	19.3	0.28	**19.6**	**25.2**	5.6	-	-	**0.32**
		26-Aug-20	BH145	Normal	740880	**6,500**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Sep-20	BH145	Normal	ES2032115	-	4,630	**2,210**	-	-	<1	1,230	223	-	53	-	22	-	9	-	1,720	1,950	-	171	79.5	83.1	2.24	1,230	<1	**3.06**	3.82	0.49	**4.31**	**9.6**	5.3	-	-	**1.16**
		08-Oct-20	BH145	Normal	ES2035519	-	*7,420*	**22,200**	-	-	<1	1,250	264	-	66	-	24	-	11	-	1,770	2,490	-	163	82.5	98.6	8.87	1,250	<1	**2.88**	6.44	3.76	**10.2**	**31**	20.8	-	-	**10.8**
		11-Nov-20	BH145	Normal	ES2040330	-	1,610	**428**	-	-	<1	385	65	-	13	-	8	-	3	-	530	604	-	124	24.4	27.3	5.56	385	<1	**1.11**	8.71	0.06	**8.77**	**11.5**	2.7	-	-	**0.14**
		12-Nov-20	BD01	Field_D	ES2040667	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Dec-20	BH145	Normal	ES2043799	-	2,300	**632**	-	-	<1	645	65	-	16	-	6	-	4	-	849	837	-	163	38.3	39.9	2	645	<1	**0.22**	0.23	0.25	**0.48**	**2.5**	2	-	-	**0.13**
		12-Jan-21	BH145	Normal	ES2101242	-	2,720	**1,010**	-	-	<1	850	88	-	22	-	8	-	5	-	949	941	-	139	43.2	46.4	3.64	850	<1	**1.49**	11.6	0.06	**11.7**	**15.7**	4	-	-	**0.69**
		09-Feb-21	BH145	Normal	ES2104999	-	2,620	**274**	-	-	<1	721	80	-	19	-	8	-	5	-	1,020	1,020	-	136	46.1	46	0.1	721	<1	**1.24**	25.5	0.32	**25.8**	**32.6**	6.8	-	-	**0.22**
		10-Mar-21	BH145	Normal	ES2108508	-	3,500	**2,330**	-	-	<1	761	119	-	28	-	12	-	8	-	1,260	1,460	-	160	57.4	59.7	1.98	761	<1	**2.84**	22	0.51	**22.5**	**28.7**	6.2	-	-	**0.88**
		07-Apr-21	BH145	Normal	ES2112804	-	2,220	**1,100**	<1	518	<1	518	65	-	16	-	6	-	4	-	795	745	-	132	36	34.1	2.66	-	-	**0.73**	21	0.45	**21.5**	**24.4**	2.9	-	-	**0.43**
		08-Jun-21	BH145	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1.82**	60.1	5.97	**66.1**	**81.5**	15.4	-	-	**3.64**
		07-Jul-21	BH145	Normal	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH145	Normal	ES2131753	-	4,980	**3,470**	<1	605	<1	605	211	-	50	-	21	-	8	-	1,670	1,790	-	140	77.1	65.5	8.12	-	-	**1.34**	*133*	*9.19*	**142**	**156**	14	-	-	**1.24**
		15-Oct-21	BH145	Normal	ES2137338	-	342	**18**	<1	96	<1	96	86	-	8	-	16	-	4	-	90	150	-	6	5.73	6.27	4.51	-	-	<0.01	0.26	<0.01	**0.26**	0.3	<0.1	-	-	**0.1**
		08-Nov-21	GWDUP2	Interlab_D	839397	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH145	Normal	ES2140334	-	*5,170*	**1,400**	<1	655	<1	655	234	-	54	-	24	-	11	-	1,760	2,090	-	137	81.5	74.9	4.23	-	-	**1.2**	*127*	8.18	**135**	**155**	19.8	-	-	**0.65**
		08-Dec-21	BH145	Normal	ES2144782	-	*5,590*	**12,000**	<1	504	<1	504	228	-	55	-	22	-	10	-	1,770	1,980	-	153	81.8	69.1	8.41	-	-	**1.59**	*130*	4.93	**135**	**158**	22.7	-	-	**4.22**
		13-Jan-22	BH145	Normal	ES2201179	-	4,560	**3,780**	<1	455	<1	455	154	-	37	-	15	-	7	-	1,390	1,800	-	128	63.7	62.5	0.94	-	-	**1.12**	*118*	1.92	**120**	**125**	5	<0.01	-	**0.68**
		10-Feb-22	BH145	Normal	ES2204606	-	4,330	**1,220**	<1	497	<1	497	131	-	31	-	13	-	6	-	1,350	1,610	-	126	61.5	58	2.95	-	-	**0.71**	*91.7*	3.13	**94.8**	**103**	7.8	<0.01	-	**0.72**
		18-Mar-22	BH145	Normal	ES2209694	-	4,030	**997**	<1	410	<1	410	149	-	35	-	15	-	7	-	1,350	1,700	-	125	61.9	58.7	2.6	-	-	**0.54**	*94.2*	1.74	**95.9**	**106**	10.6	<0.01	-	**0.34**
		25-May-22	GWDUP2	Interlab_D	892529	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH145	Normal	ES2218210	-	3,590	**912**	<1	431	<1	431	106	-	26	-	10	-	6	-	1,210	1,500	-	117	54.9	53.4	1.43	-	-	**1.01**	*75*	3.38	**78.4**	**91.4**	13	<0.01	-	**0.08**
			GWDUP1	Field_D	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH145	Normal	ES2222571	-	3,760	**4,260**	<1	412	<1	412	113	-	27	-	11	-	6	-	1,380	1,520	-	119	62.4	53.6	7.62	-	-	**1.03**	53.4	2.52	**55.9**	**66.2**	10.3	<0.01	-	**0.85**
			GWDUP1	Field_D	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH145	Normal	ES2225656	-	1,950	**814**	<1	277	<1	277	48	-	11	-	5	-	3	-	585	744	-	54	26.5	27.6	2.15	-	-	**0.31**	28.4	0.54	**28.9**	**30.6**	1.7	<0.01	-	**0.12**
			GWDUP1	Field_D	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Inorganics			Acidity & Alkalinity					Major Ions															Minor Ions		Nutrients								
	Electrical conductivity (lab)	Total Dissolved Solids	Total Suspended Solids	Alkalinity (Carbonate as CaCO3)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Hardness as CaCO3 (Filtered)	Calcium	Calcium (Filtered)	Magnesium	Magnesium (Filtered)	Potassium	Potassium (Filtered)	Sodium	Sodium (Filtered)	Chloride	Sulfate	Sulfate (Filtered)	Cations Total	Anions Total	Ionic Balance	Bicarbonate ion (HCO3-)	Carbonate ion	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total Oxidised) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Reactive Phosphorus as P	Phosphate total (P)	Phosphorus (Total)
	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	10	10	5	1	1	1	1	1	0.5	1	0.5	1	0.5	1	0.5	1	1	2	1	0.01	0.01	0.01	1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)																		500[#1]	500[#1]							11.29[#2]	0.91[#3]						
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)	**200**		**6**																						**0.01165[#4]**				**0.04**	**0.35**		**0.008**		**0.025**
ANZECC 2000 - Stock Watering		*5000[#5]*							*1000*	*1000*								*1000*	*1000*							*90[#6]*	*9.1[#7]*							
ANZG (2018) - FW - 95% (updated 26 July 2021)																									0.9[#9]	2.4[#10]							
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																	
2-4m																																	
4-8m																																	
>8m																																	

Statistical Summary

Number of Results	1	91	91	87	56	129	129	82	1	128	1	128	1	128	1	128	130	2	128	128	128	128	73	42	130	130	130	130	130	130	62	1	129
Number of Detects	1	91	89	0	56	0	129	82	1	128	1	128	1	128	1	128	130	2	128	128	128	128	73	0	121	127	56	128	114	112	3	1	113
Minimum Concentration	6500	342	<5	<1	96	<1	96	48	96	8	190	5	17	3	1600	90	150	200	6	5.73	6.27	0.07	385	<1	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.01	0.06	<0.01
Minimum Detect	6500	342	6	ND	96	ND	96	48	96	8	190	5	17	3	1600	90	150	200	6	5.73	6.27	0.07	385	ND	0.01	0.01	0.01	0.01	0.2	0.1	0.01	0.06	0.02
Maximum Concentration	6500	15400	22200	<10	1700	<20	1750	3730	96	288	190	732	17	44	1600	3580	7220	420	913	231	240	11.4	1750	<1	3.55	133	10.5	142	158	22.7	0.24	0.06	10.8
Maximum Detect	6500	15400	22200	ND	1700	ND	1750	3730	96	288	190	732	17	44	1600	3580	7220	420	913	231	240	11.4	1750	ND	3.55	133	10.5	142	158	22.7	0.24	0.06	10.8
Average Concentration		5815	981	0.55	989	0.57	1099	1082		118		228		24		1877	2850		417	107	111	3.3	1183	0.5	0.75	10	0.75	11	14	2.6	0.009		0.42
Geometric Average		5063	165	0.51	893	0.51	1019	694		91		137		20		1697	2393		345	94	98	2.2	1127	0.5	0.24	0.58	0.024	0.62	2.2	1	0.0055		0.11
Median Concentration	6500	5590	138	0.5	1025	0.5	1130	1180	96	114	190	254.5	17	24.5	1600	1830	2710	310	443.5	108.5	113	2.76	1230	0.5	0.25	0.35	0.005	0.4	2.4	1.2	0.005	0.06	0.1
Standard Deviation		2759	2831	0.48	377	0.84	368	794		71		163		12		728	1503		210	47	49	2.6	341	0	0.92	27	2	28	31	4.1	0.03		1.2
Geometric Standard Deviation		1.8	6.8	1.3	1.7	1.3	1.5	3.1		2.3		3.6		2		1.7	1.9	1.7	2.1	1.8	1.8	3.1	1.4		6.1	14	11	14	7.1	4.3	1.7		4.8
Number of Guideline Exceedances	1	55	89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	0	0	0	0	0	122	37	18	119	110	0	62	0	107
Number of Guideline Exceedances(Detects Only)	1	55	89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	0	0	0	0	0	119	37	18	119	108	0	3	0	105
% of Results at or above the Detect Limit	100	100	98	0	100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0	93	98	43	98	88	86	5	100	88
% of Results below the Detect Limit	0	0	2	100	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	7	2	57	2	12	14	95	0	12
% of Detects at or above Guidelines	100	60	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0	0	0	0	0	92	28	14	92	83	0	5	0	81
% of Results Below Guidelines or Non-Detect	0	40	2	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	62	100	100	100	100	100	8	72	86	8	17	100	95	100	19

A Non-Detect multiplier of 0.5 has been applied.

Env Stds Comments
#1:Not specifically guideline value: >500mg/L can have purgative effects
#2:Guideline value calculated by dividing Nitrate (as Nitrate) value (50 mg/L) by 4.427
#3:Guideline value calculated by dividing Nitrite (as Nitrite) value (0.3 mg/L) by molecular weight (3.2967033).
#4:Calculated from ammonia NH4
#5:Loss of production expected at 5000 mg/L for beef cattle, 4000 mg/L dairy cattle, 10000 mg/L sheep, 6000 mg/L horses and pigs, 3000 mg/L poultry
#6:400 mg/L divided by molecular weight, stock may tolerate higher nitrate concentrations if nitrate in feed are not high, water containing >1500 mg/L (as NO3) is likely to be toxic.
#7:30 mg/L divided by molecular weight
#8:>0.5 mg/L hazardous to sheep, >1 mg/L for cattle, >5 mg/L pigs and poulty
#9:Measured as NH3-N at pH 8
#10:Values taken from "Updating nitrate toxicity effects on freshwater aquatic species, 2013"
#11:In absence of total As guideline, As (V) guideline has been adopted.
#12:In absence of total Cr guideline, Cr (VI) guideline has been adopted.
#13:Not limiting: Derived water HSL exceeds water solubility limit
#14:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

Data Comments
#1 Reported Analyte LOR is higher than Requested Analyte LOR

						Metals										BTEXN								TRH - NEPM 2013							TRH - NEPM 1999					PAHs - standard 16					
						Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Iron (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Naphthalene (BTEXN suite)	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	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL						0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001	0.005	1	2	2	2	2	2	1	5	20	20	100	100	100	100	100	20	50	100	50	50	1	1	1	1	0.5	1
ADWG 2011 Health (v3.7 updated 2022)						0.01	0.002		2		0.01	0.5	0.001	0.02		1	800	300			600																			0.01	
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																									
ANZECC 2000 - Stock Watering						*0.5*	*0.01*	*1*	*1* [#8]		*0.1*		*0.002*	*1*	*20*																											
ANZG (2018) - FW - 95% (updated 26 July 2021)						0.013 [#11]	0.0002	0.001 [#12]	0.0014		0.0034	1.9	0.0006	0.011	0.008	950	180	80	350				16															0.4		0.2	
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																									
2-4m																5000	NL [#13]	NL [#13]			NL [#13]		NL [#13]	6000 [#14]		NL [#13]															
4-8m																5000	NL [#13]	NL [#13]			NL [#13]		NL [#13]	6000 [#14]		NL [#13]															
>8m																5000	NL [#13]	NL [#13]			NL [#13]		NL [#13]	7000 [#14]		NL [#13]															
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																					
M12 - West	BH104	16-Jul-19	BH104	Normal	ES1922192	<0.001	0.0002	<0.001	0.018	-	0.001	-	<0.0001	0.06	0.109	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		20-Aug-19	BH104	Normal	ES1926460	<0.001	<0.0001	<0.001	0.015	-	0.001	-	<0.0001	0.074	0.033	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		24-Sep-19	BH104	Normal	ES1930997	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.117	0.021	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		22-Oct-19	BH104	Normal	ES1934707	<0.001	<0.0001	<0.001	0.009	-	<0.001	-	<0.0001	0.062	0.051	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		07-Nov-19	BH104	Normal	ES1936840	<0.001	<0.0001	<0.001	0.004	-	<0.001	-	<0.0001	0.078	0.057	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		12-Dec-19	BH104	Normal	ES1941279	<0.001	<0.0001	0.001	0.016	-	0.001	-	<0.0001	0.107	0.163	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		16-Jan-20	BH104	Normal	ES2001376	0.002	<0.0001	0.001	0.081	-	0.005	-	<0.0001	0.109	0.172	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		18-Feb-20	BH104	Normal	ES2005577	0.001	<0.0001	<0.001	0.039	-	0.001	-	<0.0001	0.06	0.114	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		12-Mar-20	SD01	Interlab_D	707829	<0.001	<0.0002	<0.001	0.02	-	<0.001	-	<0.0001	0.053	0.1	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1	<1	<1	<1	<1
		12-Mar-20	BD01	Field_D	ES2008731	<0.001	<0.0001	<0.001	0.012	-	<0.001	-	<0.0001	0.042	0.067	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
			BH104	Normal	ES2008731	<0.001	<0.0001	<0.001	0.012	-	<0.001	-	<0.0001	0.046	0.077	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		23-Apr-20	BH104	Normal	ES2013858	<0.001	<0.0001	<0.001	0.046	-	0.001	-	<0.0001	0.091	0.17	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		19-May-20	BH104	Normal	ES2017191	<0.001	<0.0001	<0.001	0.026	-	<0.001	-	<0.0001	0.027	0.042	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		30-Jul-20	BH104	Normal	ES2026408	<0.001	<0.0001	<0.001	0.015	0.19	<0.001	0.247	<0.0001	0.066	0.041	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		11-Aug-20	BH104	Normal	ES2027951	<0.001	0.0001	<0.001	0.105	0.15	0.002	0.266	<0.0001	0.076	0.368	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		10-Sep-20	BD01	Field_D	ES2032115	<0.001	<0.0001	<0.001	0.003	0.72	<0.001	0.339	<0.0001	0.023	0.077	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			BH104	Normal	ES2032115	<0.001	<0.0001	<0.001	0.002	0.24	<0.001	0.347	<0.0001	0.022	0.061	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		09-Oct-20	BD01	Field_D	ES2035519	<0.001	0.0001	<0.001	0.074	-	0.002	-	<0.0001	0.087	0.125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH104	Normal	ES2035519	<0.001	<0.0001	<0.001	0.001	0.37	<0.001	0.584	<0.0001	0.031	0.025	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		13-Nov-20	BH104	Normal	ES2040330	<0.001	<0.0001	<0.001	<0.001	1.51	<0.001	0.609	<0.0001	0.137	0.025	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Dec-20	BH104	Normal	ES2043799	<0.001	<0.0001	0.002	<0.001	2.83	<0.001	0.93	<0.0001	0.105	0.093	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			M12GW_DUP	Field_D	ES2043799	<0.001	<0.0001	0.002	<0.001	-	<0.001	-	<0.0001	0.103	0.089	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14-Jan-21	BH104	Normal	ES2101242	<0.001	<0.0001	<0.001	<0.001	3.12	<0.001	1.33	<0.0001	0.175	0.019	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2101242	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.181	0.023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Feb-21	BH104	Normal	ES2104999	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.896	<0.0001	0.081	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	130	<100	130	<20	<50	<100	80	80	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2104999	0.002	<0.0001	0.002	<0.001	-	<0.001	-	<0.0001	0.206	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH104	Normal	ES2108508	0.001	<0.0001	<0.001	0.002	2.15	<0.001	1.02	<0.0001	0.057	0.025	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2108508	0.001	<0.0001	<0.001	0.067	-	0.002	-	<0.0001	0.064	0.105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH104	Normal	ES2112804	<0.001	<0.0001	<0.001	0.002	0.41	<0.001	0.39	<0.0001	0.04	0.008	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2112804	<0.001	<0.0001	0.001	0.003	-	<0.001	-	<0.0001	0.039	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04-May-21	BH104	Normal	ES2116634	<0.001	<0.0001	<0.001	0.002	0.16	<0.001	0.274	<0.0001	0.108	0.03	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2116634	<0.001	<0.0001	<0.001	0.002	-	<0.001	-	<0.0001	0.113	0.039	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH104	Normal	ES2121745	<0.001	<0.0001	<0.001	0.002	0.77	<0.001	0.313	<0.0001	0.081	0.062	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2121745	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.074	0.067	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH104	Normal	ES2125048	<0.001	<0.0001	<0.001	<0.001	1.09	<0.001	0.323	<0.0001	0.011	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2125048	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.012	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-21	BH104	Normal	ES2129596	0.001	<0.0001	<0.001	<0.001	0.69	<0.001	0.308	<0.0001	0.057	0.092	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2129596	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.054	0.086	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH104	Normal	ES2131753	<0.001	<0.0001	<0.001	<0.001	0.34	<0.001	0.305	<0.0001	0.033	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2131753	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.039	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH104	Normal	ES2137338	<0.001	<0.0001	0.002	0.002	0.82	<0.001	0.542	<0.0001	0.043	0.039	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		15-Oct-21	GWDUP1	Field_D	ES2137338	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.037	0.078	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH104	Normal	ES2140334	<0.001	<0.0001	<0.001	0.002	0.24	<0.001	0.299	<0.0001	0.035	0.019	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			GWDUP1	Field_D	ES2140334	<0.001	<0.0001	<0.001	0.001	-	<0.001	-	<0.0001	0.033	0.018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH104	Normal	ES2144782	0.001	<0.0001	<0.001	0.004	0.35	<0.001	0.834	<0.0001	0.023	0.149	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			GWDUP1	Field_D	ES2144782	<0.001	<0.0001	<0.001	0.003	-	<0.001	-	<0.0001	0.024	0.154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH104	Normal	ES2201179	0.002	<0.0001	<0.001	0.009	<0.05	<0.001	0.53	<0.0001	0.035	0.011	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
			GWDUP1	Field_D	ES2201179	0.002	<0.0001	<0.001	0.004	-	<0.001	-	<0.0001	0.05	0.098	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	GWDUP2	Interlab_D	863166	<0.001	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.051	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH104	Normal	ES2204606	<0.001	<0.0001	<0.001	<0.001	0.99	<0.001	0.421	<0.0001	0.06	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		18-Mar-22	BH104	Normal	ES2209694	0.001	<0.0001	<0.001	0.008	1.03	<0.001	0.391	<0.0001	0.192	0.008	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		25-May-22	BH104	Normal	ES2218210	<0.001	<0.0001	<0.001	0.034	<0.05	<0.001	0.096	<0.0001	0.003	0.008	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		27-Jun-22	GWDUP2	Interlab_D	901087	<0.001	0.0002	<0.001	0.17	-	<0.001	-	<0.0001	0.024	0.011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH104	Normal	ES2222571	<0.001	<0.0001	<0.001	0.071	<0.05	<0.001	0.2	<0.0001	0.024	0.008	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		20-Jul-22	GWDUP2	Interlab_D	907459	<0.001	<0.0002	<0.001	0.079	-	<0.001	-	<0.0001	0.009	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH104	Normal	ES2225656	0.002	0.0003	0.002	0.089	<0.05	<0.001	0.337	<0.0001	0.011	0.011	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-

							Metals										BTEXN								TRH - NEPM 2013							TRH - NEPM 1999					PAHs - standard 16					
							Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Iron (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Naphthalene (BTEXN suite)	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	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene
							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL							0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001	0.005	1	2	2	2	2	2	1	5	20	20	100	100	100	100	100	20	50	100	50	50	1	1	1	1	0.5	1
ADWG 2011 Health (v3.7 updated 2022)							0.01	0.002		2		0.01	0.5	0.001	0.02		1	800	300			600																			0.01	
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																										
ANZECC 2000 - Stock Watering							*0.5*	*0.01*	*1*	*1* [#8]		*0.1*		*0.002*	*1*	*20*																												
ANZG (2018) - FW - 95% (updated 26 July 2021)							0.013 [#11]	0.0002	0.001 [#12]	0.0014		0.0034	1.9	0.0006	0.011	0.008	950	180	80	350				16															0.4		0.2	
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																										
2-4m																	5000	NL [#13]	NL [#13]			NL [#13]		NL [#13]	6000 [#14]		NL [#13]																
4-8m																	5000	NL [#13]	NL [#13]			NL [#13]		NL [#13]	6000 [#14]		NL [#13]																
>8m																	5000	NL [#13]	NL [#13]			NL [#13]		NL [#13]	7000 [#14]		NL [#13]																
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																						
M12 - West	BH107	18-Jul-19	BH107	Normal	ES1922601	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.018	0.012	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		20-Aug-19	BH107	Normal	ES1926460	<0.001	<0.0001	<0.001	0.005	-	<0.001	-	<0.0001	0.033	0.026	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		24-Sep-19	BH107	Normal	ES1930997	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.067	0.016	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		22-Oct-19	BH107	Normal	ES1934707	<0.001	<0.0001	<0.001	0.009	-	<0.001	-	<0.0001	0.057	0.029	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		07-Nov-19	BH107	Normal	ES1936840	<0.001	<0.0001	0.006	0.014	-	<0.001	-	<0.0001	0.055	0.089	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		12-Dec-19	BH107	Normal	ES1941279	<0.001	<0.0001	<0.001	0.036	-	0.002	-	<0.0001	0.046	0.049	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		20-Feb-20	BH107	Normal	ES2005947	<0.001	<0.0001	<0.001	0.013	-	<0.001	-	<0.0001	0.07	0.036	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		23-Apr-20	BH107	Normal	ES2013858	<0.001	<0.0001	<0.001	0.016	-	<0.001	-	<0.0001	0.084	0.077	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		21-May-20	BH107	Normal	ES2017665	<0.001	<0.0001	<0.001	0.003	-	<0.001	-	<0.0001	0.037	0.028	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		30-Jul-20	BH107	Normal	ES2026408	<0.001	0.0003	<0.001	0.079	0.14	0.004	0.471	<0.0001	0.045	0.17	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		11-Aug-20	BH107	Normal	ES2027951	<0.001	0.0001	<0.001	0.11	0.1	0.001	0.543	<0.0001	0.04	0.182	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		10-Sep-20	BH107	Normal	ES2032115	<0.001	<0.0001	<0.001	0.084	0.23	0.002	0.645	<0.0001	0.023	0.085	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		09-Oct-20	BH107	Normal	ES2035519	<0.001	0.0001	<0.001	0.074	0.09	0.003	0.59	<0.0001	0.055	0.122	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Dec-20	BH107	Normal	ES2043799	<0.001	<0.0001	<0.001	<0.001	0.15	<0.001	0.459	<0.0001	0.109	0.034	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		14-Jan-21	BH107	Normal	ES2101242	<0.001	<0.0001	<0.001	0.001	0.17	<0.001	0.43	<0.0001	0.068	0.017	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		11-Feb-21	BH107	Normal	ES2104999	<0.001	0.0006	<0.001	0.089	0.13	0.003	0.621	<0.0001	0.09	0.168	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		10-Mar-21	BH107	Normal	ES2108508	<0.001	0.0002	<0.001	0.119	0.15	0.002	0.522	<0.0001	0.056	0.084	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		07-Apr-21	BH107	Normal	ES2112804	<0.001	<0.0001	<0.001	0.008	<0.05	<0.001	0.389	<0.0001	0.041	0.017	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		03-May-21	BH107	Normal	ES2116634	<0.001	<0.0001	<0.001	0.016	0.06	<0.001	0.052	<0.0001	0.011	0.046	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Jun-21	BH107	Normal	ES2121745	<0.001	<0.0001	<0.001	0.002	0.14	<0.001	0.443	<0.0001	0.096	0.028	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		07-Jul-21	BH107	Normal	ES2125048	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.34	<0.0001	0.004	0.008	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		13-Aug-21	BH107	Normal	ES2129596	<0.001	<0.0001	<0.001	<0.001	0.06	<0.001	0.408	<0.0001	0.021	0.012	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		01-Sep-21	BH107	Normal	ES2131753	<0.001	<0.0001	<0.001	0.002	0.24	<0.001	0.344	<0.0001	0.05	0.009	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		15-Oct-21	GWDUP2	Interlab_D	833147	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.051	0.072	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH107	Normal	ES2137338	<0.001	<0.0001	<0.001	<0.001	0.31	<0.001	0.29	<0.0001	0.05	0.057	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Nov-21	BH107	Normal	ES2140334	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.201	<0.0001	0.024	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Dec-21	GWDUP2	Interlab_D	849475	<0.001	<0.0002	<0.001	0.003	-	<0.001	-	<0.0001	0.008	0.68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH107	Normal	ES2144782	<0.001	<0.0001	<0.001	<0.001	0.09	<0.001	0.308	<0.0001	0.009	0.679	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		13-Jan-22	BH107	Normal	ES2201179	<0.001	<0.0001	<0.001	0.009	<0.05	<0.001	0.264	<0.0001	0.07	0.078	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		10-Feb-22	BH107	Normal	ES2204606	<0.001	<0.0001	<0.001	<0.001	0.05	<0.001	0.353	<0.0001	0.073	0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		18-Mar-22	BH107	Normal	ES2209694	<0.001	<0.0001	<0.001	0.006	0.13	<0.001	0.236	<0.0001	0.061	0.022	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
			GWDUP1	Field_D	ES2209694	<0.001	<0.0001	<0.001	0.006	-	<0.001	-	<0.0001	0.069	0.021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH107	Normal	ES2218210	<0.001	<0.0001	<0.001	0.018	<0.05	<0.001	0.002	<0.0001	0.001	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		27-Jun-22	BH107	Normal	ES2222571	<0.001	<0.0001	<0.001	0.003	0.62	<0.001	0.446	<0.0001	0.002	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		20-Jul-22	BH107	Normal	ES2225656	<0.001	<0.0001	<0.001	0.008	<0.05	<0.001	0.001	<0.0001	<0.001	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
	BH112	18-Jul-19	BH112	Normal	ES1922601	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.004	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		20-Aug-19	BH112	Normal	ES1926460	<0.001	<0.0001	<0.001	0.032	-	0.002	-	<0.0001	0.051	0.07	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		25-Sep-19	BH112	Normal	ES1931244	<0.001	<0.0001	<0.001	0.001	-	<0.001	-	<0.0001	0.804	0.038	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		22-Oct-19	BH112	Normal	ES1934707	0.001	<0.0001	<0.001	0.015	-	0.001	-	<0.0001	0.19	0.051	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		07-Nov-19	BH112	Normal	ES1936840	<0.001	<0.0001	<0.001	0.014	-	<0.001	-	<0.0001	0.095	0.076	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		12-Dec-19	BH112	Normal	ES1941279	<0.001	<0.0001	<0.001	0.027	-	0.002	-	<0.0001	0.087	0.13	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		20-Feb-20	BH112	Normal	ES2005947	<0.001	<0.0001	<0.001	0.011	-	<0.001	-	<0.0001	0.179	0.078	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		21-Apr-20	BH112	Normal	ES2013464	<0.001	<0.0001	<0.001	0.05	-	0.001	-	<0.0001	0.09	0.274	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		21-May-20	BH112	Normal	ES2017665	<0.001	<0.0001	<0.001	0.002	-	<0.001	-	<0.0001	0.025	0.012	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		30-Jul-20	BH112	Normal	ES2026408	<0.001	0.0007	<0.001	0.138	0.24	0.007	0.267	<0.0001	0.06	0.441	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		13-Aug-20	BH112	Normal	ES2028325	<0.001	<0.0001	<0.001	0.033	0.06	<0.001	0.276	<0.0001	0.068	0.204	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		10-Sep-20	BH112	Normal	ES2032115	<0.001	<0.0001	<0.001	0.08	0.15	0.001	0.284	<0.0001	0.08	0.104	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		09-Oct-20	BH112	Normal	ES2035519	<0.001	0.0002	<0.001	0.11	0.07	0.003	0.281	<0.0001	0.062	0.146	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Dec-20	BH112	Normal	ES2043799	<0.001	<0.0001	<0.001	0.004	0.09	<0.001	0.264	<0.0001	0.101	0.149	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		14-Jan-21	BH112	Normal	ES2101242	<0.001	<0.0001	<0.001	0.007	0.06	<0.001	0.223	<0.0001	0.12	0.035	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		11-Feb-21	BH112	Normal	ES2104999	<0.001	<0.0001	<0.001	0.001	<0.05	<0.001	0.222	<0.0001	0.048	0.011	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		10-Mar-21	BH112	Normal	ES2108508	<0.001	<0.0001	<0.001	0.186	0.12	0.002	0.225	<0.0001	0.04	0.086	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		07-Apr-21	BH112	Normal	ES2112804	<0.001	<0.0001	<0.001	0.011	<0.05	<0.001	0.139	<0.0001	0.036	0.009	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		04-May-21	BH112	Normal	ES2116634	<0.001	<0.0001	<0.001	0.004	0.19	<0.001	0.206	<0.0001	0.182	0.058	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Jun-21	BH112	Normal	ES2121745	<0.001	<0.0001	<0.001	0.001	0.37	<0.001	0.174	<0.0001	0.056	0.034	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		07-Jul-21	BH112	Normal	ES2125048	<0.001	<0.0001	<0.001	0.002	0.27	<0.001	0.172	<0.0001	0.01	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		13-Aug-21	BH112	Normal	ES2129596	<0.001	<0.0001	<0.001	0.002	0.17	<0.001	0.162	<0.0001	0.043	0.029	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		01-Sep-21	BH112	Normal	ES2131753	<0.001	<0.0001	<0.001	0.002	0.1	<0.001	0.142	<0.0001	0.038	0.01	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		15-Oct-21	BH112	Normal	ES2137338	<0.001	<0.0001	0.003	0.086	1.24	0.004	0.792	<0.0001	0.071	0.118	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-

						Metals										BTEXN								TRH - NEPM 2013							TRH - NEPM 1999					PAHs - standard 16					
						Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Iron (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Naphthalene (BTEXN suite)	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	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL						0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001	0.005	1	2	2	2	2	2	1	5	20	20	100	100	100	100	100	20	50	100	50	50	1	1	1	1	0.5	1
ADWG 2011 Health (v3.7 updated 2022)						0.01	0.002		2		0.01	0.5	0.001	0.02		1	800	300			600																			0.01	
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																									
ANZECC 2000 - Stock Watering						*0.5*	*0.01*	*1*	*1* [#8]		*0.1*		*0.002*	*1*	*20*																											
ANZG (2018) - FW - 95% (updated 26 July 2021)						0.013 [#11]	0.0002	0.001 [#12]	0.0014		0.0034	1.9	0.0006	0.011	0.008	950	180	80	350				16															0.4		0.2	
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																									
2-4m																5000	NL [#13]	NL [#13]			NL [#13]		NL [#13]	6000 [#14]		NL [#13]																
4-8m																5000	NL [#13]	NL [#13]			NL [#13]		NL [#13]	6000 [#14]		NL [#13]																
>8m																5000	NL [#13]	NL [#13]			NL [#13]		NL [#13]	7000 [#14]		NL [#13]																
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																						
M12 - West	BH112	08-Nov-21	BH112	Normal	ES2140334	<0.001	<0.0001	<0.001	0.003	<0.05	<0.001	0.19	<0.0001	0.033	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Dec-21	BH112	Normal	ES2144782	<0.001	<0.0001	<0.001	0.002	0.12	<0.001	0.164	<0.0001	0.05	0.655	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		13-Jan-22	GWDUP2	Interlab_D	856978	0.001	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.11	0.033	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH112	Normal	ES2201179	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.247	<0.0001	0.065	0.014	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		10-Feb-22	BH112	Normal	ES2204606	<0.001	<0.0001	<0.001	0.001	<0.05	<0.001	0.164	<0.0001	0.141	0.013	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
			GWPDUP1	Field_D	ES2204606	<0.001	<0.0001	<0.001	0.002	-	<0.001	-	<0.0001	0.152	0.014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	GWDUP2	Interlab_D	874238	<0.001	<0.0002	<0.001	0.001	-	<0.001	-	<0.0001	0.12	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH112	Normal	ES2209694	<0.001	<0.0001	<0.001	<0.001	0.06	<0.001	0.02	<0.0001	0.13	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		25-May-22	BH112	Normal	ES2218210	<0.001	<0.0001	<0.001	0.003	<0.05	<0.001	0.002	<0.0001	0.007	0.022	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		27-Jun-22	BH112	Normal	ES2222571	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.001	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		20-Jul-22	BH112	Normal	ES2225656	<0.001	<0.0001	<0.001	0.004	<0.05	<0.001	0.001	<0.0001	<0.001	0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
M12 - Central	BH145	13-Jun-19	BH145	Normal	ES1918214	<0.001	<0.0001	<0.001	0.091	-	<0.001	-	<0.0001	0.213	0.064	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		17-Jul-19	BH145	Normal	ES1922407	<0.001	<0.0001	<0.001	0.047	-	<0.001	-	<0.0001	0.034	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		21-Aug-19	BH145	Normal	ES1926628	<0.001	<0.0001	<0.001	0.038	-	<0.001	-	<0.0001	0.019	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		26-Sep-19	BH145	Normal	ES1931491	<0.001	<0.0001	<0.001	0.008	-	<0.001	-	<0.0001	0.008	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		23-Oct-19	BH145	Normal	ES1934911	<0.001	0.0002	<0.001	0.086	-	0.002	-	<0.0001	0.072	0.15	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		12-Dec-19	BH145	Normal	ES1941279	<0.001	0.0001	<0.001	0.059	-	<0.001	-	<0.0001	0.026	0.015	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		21-May-20	BH145	Normal	ES2017665	<0.001	<0.0001	<0.001	0.009	-	<0.001	-	<0.0001	0.033	0.106	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		30-Jul-20	BD01	Field_D	ES2026408	<0.001	<0.0001	<0.001	0.017	-	<0.001	-	<0.0001	0.047	*27.2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH145	Normal	ES2026408	<0.001	0.0001	<0.001	0.034	<0.05	<0.001	0.566	<0.0001	0.056	*30.6*	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		13-Aug-20	BH145	Normal	ES2028325	<0.001	0.0002	<0.001	0.082	22.2	<0.001	1.51	<0.0001	0.121	*41.6*	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		26-Aug-20	BH145	Normal	740880	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Sep-20	BH145	Normal	ES2032115	<0.001	0.0001	<0.001	0.153	35.3	0.002	1.64	<0.0001	0.129	2.62	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Oct-20	BH145	Normal	ES2035519	<0.001	<0.0001	<0.001	0.008	<0.05	<0.001	1.5	<0.0001	0.02	0.643	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		11-Nov-20	BH145	Normal	ES2040330	<0.001	<0.0001	<0.001	0.004	32.3	<0.001	1.48	<0.0001	0.043	10.7	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		12-Nov-20	BD01	Field_D	ES2040667	<0.001	<0.0001	<0.001	0.004	-	<0.001	-	<0.0001	0.046	11.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Dec-20	BH145	Normal	ES2043799	<0.001	<0.0001	<0.001	<0.001	31.7	<0.001	1	<0.0001	0.082	1.33	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		12-Jan-21	BH145	Normal	ES2101242	<0.001	<0.0001	0.004	0.042	19	0.014	0.935	<0.0001	0.011	1.03	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		09-Feb-21	BH145	Normal	ES2104999	<0.001	<0.0001	<0.001	0.017	5.16	<0.001	0.83	<0.0001	0.008	1.62	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		10-Mar-21	BH145	Normal	ES2108508	<0.001	<0.0001	<0.001	0.062	2.1	<0.001	0.78	<0.0001	0.068	0.297	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		07-Apr-21	BH145	Normal	ES2112804	<0.001	<0.0001	<0.001	0.007	1.91	<0.001	0.809	<0.0001	0.013	1.38	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Jun-21	BH145	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		07-Jul-21	BH145	Normal	ES2125048	-	-	-	-	-	-	-	-	-	-	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	300	300	140	<100	440	<20	150	350	<50	500	-	-	-	-	-	-
		01-Sep-21	BH145	Normal	ES2131753	<0.001	0.0004	<0.001	0.004	<0.05	<0.001	2.84	<0.0001	0.046	0.694	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		15-Oct-21	BH145	Normal	ES2137338	<0.001	<0.0001	<0.001	<0.001	0.75	<0.001	0.004	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Nov-21	GWDUP2	Interlab_D	839397	0.001	0.0006	<0.001	0.025	-	<0.001	-	<0.0001	0.028	0.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH145	Normal	ES2140334	<0.001	0.0002	<0.001	0.015	<0.05	<0.001	3.28	<0.0001	0.028	0.556	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Dec-21	BH145	Normal	ES2144782	0.035	0.0005	<0.001	<0.001	<0.05	<0.001	0.483	<0.0001	0.014	0.568	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		13-Jan-22	BH145	Normal	ES2201179	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	2.29	<0.0001	0.008	0.824	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	160	<100	160	<20	<50	130	90	220	<1	<1	<1	<1	<0.5	<1
		10-Feb-22	BH145	Normal	ES2204606	<0.001	0.0001	<0.001	0.002	0.06	<0.001	1.89	<0.0001	0.006	0.498	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		18-Mar-22	BH145	Normal	ES2209694	<0.001	0.0001	<0.001	0.005	<0.05	<0.001	1.89	<0.0001	0.006	0.567	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
		25-May-22	GWDUP2	Interlab_D	892529	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.004	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH145	Normal	ES2218210	<0.001	<0.0001	<0.001	0.006	<0.05	<0.001	1.18	<0.0001	0.004	0.21	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			GWDUP1	Field_D	ES2218210	<0.001	<0.0001	<0.001	0.004	-	<0.001	-	<0.0001	0.003	0.206	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH145	Normal	ES2222571	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.935	<0.0001	0.002	0.142	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			GWDUP1	Field_D	ES2222571	<0.001	<0.0001	<0.001	0.004	-	<0.001	-	<0.0001	0.002	0.151	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH145	Normal	ES2225656	<0.001	<0.0001	<0.001	0.002	0.06	<0.001	0.633	<0.0001	0.003	0.138	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			GWDUP1	Field_D	ES2225656	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	0.119	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Metals										BTEXN								TRH - NEPM 2013							TRH - NEPM 1999					PAHs - standard 16					
	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Iron (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Naphthalene (BTEXN suite)	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	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001	0.005	1	2	2	2	2	2	1	5	20	20	100	100	100	100	100	20	50	100	50	50	1	1	1	1	0.5	1
ADWG 2011 Health (v3.7 updated 2022)	0.01	0.002		2		0.01	0.5	0.001	0.02		1	800	300			600																			0.01	
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																				
ANZECC 2000 - Stock Watering	*0.5*	*0.01*	*1*	*1*[#8]		*0.1*		*0.002*	*1*	*20*																										
ANZG (2018) - FW - 95% (updated 26 July 2021)	0.013[#11]	0.0002	0.001[#12]	0.0014		0.0034	1.9	0.0006	0.011	0.008	950	180	80	350				16															0.4		0.2	
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																				
2-4m											5000	NL[#13]	NL[#13]			NL[#13]		NL[#13]	6000[#14]		NL[#13]															
4-8m											5000	NL[#13]	NL[#13]			NL[#13]		NL[#13]	6000[#14]		NL[#13]															
>8m											5000	NL[#13]	NL[#13]			NL[#13]		NL[#13]	7000[#14]		NL[#13]															

Statistical Summary

Number of Results	160	160	160	160	91	160	91	160	160	160	131	131	131	131	131	131	130	131	131	131	131	131	131	131	131	131	131	131	131	50	50	50	50	50	50
Number of Detects	15	23	11	125	63	28	91	0	156	150	0	0	0	0	0	0	0	0	0	0	1	1	3	0	3	0	1	2	2	3	0	0	0	0	0	0
Minimum Concentration	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.001	<0.0001	<0.001	<0.005	<1	<1	<1	<1	<2	<2	<1	<5	<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1
Minimum Detect	0.001	0.0001	0.001	0.001	0.05	0.001	0.001	ND	0.001	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	300	300	130	ND	130	ND	150	130	80	80	ND	ND	ND	ND	ND	ND
Maximum Concentration	0.035	0.0007	0.006	0.186	35.3	0.014	3.28	<0.0001	0.804	41.6	<1	<2	<2	<2	<2	<3	<1	<10	<20	<20	300	300	160	<100	440	<20	150	350	<100	500	<1	<1	<1	<1	<1	<1
Maximum Detect	0.035	0.0007	0.006	0.186	35.3	0.014	3.28	ND	0.804	41.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	300	300	160	ND	440	ND	150	350	90	500	ND	ND	ND	ND	ND	ND
Average Concentration	0.00079	0.000081	0.00063	0.022	1.9	0.00088	0.57	0.00005	0.061	0.91	0.5	1	1	1	1	1	0.5	2.5	10	10	52	52	52	50	54	10	26	53	26	31	0.5	0.5	0.5	0.5	0.26	0.5
Geometric Average	0.00056	0.0063	0.00055	0.0052	0.17	0.00064	0.29	0.0052	0.035	0.054	0.5	0.99	0.99	0.99	1	1	0.5	2.5	10	10	50	50	51	50	52	10	25	51	26	26	0.5	0.5	0.5	0.5	0.25	0.5
Median Concentration	0.0005	0.00005	0.0005	0.004	0.13	0.0005	0.347	0.00005	0.049	0.054	0.5	1	1	1	1	1	0.5	2.5	10	10	50	50	50	50	50	10	25	50	25	25	0.5	0.5	0.5	0.5	0.25	0.5
Standard Deviation	0.0027	0.000098	0.0006	0.036	6.6	0.0014	0.59	0	0.075	4.7	0	0.04	0.04	0.044	0	0.04	0	0.22	0	0	22	22	14	0	36	0	11	27	7.7	45	0	0	0	0	0.035	0
Geometric Standard Deviation	1.5	1.7	1.5	6.1	6.7	1.8	5.1		3.7	6.8		1.1	1.1	1.1		1		1.1			1.2	1.2	1.2		1.3		1.2	1.2	1.2	1.4					1.1	
Number of Guideline Exceedances	1	14	11	117	0	5	33	0	134	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	50	0
Number of Guideline Exceedances(Detects Only)	1	14	11	117	0	5	33	0	134	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit	9	14	7	78	69	18	100	0	98	94	0	0	0	0	0	0	0	0	0	0	1	1	2	0	2	0	1	2	2	2	0	0	0	0	0	0
% of Results below the Detect Limit	91	86	93	22	31	83	0	100	3	6	100	100	100	100	100	100	100	100	100	100	99	99	98	100	98	100	99	98	98	98	100	100	100	100	100	100
% of Detects at or above Guidelines	1	9	7	73	0	3	36	0	84	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect	99	91	93	27	100	97	64	100	16	15	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

A Non-Detect multiplier of 0.5 has been applied.

Env Stds Comments
#1:Not specifically guideline value: >500mg/L can have purgative effects
#2:Guideline value calculated by dividing Nitrate (as Nitrate) value (50 mg/L) by 4.427
#3:Guideline value calculated by dividing Nitrite (as Nitrite) value (0.3 mg/L) by molecular weight (3.2967033).
#4:Calculated from ammonia NH4
#5:Loss of production expected at 5000 mg/L for beef cattle, 4000 mg/L dairy cattle, 10000 mg/L sheep, 6000 mg/L horses and pigs, 3000 mg/L poultry
#6:400 mg/L divided by molecular weight, stock may tolerate higher nitrate concentrations if nitrate in feed are not high, water containing >1500 mg/L (as NO3) is likely to be toxic.
#7:30 mg/L divided by molecular weight
#8:>0.5 mg/L hazardous to sheep, >1 mg/L for cattle, >5 mg/L pigs and poulty
#9:Measured as NH3-N at pH 8
#10:Values taken from "Updating nitrate toxicity effects on freshwater aquatic species, 2013"
#11:In absence of total As guideline, As (V) guideline has been adopted.
#12:In absence of total Cr guideline, Cr (VI) guideline has been adopted.
#13:Not limiting: Derived water HSL exceeds water solubility limit
#14:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

Data Comments
#1 Reported Analyte LOR is higher than Requested Analyte LOR

					PAHs - standard 16													Phenols - Halogenated									Phenols - Non-Halogenated										OC Pesticides								
					Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	Sum of standard 16 PAHs	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	tetrachlorophenols	Phenols (halogenated)	Phenol	2-Nitrophenol	2-Methylphenol (o-Cresol)	3,4-Methylphenol (m,p-cresol)	2,4-Dimethylphenol	2,4-Dinitrophenol	4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexyl phenol	4-Nitrophenol	Phenols (Total Non Halogenated)	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					1	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	1	1	1	1	1	1	2	30	10	1	1	1	2	1	30	30	100	30	100	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)															0.01	0.01		300	200		20			10																		0.3		2
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																												
ANZECC 2000 - Stock Watering																																												
ANZG (2018) - FW - 95% (updated 26 July 2021)									1.4			16	2					490	160		20			10			320					45												0.08
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																												
2-4m												NL[#13]																																	
4-8m												NL[#13]																																	
>8m												NL[#13]																																	
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																								
M12 - West	BH104	16-Jul-19	BH104	Normal	ES1922192	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		20-Aug-19	BH104	Normal	ES1926460	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		24-Sep-19	BH104	Normal	ES1930997	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		22-Oct-19	BH104	Normal	ES1934707	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		07-Nov-19	BH104	Normal	ES1936840	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		12-Dec-19	BH104	Normal	ES1941279	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		16-Jan-20	BH104	Normal	ES2001376	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		18-Feb-20	BH104	Normal	ES2005577	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		12-Mar-20	SD01	Interlab_D	707829	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<10	<3	<6	<3	<30	<30	<100	<30	<100	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
		12-Mar-20	BD01	Field_D	ES2008731	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
			BH104	Normal	ES2008731	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		23-Apr-20	BH104	Normal	ES2013858	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		19-May-20	BH104	Normal	ES2017191	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		30-Jul-20	BH104	Normal	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Aug-20	BH104	Normal	ES2027951	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Sep-20	BD01	Field_D	ES2032115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH104	Normal	ES2032115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Oct-20	BD01	Field_D	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH104	Normal	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Nov-20	BH104	Normal	ES2040330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-20	BH104	Normal	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GW_DUP	Field_D	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14-Jan-21	BH104	Normal	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Feb-21	BH104	Normal	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH104	Normal	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH104	Normal	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04-May-21	BH104	Normal	ES2116634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2116634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH104	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH104	Normal	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-21	BH104	Normal	ES2129596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2129596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH104	Normal	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH104	Normal	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	GWDUP1	Field_D	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH104	Normal	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH104	Normal	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH104	Normal	ES2201179	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2201179	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	GWDUP2	Interlab_D	863166	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH104	Normal	ES2204606	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH104	Normal	ES2209694	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH104	Normal	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	GWDUP2	Interlab_D	901087	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH104	Normal	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	GWDUP2	Interlab_D	907459	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH104	Normal	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

						PAHs - standard 16												Phenols - Halogenated									Phenols - Non-Halogenated										OC Pesticides								
						Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	Sum of standard 16 PAHs	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	tetrachlorophenols	Phenols (halogenated)	Phenol	2-Nitrophenol	2-Methylphenol (o-Cresol)	3,4-Methylphenol (m,p-cresol)	2,4-Dimethylphenol	2,4-Dinitrophenol	4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexyl phenol	4-Nitrophenol	Phenols (Total Non Halogenated)	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL						1	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	1	1	1	1	1	1	2	30	10	1	1	1	2	1	30	30	100	30	100	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)																0.01	0.01		300	200		20			10																	0.3		2
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																												
ANZECC 2000 - Stock Watering																																												
ANZG (2018) - FW - 95% (updated 26 July 2021)										1.4			16	2					490	160		20			10			320					45											0.08
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																												
2-4m													NL[#13]																																
4-8m													NL[#13]																																
>8m													NL[#13]																																
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																								
M12 - West	BH107	18-Jul-19	BH107	Normal	ES1922601	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		20-Aug-19	BH107	Normal	ES1926460	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		24-Sep-19	BH107	Normal	ES1930997	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		22-Oct-19	BH107	Normal	ES1934707	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		07-Nov-19	BH107	Normal	ES1936840	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		12-Dec-19	BH107	Normal	ES1941279	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		20-Feb-20	BH107	Normal	ES2005947	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		23-Apr-20	BH107	Normal	ES2013858	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		21-May-20	BH107	Normal	ES2017665	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		30-Jul-20	BH107	Normal	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Aug-20	BH107	Normal	ES2027951	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Sep-20	BH107	Normal	ES2032115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Oct-20	BH107	Normal	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-20	BH107	Normal	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14-Jan-21	BH107	Normal	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Feb-21	BH107	Normal	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH107	Normal	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH107	Normal	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		03-May-21	BH107	Normal	ES2116634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH107	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH107	Normal	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-21	BH107	Normal	ES2129596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH107	Normal	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	GWDUP2	Interlab_D	833147	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH107	Normal	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH107	Normal	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	GWDUP2	Interlab_D	849475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH107	Normal	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH107	Normal	ES2201179	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH107	Normal	ES2204606	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH107	Normal	ES2209694	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2209694	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH107	Normal	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH107	Normal	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH107	Normal	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH112	18-Jul-19	BH112	Normal	ES1922601	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		20-Aug-19	BH112	Normal	ES1926460	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		25-Sep-19	BH112	Normal	ES1931244	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		22-Oct-19	BH112	Normal	ES1934707	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		07-Nov-19	BH112	Normal	ES1936840	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		12-Dec-19	BH112	Normal	ES1941279	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		20-Feb-20	BH112	Normal	ES2005947	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		21-Apr-20	BH112	Normal	ES2013464	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		21-May-20	BH112	Normal	ES2017665	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		30-Jul-20	BH112	Normal	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-20	BH112	Normal	ES2028325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Sep-20	BH112	Normal	ES2032115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Oct-20	BH112	Normal	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-20	BH112	Normal	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14-Jan-21	BH112	Normal	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Feb-21	BH112	Normal	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH112	Normal	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH112	Normal	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04-May-21	BH112	Normal	ES2116634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH112	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH112	Normal	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-21	BH112	Normal	ES2129596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH112	Normal	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH112	Normal	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

						PAHs - standard 16													Phenols - Halogenated									Phenols - Non-Halogenated									OC Pesticides								
						Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	Sum of standard 16 PAHs	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	tetrachlorophenols	Phenols (halogenated)	Phenol	2-Nitrophenol	2-Methylphenol (o-Cresol)	3,4-Methylphenol (m,p-cresol)	2,4-Dimethylphenol	2,4-Dinitrophenol	4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexyl phenol	4-Nitrophenol	Phenols (Total Non Halogenated)	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL						1	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	1	1	1	1	1	1	2	30	10	1	1	1	2	1	30	30	100	30	100	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)																0.01	0.01		300	200		20			10																		0.3		2
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																												
ANZECC 2000 - Stock Watering																																												
ANZG (2018) - FW - 95% (updated 26 July 2021)										1.4			16	2					490	160		20			10			320					45											0.08
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																												
2-4m													NL[#13]																																
4-8m													NL[#13]																																
>8m													NL[#13]																																
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																								
M12 - West	BH112	08-Nov-21	BH112	Normal	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH112	Normal	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	GWDUP2	Interlab_D	856978	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH112	Normal	ES2201179	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH112	Normal	ES2204606	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWPDUP1	Field_D	ES2204606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	GWDUP2	Interlab_D	874238	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH112	Normal	ES2209694	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH112	Normal	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH112	Normal	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH112	Normal	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M12 - Central	BH145	13-Jun-19	BH145	Normal	ES1918214	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		17-Jul-19	BH145	Normal	ES1922407	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		21-Aug-19	BH145	Normal	ES1926628	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		26-Sep-19	BH145	Normal	ES1931491	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		23-Oct-19	BH145	Normal	ES1934911	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		12-Dec-19	BH145	Normal	ES1941279	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	-	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		21-May-20	BH145	Normal	ES2017665	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
		30-Jul-20	BD01	Field_D	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH145	Normal	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-20	BH145	Normal	ES2028325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		26-Aug-20	BH145	Normal	740880	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Sep-20	BH145	Normal	ES2032115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Oct-20	BH145	Normal	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Nov-20	BH145	Normal	ES2040330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12-Nov-20	BD01	Field_D	ES2040667	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Dec-20	BH145	Normal	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12-Jan-21	BH145	Normal	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Feb-21	BH145	Normal	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH145	Normal	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH145	Normal	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH145	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH145	Normal	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH145	Normal	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH145	Normal	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	GWDUP2	Interlab_D	839397	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH145	Normal	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH145	Normal	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH145	Normal	ES2201179	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH145	Normal	ES2204606	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH145	Normal	ES2209694	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<2	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	GWDUP2	Interlab_D	892529	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH145	Normal	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH145	Normal	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH145	Normal	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	PAHs - standard 16													Phenols - Halogenated									Phenols - Non-Halogenated									OC Pesticides								
	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	Sum of standard 16 PAHs	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	tetrachlorophenols	Phenols (halogenated)	Phenol	2-Nitrophenol	2-Methylphenol (o-Cresol)	3,4-Methylphenol (m,p-cresol)	2,4-Dimethylphenol	2,4-Dinitrophenol	4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexyl phenol	4-Nitrophenol	Phenols (Total Non Halogenated)	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	1	1	1	1	1	1	1	1	1	0.5	0.5	0.5	1	1	1	1	1	1	2	30	10	1	1	1	2	1	30	30	100	30	100	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)											0.01	0.01		300	200		20			10																	0.3		2
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																							
ANZECC 2000 - Stock Watering																																								
ANZG (2018) - FW - 95% (updated 26 July 2021)					1.4			16	2					490	160		20			10			320				45													0.08
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																								
2-4m								NL[#13]																																
4-8m								NL[#13]																																
>8m								NL[#13]																																

Statistical Summary

Number of Results	50	50	50	50	50	50	50	50	50	50	24	26	49	50	50	50	50	50	50	50	1	1	50	50	50	50	50	1	1	1	1	1	1	1	38	38	38	1	38	38
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	<30	<10	<1	<1	<1	<2	<1	<30	<30	<100	<30	<100	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<1	<0.5	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<100	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.25	0.26	0.25	0.52	0.52	0.59	0.59	0.52	0.59	1.1			0.52	0.59	0.52	1	0.52										0.005	0.005	0.005		0.005	0.005
Geometric Average	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.25	0.26	0.25	0.51	0.51	0.52	0.52	0.51	0.52	1			0.51	0.52	0.51	1	0.51										0.005	0.005	0.005		0.005	0.005
Median Concentration	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.25	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.5	1	15	5	0.5	0.5	0.5	1	0.5	15	15	50	15	50	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0.049	0	0.14	0.14	0.64	0.64	0.14	0.64	0.57			0.14	0.64	0.14	0.28	0.14										0	0	0		0	0
Geometric Standard Deviation												1.1		1.2	1.2	1.4	1.4	1.2	1.4	1.3			1.2	1.4	1.2	1.2	1.2															
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	24	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results below the Detect Limit	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% of Detects at or above Guidelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

A Non-Detect multiplier of 0.5 has been applied.

Env Stds Comments
#1:Not specifically guideline value: >500mg/L can have purgative effects
#2:Guideline value calculated by dividing Nitrate (as Nitrate) value (50 mg/L) by 4.427
#3:Guideline value calculated by dividing Nitrite (as Nitrite) value (0.3 mg/L) by molecular weight (3.2967033).
#4:Calculated from ammonia NH4
#5:Loss of production expected at 5000 mg/L for beef cattle, 4000 mg/L dairy cattle, 10000 mg/L sheep, 6000 mg/L horses and pigs, 3000 mg/L poultry
#6:400 mg/L divided by molecular weight, stock may tolerate higher nitrate concentrations if nitrate in feed are not high, water containing >1500 mg/L (as NO3) is likely to be toxic.
#7:30 mg/L divided by molecular weight
#8:>0.5 mg/L hazardous to sheep, >1 mg/L for cattle, >5 mg/L pigs and poulty
#9:Measured as NH3-N at pH 8
#10:Values taken from "Updating nitrate toxicity effects on freshwater aquatic species, 2013"
#11:In absence of total As guideline, As (V) guideline has been adopted.
#12:In absence of total Cr guideline, Cr (VI) guideline has been adopted.
#13:Not limiting: Derived water HSL exceeds water solubility limit
#14:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

Data Comments
#1 Reported Analyte LOR is higher than Requested Analyte LOR

| | | |

| | | |

						OC Pesticides																			OP Pesticides												
						Chlordane (cis)	Chlordane (trans)	d-BHC	4,4 DDD	4,4 DDT	DDT+DDE+DDD - Lab Calc	Dieldrin	Endosulfan	Endosulfan I (alpha)	Endosulfan II (beta)	Endosulfate Sulfate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Oxychlordane	Toxaphene	Bensulide	Naftalofos	Tokuthion	Azinphos methyl	Bolstar (Sulprofos)	Bromophos-ethyl	Carbophenothion	Azinphos Ethyl	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL						0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.005	0.01	0.01	0.01	0.01	0.01	0.1	1	1	0.02	0.05	0.1	0.02	0.02	0.02	0.02	0.2	0.01	0.02	0.02
ADWG 2011 Health (v3.7 updated 2022)										9			20							10	0.3			300						30	10	10	0.5		2	10				
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																								
ANZECC 2000 - Stock Watering																																								
ANZG (2018) - FW - 95% (updated 26 July 2021)										0.01			0.2				0.02			0.2	0.09		0.1			0.2				0.02						0.01				
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																								
2-4m																																								
4-8m																																								
>8m																																								
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																			
M12 - West	BH112	08-Nov-21	BH112	Normal	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH112	Normal	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	GWDUP2	Interlab_D	856978	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH112	Normal	ES2201179	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH112	Normal	ES2204606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWPDUP1	Field_D	ES2204606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	GWDUP2	Interlab_D	874238	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH112	Normal	ES2209694	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH112	Normal	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH112	Normal	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH112	Normal	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M12 - Central	BH145	13-Jun-19	BH145	Normal	ES1918214	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	-	<0.1	<1	-	<0.02	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.2	<0.01	<0.02	<0.02
		17-Jul-19	BH145	Normal	ES1922407	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	-	<0.1	<1	-	<0.02	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.2	<0.01	<0.02	<0.02
		21-Aug-19	BH145	Normal	ES1926628	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	-	<0.1	<1	-	<0.02	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.2	<0.01	<0.02	<0.02
		26-Sep-19	BH145	Normal	ES1931491	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	-	<0.1	<1	-	<0.02	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.2	<0.01	<0.02	<0.02
		23-Oct-19	BH145	Normal	ES1934911	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	-	<0.1	<1	-	<0.02	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.2	<0.01	<0.02	<0.02
		12-Dec-19	BH145	Normal	ES1941279	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	-	<0.1	<1	-	<0.02	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.2	<0.01	<0.02	<0.02
		21-May-20	BH145	Normal	ES2017665	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	-	<0.1	<1	-	<0.02	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.2	<0.01	<0.02	<0.02
		30-Jul-20	BD01	Field_D	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH145	Normal	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-20	BH145	Normal	ES2028325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		26-Aug-20	BH145	Normal	740880	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Sep-20	BH145	Normal	ES2032115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Oct-20	BH145	Normal	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Nov-20	BH145	Normal	ES2040330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12-Nov-20	BD01	Field_D	ES2040667	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Dec-20	BH145	Normal	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12-Jan-21	BH145	Normal	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Feb-21	BH145	Normal	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH145	Normal	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH145	Normal	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH145	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH145	Normal	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH145	Normal	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH145	Normal	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	GWDUP2	Interlab_D	839397	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH145	Normal	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH145	Normal	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH145	Normal	ES2201179	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH145	Normal	ES2204606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH145	Normal	ES2209694	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	GWDUP2	Interlab_D	892529	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH145	Normal	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH145	Normal	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH145	Normal	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	OC Pesticides																				OP Pesticides														
	Chlordane (cis)	Chlordane (trans)	d-BHC	4,4 DDD	4,4 DDT	DDT+DDE+DDD - Lab Calc	Dieldrin	Endosulfan	Endosulfan I (alpha)	Endosulfan II (beta)	Endosulfan Sulfate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Oxychlordane	Toxaphene	Bensulide	Naftalofos	Tokuthion	Azinphos methyl	Bolstar (Sulprofos)	Bromophos-ethyl	Carbophenothion	Azinphos Ethyl	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.005	0.01	0.01	0.01	0.01	0.01	0.1	1	1	0.02	0.05	0.1	0.02	0.02	0.02	0.02	0.2	0.01	0.02	0.02
ADWG 2011 Health (v3.7 updated 2022)					9			20							10	0.3			300						30	10	10	0.5		2	10				
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																			
ANZECC 2000 - Stock Watering																																			
ANZG (2018) - FW - 95% (updated 26 July 2021)					0.01			0.2				0.02			0.2	0.09		0.1			0.2				0.02						0.01				
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																			
2-4m																																			
4-8m																																			
>8m																																			

Statistical Summary

Number of Results	37	37	38	38	38	38	38	37	38	38	38	38	38	38	38	38	38	38	38	37	1	37	37	1	38	38	37	37	37	38	38	38	38	38	38
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<1	<1	<0.02	<0.05	<0.1	<0.02	<0.02	<0.02	<0.02	<0.2	<0.01	<0.02	<0.02
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<1	<1	<1	<1	<0.1	<0.02	<0.02	<1	<10	<1	<10	<1	<10
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.0026	0.005	0.005	0.005	0.005		0.05	0.5		0.023	0.038	0.05	0.01	0.01	0.023	0.14	0.11	0.14	0.023	0.14
Geometric Average	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.0025	0.005	0.005	0.005	0.005		0.05	0.5		0.011	0.027	0.05	0.01	0.01	0.011	0.012	0.1	0.006	0.011	0.012
Median Concentration	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.0025	0.005	0.005	0.005	0.005	0.005	0.05	0.5	0.5	0.01	0.025	0.05	0.01	0.01	0.01	0.01	0.1	0.005	0.01	0.01
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00041	0	0	0	0		0	0		0.079	0.077	0	0	0	0.079	0.81	0.065	0.81	0.079	0.81
Geometric Standard Deviation																1.1									1.9	1.6				1.9	2.7	1.3	3.1	1.9	2.7
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	38	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results below the Detect Limit	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% of Detects at or above Guidelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

A Non-Detect multiplier of 0.5 has been applied.

Env Stds Comments
#1:Not specifically guideline value: >500mg/L can have purgative effects
#2:Guideline value calculated by dividing Nitrate (as Nitrate) value (50 mg/L) by 4.427
#3:Guideline value calculated by dividing Nitrite (as Nitrite) value (0.3 mg/L) by molecular weight (3.2967033).
#4:Calculated from ammonia NH4
#5:Loss of production expected at 5000 mg/L for beef cattle, 4000 mg/L dairy cattle, 10000 mg/L sheep, 6000 mg/L horses and pigs, 3000 mg/L poultry
#6:400 mg/L divided by molecular weight, stock may tolerate higher nitrate concentrations if nitrate in feed are not high, water containing >1500 mg/L (as NO3) is likely to be toxic.
#7:30 mg/L divided by molecular weight
#8:>0.5 mg/L hazardous to sheep, >1 mg/L for cattle, >5 mg/L pigs and poulty
#9:Measured as NH3-N at pH 8
#10:Values taken from "Updating nitrate toxicity effects on freshwater aquatic species, 2013"
#11:In absence of total As guideline, As (V) guideline has been adopted.
#12:In absence of total Cr guideline, Cr (VI) guideline has been adopted.
#13:Not limiting: Derived water HSL exceeds water solubility limit
#14:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

Data Comments
#1 Reported Analyte LOR is higher than Requested Analyte LOR

						OP Pesticides																																	
						Demeton-S-methyl	Diazinon	Dichlorvos	Dimethoate	Disulfoton	EPN	Ethion	Ethoprop	Fenamiphos	Fenitrothion	Fensulfothion	Fenthion	Malathion	Merphos	Methidathion	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Parathion	Phorate	Pirimphos-ethyl	Pirimiphos-methyl	Profenofos	Prothiofos	Pyrazophos	Ronnel	Sulfotepp	Terbufos	Thiometon	Trichloronate	Tetrachlorvinphos
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL						0.02	0.01	0.2	0.02	0.05	0.05	0.02	0.01	0.01	2	0.01	0.05	0.02	1	0.1	0.5	0.02	0.02	1	0.01	0.2	0.1	0.01	0.01	0.01	0.1	0.1	10	0.005	0.01	0.5	0.5	0.01
ADWG 2011 Health (v3.7 updated 2022)							4	5	7	4		4	1	0.5	7	10	7	70		6	0.7	5	2		1	20		0.5	90	0.3		20			0.9	4		100
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																							
ANZECC 2000 - Stock Watering																																							
ANZG (2018) - FW - 95% (updated 26 July 2021)							0.01		0.15						0.2			0.05								0.004													
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																							
2-4m																																							
4-8m																																							
>8m																																							
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																		
M12 - West	BH104	16-Jul-19	BH104	Normal	ES1922192	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		20-Aug-19	BH104	Normal	ES1926460	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		24-Sep-19	BH104	Normal	ES1930997	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		22-Oct-19	BH104	Normal	ES1934707	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		07-Nov-19	BH104	Normal	ES1936840	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		12-Dec-19	BH104	Normal	ES1941279	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		16-Jan-20	BH104	Normal	ES2001376	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		18-Feb-20	BH104	Normal	ES2005577	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		12-Mar-20	SD01	Interlab_D	707829	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	-	<10	-	-	<1	<1	-	<1	-	<1	<1
		12-Mar-20	BD01	Field_D	ES2008731	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
			BH104	Normal	ES2008731	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		23-Apr-20	BH104	Normal	ES2013858	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		19-May-20	BH104	Normal	ES2017191	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		30-Jul-20	BH104	Normal	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Aug-20	BH104	Normal	ES2027951	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Sep-20	BD01	Field_D	ES2032115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH104	Normal	ES2032115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Oct-20	BD01	Field_D	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH104	Normal	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Nov-20	BH104	Normal	ES2040330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-20	BH104	Normal	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GW_DUP	Field_D	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14-Jan-21	BH104	Normal	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Feb-21	BH104	Normal	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH104	Normal	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH104	Normal	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04-May-21	BH104	Normal	ES2116634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2116634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH104	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH104	Normal	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-21	BH104	Normal	ES2129596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2129596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH104	Normal	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH104	Normal	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	GWDUP1	Field_D	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH104	Normal	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH104	Normal	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH104	Normal	ES2201179	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2201179	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	GWDUP2	Interlab_D	863166	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH104	Normal	ES2204606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH104	Normal	ES2209694	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH104	Normal	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	GWDUP2	Interlab_D	901087	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH104	Normal	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	GWDUP2	Interlab_D	907459	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH104	Normal	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

									OP Pesticides																															
									Demeton-S-methyl	Diazinon	Dichlorvos	Dimethoate	Disulfoton	EPN	Ethion	Ethoprop	Fenamiphos	Fenitrothion	Fensulfothion	Fenthion	Malathion	Merphos	Methidathion	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Parathion	Phorate	Pirimphos-ethyl	Pirimiphos-methyl	Profenofos	Prothiofos	Pyrazophos	Ronnel	Sulfotepp	Terbufos	Thiometon	Trichloronate	Tetrachlorvinphos
									µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL									0.02	0.01	0.2	0.02	0.05	0.05	0.02	0.01	0.01	2	0.01	0.05	0.02	1	0.1	0.5	0.02	0.02	1	0.01	0.2	0.1	0.01	0.01	0.01	0.1	0.1	10	0.005	0.01	0.5	0.5	0.01
ADWG 2011 Health (v3.7 updated 2022)										4	5	7	4		4	1	0.5	7	10	7	70		6	0.7	5	2		1	20		0.5	90	0.3		20			0.9	4		100
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																								
ANZECC 2000 - Stock Watering																																								
ANZG (2018) - FW - 95% (updated 26 July 2021)										0.01		0.15						0.2			0.05								0.004											
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																								
2-4m																																								
4-8m																																								
>8m																																								
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																				
M12 - West	BH107	18-Jul-19	BH107	Normal	ES1922601	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		20-Aug-19	BH107	Normal	ES1926460	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		24-Sep-19	BH107	Normal	ES1930997	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		22-Oct-19	BH107	Normal	ES1934707	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		07-Nov-19	BH107	Normal	ES1936840	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		12-Dec-19	BH107	Normal	ES1941279	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		20-Feb-20	BH107	Normal	ES2005947	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		23-Apr-20	BH107	Normal	ES2013858	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		21-May-20	BH107	Normal	ES2017665	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		30-Jul-20	BH107	Normal	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Aug-20	BH107	Normal	ES2027951	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Sep-20	BH107	Normal	ES2032115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Oct-20	BH107	Normal	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-20	BH107	Normal	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14-Jan-21	BH107	Normal	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Feb-21	BH107	Normal	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH107	Normal	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH107	Normal	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		03-May-21	BH107	Normal	ES2116634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH107	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH107	Normal	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-21	BH107	Normal	ES2129596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH107	Normal	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	GWDUP2	Interlab_D	833147	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH107	Normal	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH107	Normal	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	GWDUP2	Interlab_D	849475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH107	Normal	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH107	Normal	ES2201179	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH107	Normal	ES2204606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH107	Normal	ES2209694	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2209694	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH107	Normal	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH107	Normal	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH107	Normal	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH112	18-Jul-19	BH112	Normal	ES1922601	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		20-Aug-19	BH112	Normal	ES1926460	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		25-Sep-19	BH112	Normal	ES1931244	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		22-Oct-19	BH112	Normal	ES1934707	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		07-Nov-19	BH112	Normal	ES1936840	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		12-Dec-19	BH112	Normal	ES1941279	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		20-Feb-20	BH112	Normal	ES2005947	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		21-Apr-20	BH112	Normal	ES2013464	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		21-May-20	BH112	Normal	ES2017665	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		30-Jul-20	BH112	Normal	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-20	BH112	Normal	ES2028325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Sep-20	BH112	Normal	ES2032115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Oct-20	BH112	Normal	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-20	BH112	Normal	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14-Jan-21	BH112	Normal	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Feb-21	BH112	Normal	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH112	Normal	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH112	Normal	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04-May-21	BH112	Normal	ES2116634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH112	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH112	Normal	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-21	BH112	Normal	ES2129596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH112	Normal	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH112	Normal	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

									OP Pesticides																															
									Demeton-S-methyl	Diazinon	Dichlorvos	Dimethoate	Disulfoton	EPN	Ethion	Ethoprop	Fenamiphos	Fenitrothion	Fensulfothion	Fenthion	Malathion	Merphos	Methidathion	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Parathion	Phorate	Pirimphos-ethyl	Pirimiphos-methyl	Profenofos	Prothiofos	Pyrazophos	Ronnel	Sulfotepp	Terbufos	Thiometon	Trichloronate	Tetrachlorvinphos
									µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL									0.02	0.01	0.2	0.02	0.05	0.05	0.02	0.01	0.01	2	0.01	0.05	0.02	1	0.1	0.5	0.02	0.02	1	0.01	0.2	0.1	0.01	0.01	0.01	0.1	0.1	10	0.005	0.01	0.5	0.5	0.01
ADWG 2011 Health (v3.7 updated 2022)										4	5	7	4		4	1	0.5	7	10	7	70		6	0.7	5	2		1	20		0.5	90	0.3		20			0.9	4		100
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																									
ANZECC 2000 - Stock Watering																																									
ANZG (2018) - FW - 95% (updated 26 July 2021)										0.01		0.15						0.2			0.05								0.004												
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																									
2-4m																																									
4-8m																																									
>8m																																									
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																																					
M12 - West	BH112	08-Nov-21	BH112	Normal	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH112	Normal	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	GWDUP2	Interlab_D	856978	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH112	Normal	ES2201179	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH112	Normal	ES2204606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWPDUP1	Field_D	ES2204606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	GWDUP2	Interlab_D	874238	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH112	Normal	ES2209694	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH112	Normal	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH112	Normal	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH112	Normal	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M12 - Central	BH145	13-Jun-19	BH145	Normal	ES1918214	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		17-Jul-19	BH145	Normal	ES1922407	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		21-Aug-19	BH145	Normal	ES1926628	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		26-Sep-19	BH145	Normal	ES1931491	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		23-Oct-19	BH145	Normal	ES1934911	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		12-Dec-19	BH145	Normal	ES1941279	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		21-May-20	BH145	Normal	ES2017665	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<2	<0.01	<0.05	<0.02	-	<0.1	<0.5	<0.02	<0.02	-	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01
		30-Jul-20	BD01	Field_D	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH145	Normal	ES2026408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-20	BH145	Normal	ES2028325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		26-Aug-20	BH145	Normal	740880	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Sep-20	BH145	Normal	ES2032115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Oct-20	BH145	Normal	ES2035519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Nov-20	BH145	Normal	ES2040330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12-Nov-20	BD01	Field_D	ES2040667	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Dec-20	BH145	Normal	ES2043799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12-Jan-21	BH145	Normal	ES2101242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Feb-21	BH145	Normal	ES2104999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH145	Normal	ES2108508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH145	Normal	ES2112804	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH145	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH145	Normal	ES2125048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH145	Normal	ES2131753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH145	Normal	ES2137338	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	GWDUP2	Interlab_D	839397	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH145	Normal	ES2140334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH145	Normal	ES2144782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH145	Normal	ES2201179	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH145	Normal	ES2204606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH145	Normal	ES2209694	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	GWDUP2	Interlab_D	892529	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH145	Normal	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2218210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH145	Normal	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2222571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH145	Normal	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	OP Pesticides																																
	Demeton-S-methyl	Diazinon	Dichlorvos	Dimethoate	Disulfoton	EPN	Ethion	Ethoprop	Fenamiphos	Fenitrothion	Fensulfothion	Fenthion	Malathion	Merphos	Methidathion	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Parathion	Phorate	Pirimphos-ethyl	Pirimiphos-methyl	Profenofos	Prothiofos	Pyrazophos	Ronnel	Sulfotepp	Terbufos	Thiometon	Trichloronate	Tetrachlorvinphos
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	0.02	0.01	0.2	0.02	0.05	0.05	0.02	0.01	0.01	2	0.01	0.05	0.02	1	0.1	0.5	0.02	0.02	1	0.01	0.2	0.1	0.01	0.01	0.01	0.1	0.1	10	0.005	0.01	0.5	0.5	0.01
ADWG 2011 Health (v3.7 updated 2022)		4	5	7	4		4	1	0.5	7	10	7	70		6	0.7	5	2		1	20		0.5	90	0.3		20			0.9	4		100
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																	
ANZECC 2000 - Stock Watering																																	
ANZG (2018) - FW - 95% (updated 26 July 2021)		0.01		0.15						0.2			0.05								0.004												
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																	
2-4m																																	
4-8m																																	
>8m																																	
Statistical Summary																																	
Number of Results	37	38	38	38	38	38	38	38	37	38	38	38	38	1	37	38	38	38	1	38	38	38	37	38	37	37	38	38	37	38	37	38	38
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.02	<0.01	<0.2	<0.02	<0.05	<0.05	<0.02	<0.01	<0.01	<1	<0.01	<0.05	<0.02	<1	<0.1	<0.5	<0.02	<0.02	<1	<0.01	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<1	<0.005	<0.01	<0.5	<0.5	<0.01
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<0.02	<1	<1	<1	<1	<1	<1	<1	<0.01	<2	<1	<1	<1	<1	<0.1	<1	<1	<1	<1	<1	<1	<1	<0.01	<10	<0.01	<0.1	<1	<10	<0.005	<1	<0.5	<1	<1
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.01	0.018	0.11	0.023	0.038	0.038	0.023	0.018	0.005	0.99	0.018	0.038	0.023		0.05	0.26	0.023	0.023		0.018	0.11	0.062	0.005	0.14	0.005	0.05	0.062	4.9	0.0025	0.018	0.25	0.26	0.018
Geometric Average	0.01	0.0056	0.1	0.011	0.027	0.027	0.011	0.0056	0.005	0.98	0.0056	0.027	0.011		0.05	0.25	0.011	0.011		0.0056	0.1	0.053	0.005	0.006	0.005	0.05	0.053	4.7	0.0025	0.0056	0.25	0.25	0.0056
Median Concentration	0.01	0.005	0.1	0.01	0.025	0.025	0.01	0.005	0.005	1	0.005	0.025	0.01	0.5	0.05	0.25	0.01	0.01	0.5	0.005	0.1	0.05	0.005	0.005	0.005	0.05	0.05	5	0.0025	0.005	0.25	0.25	0.005
Standard Deviation	0	0.08	0.065	0.079	0.077	0.077	0.079	0.08	0	0.081	0.08	0.077	0.079		0	0.041	0.079	0.079		0.08	0.065	0.073	0	0.81	0	0	0.073	0.73	0	0.08	0	0.041	0.08
Geometric Standard Deviation		2.1	1.3	1.9	1.6	1.6	1.9	2.1		1.1	2.1	1.6	1.9			1.1	1.9	1.9		2.1	1.3	1.5		3.1			1.5	1.5		2.1		1.1	2.1
Number of Guideline Exceedances	0	1	0	1	0	0	0	0	0	38	0	0	1	0	0	1	0	0	0	0	38	0	0	0	0	0	0	0	0	1	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results below the Detect Limit	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% of Detects at or above Guidelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

A Non-Detect multiplier of 0.5 has been applied.

Env Stds Comments
#1:Not specifically guideline value: >500mg/L can have purgative effects
#2:Guideline value calculated by dividing Nitrate (as Nitrate) value (50 mg/L) by 4.427
#3:Guideline value calculated by dividing Nitrite (as Nitrite) value (0.3 mg/L) by molecular weight (3.2967033).
#4:Calculated from ammonia NH4
#5:Loss of production expected at 5000 mg/L for beef cattle, 4000 mg/L dairy cattle, 10000 mg/L sheep, 6000 mg/L horses and pigs, 3000 mg/L poultry
#6:400 mg/L divided by molecular weight, stock may tolerate higher nitrate concentrations if nitrate in feed are not high, water containing >1500 mg/L (as NO3) is likely to be toxic.
#7:30 mg/L divided by molecular weight
#8:>0.5 mg/L hazardous to sheep, >1 mg/L for cattle, >5 mg/L pigs and poulty
#9:Measured as NH3-N at pH 8
#10:Values taken from "Updating nitrate toxicity effects on freshwater aquatic species, 2013"
#11:In absence of total As guideline, As (V) guideline has been adopted.
#12:In absence of total Cr guideline, Cr (VI) guideline has been adopted.
#13:Not limiting: Derived water HSL exceeds water solubility limit
#14:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

Data Comments
#1 Reported Analyte LOR is higher than Requested Analyte LOR

						Pesticides						Fungicides	Herbicides
						Acephate	Demeton-O & Demeton-S	Formothion	Temephos	Trichlorfon	Triazophos	Fosetyl-al	Dinoseb
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL						0.5	0.02	20	0.02	0.02	0.005	10	100
ADWG 2011 Health (v3.7 updated 2022)						8		50	400	7			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)													
ANZECC 2000 - Stock Watering													
ANZG (2018) - FW - 95% (updated 26 July 2021)													
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand													
2-4m													
4-8m													
>8m													
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**								
M12 - West	BH104	16-Jul-19	BH104	Normal	ES1922192	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		20-Aug-19	BH104	Normal	ES1926460	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		24-Sep-19	BH104	Normal	ES1930997	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		22-Oct-19	BH104	Normal	ES1934707	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		07-Nov-19	BH104	Normal	ES1936840	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		12-Dec-19	BH104	Normal	ES1941279	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		16-Jan-20	BH104	Normal	ES2001376	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		18-Feb-20	BH104	Normal	ES2005577	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		12-Mar-20	SD01	Interlab_D	707829	-	-	-	-	-	-	-	<100
		12-Mar-20	BD01	Field_D	ES2008731	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
			BH104	Normal	ES2008731	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		23-Apr-20	BH104	Normal	ES2013858	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		19-May-20	BH104	Normal	ES2017191	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		30-Jul-20	BH104	Normal	ES2026408	-	-	-	-	-	-	-	-
		11-Aug-20	BH104	Normal	ES2027951	-	-	-	-	-	-	-	-
		10-Sep-20	BD01	Field_D	ES2032115	-	-	-	-	-	-	-	-
			BH104	Normal	ES2032115	-	-	-	-	-	-	-	-
		09-Oct-20	BD01	Field_D	ES2035519	-	-	-	-	-	-	-	-
			BH104	Normal	ES2035519	-	-	-	-	-	-	-	-
		13-Nov-20	BH104	Normal	ES2040330	-	-	-	-	-	-	-	-
		08-Dec-20	BH104	Normal	ES2043799	-	-	-	-	-	-	-	-
			M12GW_DUP	Field_D	ES2043799	-	-	-	-	-	-	-	-
		14-Jan-21	BH104	Normal	ES2101242	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2101242	-	-	-	-	-	-	-	-
		11-Feb-21	BH104	Normal	ES2104999	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2104999	-	-	-	-	-	-	-	-
		10-Mar-21	BH104	Normal	ES2108508	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2108508	-	-	-	-	-	-	-	-
		07-Apr-21	BH104	Normal	ES2112804	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2112804	-	-	-	-	-	-	-	-
		04-May-21	BH104	Normal	ES2116634	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2116634	-	-	-	-	-	-	-	-
		08-Jun-21	BH104	Normal	ES2121745	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2121745	-	-	-	-	-	-	-	-
		07-Jul-21	BH104	Normal	ES2125048	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2125048	-	-	-	-	-	-	-	-
		13-Aug-21	BH104	Normal	ES2129596	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2129596	-	-	-	-	-	-	-	-
		01-Sep-21	BH104	Normal	ES2131753	-	-	-	-	-	-	-	-
			M12GWDUP	Field_D	ES2131753	-	-	-	-	-	-	-	-
		15-Oct-21	BH104	Normal	ES2137338	-	-	-	-	-	-	-	-
		15-Oct-21	GWDUP1	Field_D	ES2137338	-	-	-	-	-	-	-	-
		08-Nov-21	BH104	Normal	ES2140334	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2140334	-	-	-	-	-	-	-	-
		08-Dec-21	BH104	Normal	ES2144782	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2144782	-	-	-	-	-	-	-	-
		13-Jan-22	BH104	Normal	ES2201179	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2201179	-	-	-	-	-	-	-	-
		10-Feb-22	GWDUP2	Interlab_D	863166	-	-	-	-	-	-	-	-
		10-Feb-22	BH104	Normal	ES2204606	-	-	-	-	-	-	-	-
		18-Mar-22	BH104	Normal	ES2209694	-	-	-	-	-	-	-	-
		25-May-22	BH104	Normal	ES2218210	-	-	-	-	-	-	-	-
		27-Jun-22	GWDUP2	Interlab_D	901087	-	-	-	-	-	-	-	-
		27-Jun-22	BH104	Normal	ES2222571	-	-	-	-	-	-	-	-
		20-Jul-22	GWDUP2	Interlab_D	907459	-	-	-	-	-	-	-	-
		20-Jul-22	BH104	Normal	ES2225656	-	-	-	-	-	-	-	-

						Pesticides						Fungicides	Herbicides
						Acephate	Demeton-O & Demeton-S	Formothion	Temephos	Trichlorfon	Triazophos	Fosetyl-al	Dinoseb
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL						0.5	0.02	20	0.02	0.02	0.005	10	100
ADWG 2011 Health (v3.7 updated 2022)						8		50	400	7			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)													
ANZECC 2000 - Stock Watering													
ANZG (2018) - FW - 95% (updated 26 July 2021)													
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand													
2-4m													
4-8m													
>8m													
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**								
M12 - West	BH107	18-Jul-19	BH107	Normal	ES1922601	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		20-Aug-19	BH107	Normal	ES1926460	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		24-Sep-19	BH107	Normal	ES1930997	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		22-Oct-19	BH107	Normal	ES1934707	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		07-Nov-19	BH107	Normal	ES1936840	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		12-Dec-19	BH107	Normal	ES1941279	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		20-Feb-20	BH107	Normal	ES2005947	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		23-Apr-20	BH107	Normal	ES2013858	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		21-May-20	BH107	Normal	ES2017665	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		30-Jul-20	BH107	Normal	ES2026408	-	-	-	-	-	-	-	-
		11-Aug-20	BH107	Normal	ES2027951	-	-	-	-	-	-	-	-
		10-Sep-20	BH107	Normal	ES2032115	-	-	-	-	-	-	-	-
		09-Oct-20	BH107	Normal	ES2035519	-	-	-	-	-	-	-	-
		08-Dec-20	BH107	Normal	ES2043799	-	-	-	-	-	-	-	-
		14-Jan-21	BH107	Normal	ES2101242	-	-	-	-	-	-	-	-
		11-Feb-21	BH107	Normal	ES2104999	-	-	-	-	-	-	-	-
		10-Mar-21	BH107	Normal	ES2108508	-	-	-	-	-	-	-	-
		07-Apr-21	BH107	Normal	ES2112804	-	-	-	-	-	-	-	-
		03-May-21	BH107	Normal	ES2116634	-	-	-	-	-	-	-	-
		08-Jun-21	BH107	Normal	ES2121745	-	-	-	-	-	-	-	-
		07-Jul-21	BH107	Normal	ES2125048	-	-	-	-	-	-	-	-
		13-Aug-21	BH107	Normal	ES2129596	-	-	-	-	-	-	-	-
		01-Sep-21	BH107	Normal	ES2131753	-	-	-	-	-	-	-	-
		15-Oct-21	GWDUP2	Interlab_D	833147	-	-	-	-	-	-	-	-
		15-Oct-21	BH107	Normal	ES2137338	-	-	-	-	-	-	-	-
		08-Nov-21	BH107	Normal	ES2140334	-	-	-	-	-	-	-	-
		08-Dec-21	GWDUP2	Interlab_D	849475	-	-	-	-	-	-	-	-
		08-Dec-21	BH107	Normal	ES2144782	-	-	-	-	-	-	-	-
		13-Jan-22	BH107	Normal	ES2201179	-	-	-	-	-	-	-	-
		10-Feb-22	BH107	Normal	ES2204606	-	-	-	-	-	-	-	-
		18-Mar-22	BH107	Normal	ES2209694	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2209694	-	-	-	-	-	-	-	-
		25-May-22	BH107	Normal	ES2218210	-	-	-	-	-	-	-	-
		27-Jun-22	BH107	Normal	ES2222571	-	-	-	-	-	-	-	-
		20-Jul-22	BH107	Normal	ES2225656	-	-	-	-	-	-	-	-
	BH112	18-Jul-19	BH112	Normal	ES1922601	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		20-Aug-19	BH112	Normal	ES1926460	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		25-Sep-19	BH112	Normal	ES1931244	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		22-Oct-19	BH112	Normal	ES1934707	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		07-Nov-19	BH112	Normal	ES1936840	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		12-Dec-19	BH112	Normal	ES1941279	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		20-Feb-20	BH112	Normal	ES2005947	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		21-Apr-20	BH112	Normal	ES2013464	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		21-May-20	BH112	Normal	ES2017665	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		30-Jul-20	BH112	Normal	ES2026408	-	-	-	-	-	-	-	-
		13-Aug-20	BH112	Normal	ES2028325	-	-	-	-	-	-	-	-
		10-Sep-20	BH112	Normal	ES2032115	-	-	-	-	-	-	-	-
		09-Oct-20	BH112	Normal	ES2035519	-	-	-	-	-	-	-	-
		08-Dec-20	BH112	Normal	ES2043799	-	-	-	-	-	-	-	-
		14-Jan-21	BH112	Normal	ES2101242	-	-	-	-	-	-	-	-
		11-Feb-21	BH112	Normal	ES2104999	-	-	-	-	-	-	-	-
		10-Mar-21	BH112	Normal	ES2108508	-	-	-	-	-	-	-	-
		07-Apr-21	BH112	Normal	ES2112804	-	-	-	-	-	-	-	-
		04-May-21	BH112	Normal	ES2116634	-	-	-	-	-	-	-	-
		08-Jun-21	BH112	Normal	ES2121745	-	-	-	-	-	-	-	-
		07-Jul-21	BH112	Normal	ES2125048	-	-	-	-	-	-	-	-
		13-Aug-21	BH112	Normal	ES2129596	-	-	-	-	-	-	-	-
		01-Sep-21	BH112	Normal	ES2131753	-	-	-	-	-	-	-	-
		15-Oct-21	BH112	Normal	ES2137338	-	-	-	-	-	-	-	-

						Pesticides						Fungicides	Herbicides
						Acephate	Demeton-O & Demeton-S	Formothion	Temephos	Trichlorfon	Triazophos	Fosetyl-al	Dinoseb
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL						0.5	0.02	20	0.02	0.02	0.005	10	100
ADWG 2011 Health (v3.7 updated 2022)						8		50	400	7			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)													
ANZECC 2000 - Stock Watering													
ANZG (2018) - FW - 95% (updated 26 July 2021)													
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand													
2-4m													
4-8m													
>8m													
Package	**Location Code**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**								
M12 - West	BH112	08-Nov-21	BH112	Normal	ES2140334	-	-	-	-	-	-	-	-
		08-Dec-21	BH112	Normal	ES2144782	-	-	-	-	-	-	-	-
		13-Jan-22	GWDUP2	Interlab_D	856978	-	-	-	-	-	-	-	-
		13-Jan-22	BH112	Normal	ES2201179	-	-	-	-	-	-	-	-
		10-Feb-22	BH112	Normal	ES2204606	-	-	-	-	-	-	-	-
			GWPDUP1	Field_D	ES2204606	-	-	-	-	-	-	-	-
		18-Mar-22	GWDUP2	Interlab_D	874238	-	-	-	-	-	-	-	-
		18-Mar-22	BH112	Normal	ES2209694	-	-	-	-	-	-	-	-
		25-May-22	BH112	Normal	ES2218210	-	-	-	-	-	-	-	-
		27-Jun-22	BH112	Normal	ES2222571	-	-	-	-	-	-	-	-
		20-Jul-22	BH112	Normal	ES2225656	-	-	-	-	-	-	-	-
M12 - Central	BH145	13-Jun-19	BH145	Normal	ES1918214	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		17-Jul-19	BH145	Normal	ES1922407	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		21-Aug-19	BH145	Normal	ES1926628	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		26-Sep-19	BH145	Normal	ES1931491	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		23-Oct-19	BH145	Normal	ES1934911	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		12-Dec-19	BH145	Normal	ES1941279	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		21-May-20	BH145	Normal	ES2017665	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		30-Jul-20	BD01	Field_D	ES2026408	-	-	-	-	-	-	-	-
			BH145	Normal	ES2026408	-	-	-	-	-	-	-	-
		13-Aug-20	BH145	Normal	ES2028325	-	-	-	-	-	-	-	-
		26-Aug-20	BH145	Normal	740880	-	-	-	-	-	-	-	-
		09-Sep-20	BH145	Normal	ES2032115	-	-	-	-	-	-	-	-
		08-Oct-20	BH145	Normal	ES2035519	-	-	-	-	-	-	-	-
		11-Nov-20	BH145	Normal	ES2040330	-	-	-	-	-	-	-	-
		12-Nov-20	BD01	Field_D	ES2040667	-	-	-	-	-	-	-	-
		09-Dec-20	BH145	Normal	ES2043799	-	-	-	-	-	-	-	-
		12-Jan-21	BH145	Normal	ES2101242	-	-	-	-	-	-	-	-
		09-Feb-21	BH145	Normal	ES2104999	-	-	-	-	-	-	-	-
		10-Mar-21	BH145	Normal	ES2108508	-	-	-	-	-	-	-	-
		07-Apr-21	BH145	Normal	ES2112804	-	-	-	-	-	-	-	-
		08-Jun-21	BH145	Normal	ES2121745	-	-	-	-	-	-	-	-
		07-Jul-21	BH145	Normal	ES2125048	-	-	-	-	-	-	-	-
		01-Sep-21	BH145	Normal	ES2131753	-	-	-	-	-	-	-	-
		15-Oct-21	BH145	Normal	ES2137338	-	-	-	-	-	-	-	-
		08-Nov-21	GWDUP2	Interlab_D	839397	-	-	-	-	-	-	-	-
		08-Nov-21	BH145	Normal	ES2140334	-	-	-	-	-	-	-	-
		08-Dec-21	BH145	Normal	ES2144782	-	-	-	-	-	-	-	-
		13-Jan-22	BH145	Normal	ES2201179	-	-	-	-	-	-	-	-
		10-Feb-22	BH145	Normal	ES2204606	-	-	-	-	-	-	-	-
		18-Mar-22	BH145	Normal	ES2209694	-	-	-	-	-	-	-	-
		25-May-22	GWDUP2	Interlab_D	892529	-	-	-	-	-	-	-	-
		25-May-22	BH145	Normal	ES2218210	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2218210	-	-	-	-	-	-	-	-
		27-Jun-22	BH145	Normal	ES2222571	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2222571	-	-	-	-	-	-	-	-
		20-Jul-22	BH145	Normal	ES2225656	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	ES2225656	-	-	-	-	-	-	-	-

	Pesticides						Fungicides	Herbicides
	Acephate	Demeton-O & Demeton-S	Formothion	Temephos	Trichlorfon	Triazophos	Fosetyl-al	Dinoseb
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	0.5	0.02	20	0.02	0.02	0.005	10	100
ADWG 2011 Health (v3.7 updated 2022)	8		50	400	7			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)								
ANZECC 2000 - Stock Watering								
ANZG (2018) - FW - 95% (updated 26 July 2021)								
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand								
2-4m								
4-8m								
>8m								

Statistical Summary

Number of Results	37	37	37	37	37	37	37	1
Number of Detects	0	0	0	0	0	0	0	0
Minimum Concentration	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	<100
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	<100
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.25	0.01	10	0.01	0.01	0.0025	5	
Geometric Average	0.25	0.01	10	0.01	0.01	0.0025	5	
Median Concentration	0.25	0.01	10	0.01	0.01	0.0025	5	50
Standard Deviation	0	0	0	0	0	0	0	
Geometric Standard Deviation								
Number of Guideline Exceedances	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0
% of Results at or above the Detect Limit	0	0	0	0	0	0	0	0
% of Results below the Detect Limit	100	100	100	100	100	100	100	100
% of Detects at or above Guidelines	0	0	0	0	0	0	0	0
% of Results Below Guidelines or Non-Detect	100	100	100	100	100	100	100	100

A Non-Detect multiplier of 0.5 has been applied.

Env Stds Comments
#1:Not specifically guideline value: >500mg/L can have purgative effects
#2:Guideline value calculated by dividing Nitrate (as Nitrate) value (50 mg/L) by 4.427
#3:Guideline value calculated by dividing Nitrite (as Nitrite) value (0.3 mg/L) by molecular weight (3.2967033).
#4:Calculated from ammonia NH4
#5:Loss of production expected at 5000 mg/L for beef cattle, 4000 mg/L dairy cattle, 10000 mg/L sheep, 6000 mg/L horses and pigs, 3000 mg/L poultry
#6:400 mg/L divided by molecular weight, stock may tolerate higher nitrate concentrations if nitrate in feed are not high, water containing >1500 mg/L (as NO3) is likely to be toxic.
#7:30 mg/L divided by molecular weight
#8:>0.5 mg/L hazardous to sheep, >1 mg/L for cattle, >5 mg/L pigs and poulty
#9:Measured as NH3-N at pH 8
#10:Values taken from "Updating nitrate toxicity effects on freshwater aquatic species, 2013"
#11:In absence of total As guideline, As (V) guideline has been adopted.
#12:In absence of total Cr guideline, Cr (VI) guideline has been adopted.
#13:Not limiting: Derived water HSL exceeds water solubility limit
#14:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

Data Comments
#1 Reported Analyte LOR is higher than Requested Analyte LOR

						Inorganics		Acidity & Alkalinity			Major Ions									Minor Ions		Nutrients							
						Total Dissolved Solids	Total Suspended Solids	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Hardness as CaCO3 (filtered)	Calcium (filtered)	Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)	Chloride	Sulfate (filtered)	Cations Total	Anions Total	Ionic Balance	Bicarbonate ion (HCO3-)	Carbonate ion	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total Oxidised) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Reactive Phosphorus as P	Phosphorus (Total)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL						10	5	1	1	1	1	1	1	1	1	1	0.01	0.01	0.01	1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)																500[#1]							11.29[#2]	0.91[#3]					
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)							**6**															**0.01165[#4]**			**0.04**	**0.35**		**0.008**	**0.025**
Package	**Location**	**Date**	**Field ID**	**Sample Type**	**Lab Report**																								
M12 - West	BH104	15 Aug 2022	BH104	Normal	ES2229015	*15000*	**14**	<1	918	3980	277	799	31	3580	8150	886	236	267	6.08	918	<1	**0.03**	7.92	<0.01	**7.92**	**8.2**	0.3	<0.01	**0.04**
			GWDUP1	Field_D	ES2229015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Sep 2022	BH104	Normal	ES2233729	*15600*	**28**	<1	882	4140	335	801	33	3760	7280	842	247	240	1.34	882	<1	**0.08**	8.42	<0.01	**8.42**	**9.3**	0.9	<0.01	**0.05**
			GWDUP1	Field_D	ES2233729	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20 Oct 2022	BH104	Normal	ES2237811	*15100*	**31**	<1	806	4020	291	801	32	3690	7660	754	242	248	1.25	806	<1	**0.12**	7.50	0.04	**7.54**	**8.5**	1.0	<0.01	**0.05**
		16 Nov 2022	BH104	Normal	ES2241428	*16500*	**24**	<1	910	4320	333	847	30	3880	8520	781	256	275	3.56	910	<1	<0.10[#15]	7.61	0.04	**7.65**	**9.2**	1.6	**0.01**	**0.09**
			GWDUP1	Field_D	ES2241428	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH104R	16 Dec 2022	BH104R	Normal	ES2245760	4370	**198**	<1	931	823	107	135	18	1320	1990	154	74.3	77.9	2.37	931	<1	**1.45**	<0.01	<0.01	<0.01	**1.6**	1.6	<0.01	**0.15**
			GWDUP2	Interlab_D	951385	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18 Jan 2023	BH104R	Normal	ES2301690	4960	**139**	<1	877	1180	130	207	19	1430	3260	128	86.2	112	13.1	877	<1	**1.41**	0.04	<0.01	**0.04**	**2.5**	2.5	<0.01	**0.30**
			GWDUP1	Field_D	ES2301690	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	957071	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Feb 2023	BH104R	Normal	ES2304063	*5000*	**162**	<1	757	1060	121	183	18	1480	2420	147	85.9	86.4	0.30	757	<1	**1.46**	0.02	<0.01	0.02	**1.8**	1.8	<0.01	**0.18**
			GWDUP1	Field_D	ES2304063	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	962102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		03 Mar 2023	BH104R	Normal	ES2307153	*5060*	**158**	<1	874	1300	137	232	17	1540	2410	132	93.4	88.2	2.84	874	<1	**1.29**	0.05	<0.01	**0.05**	**1.6**	1.5	<0.01	**0.18**
			GWDUP1	Field_D	ES2307153	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04 Apr 2023	BH104R	Normal	ES2311426	*5260*	**366**	<1	877	1380	155	241	20	1440	2570	137	90.7	92.9	1.17	877	<1	**1.20**	0.02	<0.01	0.02	**1.7**	1.7	<0.01	**0.32**
			GWDUP1	Field_D	ES2311426	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		02 May 2023	BH104R	Normal	ES2314383	*5030*	**100**	<1	888	1180	155	193	17	1330	2640	125	81.9	94.8	7.30	888	<1	**1.35**	0.02	<0.01	0.02	**1.3**	1.3	<0.01	**0.10**
			GWDUP1	Field_D	ES2314383	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jun 2023	BH104R	Normal	ES2319027	*5250*	**83**	<1	802	1520	171	265	19	1430	2870	135	93.0	99.8	3.51	802	<1	**1.10**	0.06	<0.01	**0.06**	**1.3**	1.2	<0.01	**0.07**
			GWDUP2	Interlab_D	997826	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jul 2023	BH104R	Normal	ES2322790	*5540*	**144**	<1	840	1360	143	243	18	1490	2710	120	92.4	95.7	1.76	840	<1	**1.06**	0.04	<0.01	**0.04**	**1.3**	1.3	<0.01	**0.14**
			GWDUP2	Interlab_D	1006932	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09 Aug 2023	BH104R	Normal	ES2326796	*5430*	**405**	<1	890	1570	194	264	20	1500	2550	123	97.2	92.3	2.58	890	<1	**1.11**	0.04	0.02	**0.06**	**3.9**	3.8	<0.01	**0.38**
			GWDUP1	Field_D	ES2326796	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05 Sep 2023	BH104R	Normal	ES2330598	*5010*	**128**	<1	884	1190	163	191	18	1510	2500	171	90.0	91.7	0.96	884	<1	**1.46**	0.02	0.02	**0.04**	**1.7**	1.7	<0.01	**0.18**
			GWDUP2	Interlab_D	1024024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Oct 2023	BH104R	Normal	ES2334429	4970	**102**	<1	914	1370	172	229	19	1530	2500	152	94.5	91.9	1.35	914	<1	**1.04**	0.01	0.08	**0.09**	**1.4**	1.3	<0.01	**0.13**
		08 Nov 2023	BH104R	Normal	ES2338893-AF	*5170*	**114**	<1	850	1100	134	185	19	1530	2460	157	88.9	89.6	0.39	850	<1	**1.17**	<0.01	0.04	**0.04**	**1.4**	1.4	<0.01	**0.12**
		06 Dec 2023	BH104R	Normal	ES2342531	*5060*	**79**	<1	1020	888	123	141	19	1590	2160	157	87.4	84.6	1.63	1020	<1	**1.90**	<0.01	<0.01	<0.01	**2.1**	2.1	<0.01	**0.10**
		19 Jan 2024	BH104R	Normal	ES2401985	*5060*	**82**	<1	993	936	131	148	17	1650	2080	196	90.9	82.6	4.80	993	<1	**1.69**	<0.01	<0.01	<0.01	**1.8**	1.8	-	**0.12**
			GWDUP2	Interlab_D	1061811	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13 Feb 2024	BH104R	Normal	ES2404914	*5450*	**142**	<1	1050	882	111	147	17	1330	2210	232	75.9	88.2	7.45	1050	<1	**1.45**	<0.01	0.08	<0.01	**1.7**	1.7	<0.01	**0.14**
		15 Mar 2024	BH104R	Normal	ES2408629	4730	**135**	<1	1080	920	144	136	18	1600	2170	197	88.4	86.9	0.88	1080	<1	**1.57**	<0.01	0.01	0.01	**2.0**	2.0	<0.01	**0.16**
			GWDUP2	Interlab_D	1079293	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11 Apr 2024	BH104R	Normal	ES2411734	4860	**72**	<1	1090	787	99	131	16	1550	2190	208	83.6	87.9	2.53	1090	<1	**1.56**	<0.01	<0.01	<0.01	**1.8**	1.8	<0.01	**0.10**
		15 May 2024	BH104R	Normal	ES2415903	4840	**89**	<1	993	809	108	131	17	1620	2060	220	87.1	82.5	2.68	993	<1	**1.70**	<0.01	0.01	<0.01	**2.0**	2.0	<0.01	**0.12**
			GWDUP1	Field_D	ES2415903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Jun 2024	BH104R	Normal	ES2419514	4840	**64**	<1	1010	798	102	132	17	1610	2300	216	86.4	89.6	1.78	1010	<1	**1.72**	<0.01	<0.01	<0.01	**1.7**	1.7	<0.01	**0.07**
		11 Jul 2024	BH104R	Normal	ES2422922	4910	**72**	<1	1070	742	96	122	14	1340	1810	214	73.5	76.9	2.27	1070	<1	**1.92**	0.03	<0.01	0.03	**2.1**	2.1	<0.01	**0.08**
			GWDUP1	Field_D	ES2422922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Aug 2024	BH104R	Normal	ES2425825	4100	**52**	<1	1100	779	106	125	17	1610	1800	218	86.0	77.3	5.36	1100	<1	**1.78**	<0.01	<0.01	<0.01	**2.2**	2.2	<0.01	**0.08**
			GWDUP2	Interlab_D	1127260	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Sep 2024	BH104R	Normal	ES2429962	4620	**38**	<1	1090	732	100	117	17	1540	1980	224	82.0	82.3	0.16	1090	<1	**1.81**	<0.01	<0.01	<0.01	**2.0**	2.0	<0.01	**0.06**
			GWDUP2	Interlab_D	1139072	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

						Inorganics		Acidity & Alkalinity			Major Ions									Minor Ions		Nutrients							
						Total Dissolved Solids	Total Suspended Solids	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Hardness as CaCO3 (filtered)	Calcium (filtered)	Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)	Chloride	Sulfate (filtered)	Cations Total	Anions Total	Ionic Balance	Bicarbonate ion (HCO3-)	Carbonate ion	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total Oxidised) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Reactive Phosphorus as P	Phosphorus (Total)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL						10	5	1	1	1	1	1	1	1	1	1	0.01	0.01	0.01	1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)																500[#1]							11.29[#2]	0.91[#3]					
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)							**6**															**0.01165[#4]**			**0.04**	**0.35**		**0.008**	**0.025**
Package	**Location**	**Date**	**Field ID**	**Sample Type**	**Lab Report**																								
	BH107	15 Aug 2022	BH107	Normal	ES2229015	2920	**116**	<1	1480	516	35	104	22	929	726	169	51.3	53.6	2.18	1480	<1	<0.01	12.3	<0.01	**12.3**	**14.2**	1.9	<0.01	**0.10**
		19 Sep 2022	BH107	Normal	ES2233729	2980	**184**	<1	1470	485	36	96	24	959	627	205	52.0	51.3	0.68	1470	<1	<0.01	12.5	<0.01	**12.5**	**13.7**	1.2	**0.01**	**0.06**
		20 Oct 2022	BH107	Normal	ES2237811	3200	**35**	<1	1200	575	44	113	21	1030	973	240	56.8	56.4	0.37	1200	<1	<0.01	7.34	0.11	**7.45**	**9.4**	1.9	<0.01	**0.04**
			GWDUP2	Interlab_D	934854	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16 Nov 2022	BH107	Normal	ES2241428	3130	**143**	<1	1410	555	41	110	22	998	911	230	55.1	58.6	3.15	1410	<1	<0.01	9.26	0.05	**9.31**	**10.7**	1.4	**0.01**	**0.09**
			GWDUP2	Interlab_D	941927	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH107R	16 Dec 2022	BH107R	Normal	ES2245760	2040	**1890**	<1	1280	360	32	68	15	628	318	180	34.9	38.3	4.64	1280	<1	**0.44**	0.18	0.08	**0.26**	**2.9**	2.6	<0.01	**1.05**
			GWDUP1	Field_D	ES2245760	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Feb 2023	BH107R	Normal	ES2304063	2250	**258**	<1	1430	380	30	74	14	715	296	181	39.0	40.7	2.06	1430	<1	**0.23**	0.22	0.08	**0.30**	**1.1**	0.8	<0.01	**0.14**
		03 Mar 2023	BH107R	Normal	ES2307153	2120	**275**	<1	1420	437	30	88	13	765	283	186	42.3	40.2	2.57	1420	<1	**0.22**	0.97	<0.01	**0.97**	**1.6**	0.6	<0.01	**0.15**
			GWDUP2	Interlab_D	969408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04 Apr 2023	BH107R	Normal	ES2311426	2240	**248**	<1	1470	427	34	83	15	746	306	207	41.4	42.3	1.14	1470	<1	**0.23**	0.83	<0.01	**0.83**	**1.4**	0.6	<0.01	**0.13**
		05 Apr 2023	GWDUP2	Interlab_D	979752	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		02 May 2023	BH107R	Normal	ES2314383	2160	**155**	<1	1430	397	32	77	12	598	270	172	34.2	39.8	7.45	1430	<1	**0.12**	2.08	<0.01	**2.08**	**2.7**	0.6	<0.01	**0.09**
			GWDUP2	Interlab_D	986190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jul 2023	BH107R	Normal	ES2322790	1840	**161**	<1	1360	447	29	91	12	622	183	156	36.3	35.6	1.00	1360	<1	**0.03**	3.23	<0.01	**3.23**	**4.0**	0.8	<0.01	**0.09**
			GWDUP1	Field_D	ES2322790	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09 Aug 2023	BH107R	Normal	ES2326796	2190	**315**	<1	1500	470	38	91	13	708	265	199	40.5	41.6	1.31	1500	<1	**0.12**	2.55	<0.01	**2.55**	**3.2**	0.6	**0.03**	**0.10**
			GWDUP2	Interlab_D	1015966	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05 Sep 2023	BH107R	Normal	ES2330598	2120	**49**	<1	1420	503	40	98	14	685	264	209	40.2	40.2	0.06	1420	<1	**0.02**	3.03	<0.01	**3.03**	**3.5**	0.5	**0.03**	**0.05**
			GWDUP1	Field_D	ES2330598	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Oct 2023	BH107R	Normal	ES2334429	2250	**208**	<1	1560	508	42	98	15	765	356	223	43.8	45.8	2.27	1550	11	**0.09**	2.52	0.06	**2.58**	**3.1**	0.5	**0.01**	**0.10**
			GWDUP2	Interlab_D	1033274	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Nov 2023	BH107R	Normal	ES2338893-AF	2220	**496**	<1	1340	512	37	102	15	689	272	194	40.6	38.5	2.67	1340	<1	**0.02**	2.77	<0.01	**2.77**	**4.4**	1.6	<0.01	**0.26**
			GWDUP2	Interlab_D	1043528	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Dec 2023	BH107R	Normal	ES2342531	2320	**106**	<1	1530	511	38	101	14	649	277	158	38.8	41.7	3.57	1530	<1	<0.01	2.50	<0.01	**2.50**	**2.9**	0.4	<0.01	**0.06**
			GWDUP2	Interlab_D	1052387	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Jan 2024	BH107R	Normal	ES2401985	2550	**108**	<1	1490	535	41	105	14	795	328	203	45.6	43.2	2.67	1490	<1	**0.04**	2.13	<0.01	**2.13**	**2.4**	0.3	-	**0.08**
		13 Feb 2024	BH107R	Normal	ES2404914	3010	**40**	<1	1580	515	38	102	15	629	320	220	38.0	45.2	8.58	1580	<1	**0.05**	2.27	<0.01	**2.27**	**2.7**	0.4	<0.01	**0.05**
			GWDUP2	Interlab_D	1069861	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 Mar 2024	BH107R	Normal	ES2408629	2120	**65**	<1	1570	568	43	112	15	709	272	197	42.6	43.1	0.65	1480	89	<0.01	2.40	<0.01	**2.40**	**3.4**	1.0	<0.01	**0.04**
		11 Apr 2024	BH107R	Normal	ES2411734	2330	**28**	<1	1600	536	38	107	15	739	308	200	43.2	44.8	1.80	1600	<1	**0.02**	2.20	<0.01	**2.20**	**2.6**	0.4	**0.02**	**0.03**
			GWDUP2	Interlab_D	1087440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 May 2024	BH107R	Normal	ES2415903	2160	**17**	<1	1440	547	41	108	15	735	301	210	43.3	41.6	1.95	1440	<1	**0.19**	2.30	<0.01	**2.30**	**2.6**	0.3	<0.01	**0.04**
		16 May 2024	GWDUP2	Interlab_D	1099024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Jun 2024	BH107R	Normal	ES2419514	2260	**27**	<1	1370	526	39	104	14	708	315	207	41.6	40.6	1.33	1370	<1	**0.02**	2.24	<0.01	**2.24**	**2.6**	0.4	<0.01	<0.01
		11 Jul 2024	BH107R	Normal	ES2422922	2270	**12**	<1	1530	507	35	102	12	593	351	175	36.2	44.1	9.80	1530	<1	<0.01	2.22	<0.01	**2.22**	**2.6**	0.4	**0.01**	0.02
			GWDUP2	Interlab_D	1117977	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Aug 2024	BH107R	Normal	ES2425825	2120	**24**	<1	1570	531	41	104	15	754	325	205	43.8	44.8	1.15	1570	<1	**0.04**	1.99	<0.01	**1.99**	**2.4**	0.4	<0.01	**0.04**
			GWDUP1	Field_D	ES2425825	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Sep 2024	BH107R	Normal	ES2429962	2270	**22**	<1	1570	522	41	102	15	754	323	228	43.6	45.2	1.81	1570	<1	**0.02**	2.45	<0.01	**2.45**	**2.8**	0.3	<0.01	**0.04**
	BH112	15 Aug 2022	BH112	Normal	ES2229015	1930	**2120**	<1	948	261	17	53	10	657	576	100	34.0	37.3	4.52	948	<1	<0.01	0.22	<0.01	**0.22**	0.2	<0.1	<0.01	**0.24**
			GWDUP2	Interlab_D	915049	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Sep 2022	BH112	Normal	ES2233729	2020	**1620**	<1	940	268	20	53	11	683	518	103	35.4	35.5	0.26	940	<1	0.01	0.15	<0.01	**0.15**	**0.6**	0.4	<0.01	**0.15**
			GWDUP2	Interlab_D	925349	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20 Oct 2022	BH112	Normal	ES2237811	2070	**1640**	<1	922	283	21	56	14	737	570	101	38.1	36.6	1.97	922	<1	**0.04**	0.13	<0.01	**0.13**	**1.4**	1.3	<0.01	**0.39**
			GWDUP1	Field_D	ES2237811	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16 Nov 2022	BH112	Normal	ES2241428	2150	**2710**	<1	1040	260	20	51	12	713	628	114	36.5	40.9	5.62	1040	<1	**0.23**	0.14	<0.01	**0.14**	**1.8**	1.7	<0.01	**1.06**

						Inorganics		Acidity & Alkalinity			Major Ions									Minor Ions		Nutrients							
						Total Dissolved Solids	Total Suspended Solids	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Hardness as CaCO3 (filtered)	Calcium (filtered)	Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)	Chloride	Sulfate (filtered)	Cations Total	Anions Total	Ionic Balance	Bicarbonate ion (HCO3-)	Carbonate ion	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total Oxidised) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Reactive Phosphorus as P	Phosphorus (Total)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL						10	5	1	1	1	1	1	1	1	1	1	0.01	0.01	0.01	1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)																500[#1]							11.29[#2]	0.91[#3]					
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)							**6**															**0.01165[#4]**			**0.04**	**0.35**		**0.008**	**0.025**
Package	**Location**	**Date**	**Field ID**	**Sample Type**	**Lab Report**																								
	BH112R	09 Aug 2023	BH112R	Normal	ES2326796	*10200*	**566**	<1	1350	2630	280	468	46	3220	3930	*1700*	194	173	5.59	1350	<1	2.32	0.55	2.00	**2.55**	**5.4**	2.8	**0.35**	**1.04**
		05 Sep 2023	BH112R	Normal	ES2330598	*9920*	**80**	<1	1290	2360	266	412	41	2830	4180	*1880*	171	183	3.25	1290	<1	2.39	1.39	1.34	**2.73**	**6.1**	3.4	**0.36**	**0.37**
		06 Oct 2023	BH112R	Normal	ES2334429	*9750*	**72**	<1	1370	2290	229	417	41	2890	3960	*2060*	172	182	2.67	1370	<1	2.66	1.72	0.32	**2.04**	**4.8**	2.8	**0.22**	**0.29**
			GWDUP1	Field_D	ES2334429	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Nov 2023	BH112R	Normal	ES2338893-AF	*10600*	**123**	<1	1200	2100	196	392	40	2770	4270	*1780*	164	181	5.20	1200	<1	1.93	1.86	0.31	**2.17**	**4.8**	2.6	**0.16**	**0.23**
			GWDUP1	Field_D	ES2338893-AF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Dec 2023	BH112R	Normal	ES2342531	*11400*	**77**	<1	1340	2270	228	414	46	2970	3930	*1290*	176	164	3.33	1340	<1	2.23	1.63	0.07	**1.70**	**4.2**	2.5	**0.12**	**0.19**
		19 Jan 2024	BH112R	Normal	ES2401985	*10700*	**60**	<1	1260	2460	251	446	42	3140	4040	*1620*	187	173	3.90	1260	<1	2.26	0.94	0.12	**1.06**	**3.5**	2.4	-	**0.18**
		13 Feb 2024	BH112R	Normal	ES2404914	*11100*	**48**	<1	1340	1930	202	347	42	2480	4050	*1700*	148	176	8.90	1340	<1	2.20	0.34	0.16	**0.50**	**3.1**	2.6	**0.09**	**0.14**
			GWDUP1	Field_D	ES2404914	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 Mar 2024	BH112R	Normal	ES2408629	*9900*	**52**	<1	1350	2330	270	403	42	2910	4320	*1740*	174	185	3.00	1350	<1	2.51	0.26	0.02	**0.28**	**3.2**	2.9	**0.08**	**0.11**
		11 Apr 2024	BH112R	Normal	ES2411734	*10100*	**22**	<1	1340	2130	192	401	41	2930	4040	*1490*	171	172	0.20	1340	<1	2.55	0.24	0.10	**0.34**	**3.0**	2.7	**0.07**	**0.15**
			GWDUP1	Field_D	ES2411734	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 May 2024	BH112R	Normal	ES2415903	*10100*	**51**	<1	1230	2220	202	416	42	2970	4110	*2090*	174	184	2.63	1230	<1	2.70	0.26	0.05	**0.31**	**3.1**	2.8	**0.06**	**0.11**
		12 Jun 2024	BH112R	Normal	ES2419514	*10000*	**115**	<1	1150	2110	193	395	40	2880	4130	*1600*	168	173	1.28	1150	<1	2.57	0.40	0.05	**0.45**	**3.2**	2.7	**0.05**	**0.14**
			GWDUP2	Interlab_D	1109038	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11 Jul 2024	BH112R	Normal	ES2422922	*10400*	**46**	<1	1310	2130	191	401	35	2600	4670	*1600*	156	191	9.98	1310	<1	2.14	0.88	0.05	**0.93**	**3.5**	2.6	**0.05**	**0.09**
		06 Aug 2024	BH112R	Normal	ES2425825	*9370*	**49**	<1	1340	2300	222	425	42	3050	4420	*1850*	180	190	2.75	1340	<1	2.50	0.29	0.03	**0.32**	**3.4**	3.1	**0.04**	**0.11**
		12 Sep 2024	BH112R	Normal	ES2429962	*9860*	**24**	<1	1320	2220	211	410	41	2880	3890	*1860*	170	175	1.23	1320	<1	2.40	0.39	0.01	**0.40**	**3.0**	2.6	**0.04**	**0.11**
M12 - Central	BH144	15 Nov 2022	BH144	Normal	ES2241428	2570	**8920**	<1	250	21	5	2	2	336	376	32	15.1	16.3	3.79	250	<1	**0.67**	10.7	0.13	**10.8**	**26.4**	15.6	<0.05[#15]	**3.51**
	BH145	15 Aug 2022	BH145	Normal	ES2229015	2510	**2900**	<1	322	60	14	6	4	904	1100	71	40.6	38.9	2.10	322	<1	**0.52**	45.7	1.16	**46.9**	**48.4**	1.5	<0.01	**0.04**
		19 Sep 2022	BH145	Normal	ES2233729	2950	**5390**	<1	377	97	24	9	6	1140	1330	86	51.7	46.8	4.91	377	<1	**0.73**	50.9	1.51	**52.4**	**63.7**	11.3	<0.01	**3.22**
		20 Oct 2022	BH145	Normal	ES2237811	3030	**624**	<1	320	215	68	11	6	1280	1250	87	60.1	50.4	8.84	320	<1	**0.39**	72.0	0.60	**72.6**	**96.4**	23.8	<0.01	**0.06**
		15 Nov 2022	BH145	Normal	ES2241428	2770	**3310**	<1	387	70	18	6	4	952	1170	81	42.9	42.4	0.56	387	<1	**0.24**	51.8	0.57	**52.4**	**59.3**	6.9	<0.01	**0.22**
		14 Dec 2022	BH145	Normal	ES2245760	3180	**5850**	<1	401	94	23	9	6	1120	1410	86	50.8	49.6	1.18	401	<1	**0.25**	50.0	0.68	**50.7**	**57.0**	6.3	<0.01	**0.18**
		17 Jan 2023	BH145	Normal	ES2301690	3750	**12800**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.35**	65.2	0.99	**66.2**	**71.7**	5.5	<0.01	**0.77**
		07 Feb 2023	BH145	Normal	ES2304063	-	-	<1	404	118	29	11	7	1390	1620	99	63.0	55.8	6.03	404	<1	**0.22**	88.8	0.75	**89.6**	**107**	17.0	<0.01	**1.28**
		02 Mar 2023	BH145	Normal	ES2307153	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH145R	05 Apr 2023	BH145R	Normal	ES2311426	*5710*	**38**	<1	696	974	80	188	14	1740	3040	243	95.5	105	4.60	696	<1	**1.40**	0.01	0.01	0.02	**1.8**	1.8	<0.01	**0.07**
		02 May 2023	BH145R	Normal	ES2314383	*6230*	**79**	<1	818	1170	105	221	13	1870	3400	241	105	117	5.47	818	<1	**1.67**	<0.01	<0.01	<0.01	**1.9**	1.9	<0.01	**0.09**
		06 Jun 2023	BH145R	Normal	ES2319027	*7490*	**67**	<1	834	1580	125	308	14	2270	4270	269	131	143	4.40	834	<1	**1.82**	<0.01	<0.01	<0.01	**1.9**	1.9	<0.01	**0.05**
			GWDUP1	Field_D	ES2319027	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jul 2023	BH145R	Normal	ES2322790	*8730*	**111**	<1	881	1830	126	368	15	2480	4220	271	145	142	0.89	881	<1	**1.86**	<0.01	<0.01	<0.01	**1.9**	1.9	<0.01	**0.11**
		09 Aug 2023	BH145R	Normal	ES2326796	*9290*	**288**	<1	903	2380	197	458	19	2980	4410	318	178	149	8.74	903	<1	**1.77**	<0.01	<0.01	<0.01	**2.2**	2.2	<0.01	**0.51**
		06 Sep 2023	BH145R	Normal	ES2330598	*9970*	**89**	<1	884	2090	181	398	15	2480	5020	334	150	166	5.12	884	<1	**1.87**	<0.01	<0.01	<0.01	**2.0**	2.0	<0.01	**0.06**
		06 Oct 2023	BH145R	Normal	ES2334429	*10200*	**47**	<1	969	2510	202	487	18	2980	5150	350	180	172	2.36	969	<1	**1.97**	<0.01	<0.01	<0.01	**2.2**	2.2	<0.01	**0.04**
		09 Nov 2023	BH145R	Normal	ES2338893-AF	*11900*	**44**	<1	890	2500	192	490	18	3020	5310	384	182	176	1.72	890	<1	**1.97**	0.01	<0.01	0.01	**2.2**	2.2	<0.01	**0.03**
		05 Dec 2023	BH145R	Normal	ES2342531	*11000*	**17**	<1	998	2610	212	506	19	3030	5800	383	184	192	1.87	998	<1	**2.14**	<0.01	<0.01	<0.01	**2.2**	2.2	<0.01	**0.04**
			GWDUP1	Field_D	ES2342531	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Jan 2024	BH145R	Normal	ES2401985	*13300*	**99**	<1	980	2890	227	564	18	3280	5810	375	201	191	2.45	980	<1	**2.09**	<0.01	<0.01	<0.01	**2.3**	2.3	-	**0.11**
			GWDUP1	Field_D	ES2401985	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14 Feb 2024	BH145R	Normal	ES2404914	*14500*	**115**	<1	1050	2460	206	473	19	2720	5600	385	168	187	5.34	1050	<1	**2.12**	<0.01	<0.01	<0.01	**2.3**	2.3	<0.01	**0.08**
		14 Mar 2024	BH145R	Normal	ES2408629	*11900*	**38**	<1	1070	2920	254	554	19	3190	6170	372	198	203	1.41	1070	<1	**2.23**	0.16	<0.01	**0.16**	**2.5**	2.3	<0.01	**0.03**
			GWDUP1	Field_D	ES2408629	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Apr 2024	BH145R	Normal	ES2411734	*8570*	**34**	<1	788	1900	141	377	16	2270	4110	280	137	138	0.11	788	<1	**1.77**	0.79	0.02	**0.81**	**3.0**	2.2	<0.01	**0.05**
		16 May 2024	BH145R	Normal	ES2415903	*10500*	**44**	<1	891	2590	200	508	18	3020	5230	333	184	172	3.19	891	<1	**2.24**	0.04	<0.01	**0.04**	**2.2**	2.2	<0.01	**0.04**
		06 Jun 2024	BH145R	Normal	ES2418682	*10800*	**38**	<1	1010	2750	202	546	17	3050	5560	341	188	184	1.07	1010	<1	**2.10**	0.02	<0.01	0.02	**2.0**	2.0	<0.01	**0.03**
			GWDUP1	Field_D	ES2418682	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10 Jul 2024	BH145R	Normal	ES2422922	*6030*	**464**	<1	896	1400	112	271	11	1840	3650	208	108	125	7.28	896	<1	**3.14**	<0.01	<0.01	<0.01	**3.7**	3.7	<0.01	**0.12**

						Inorganics		Acidity & Alkalinity			Major Ions										Minor Ions		Nutrients							
						Total Dissolved Solids	Total Suspended Solids	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Hardness as CaCO3 (filtered)	Calcium (filtered)	Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)	Chloride	Sulfate (filtered)	Cations Total	Anions Total	Ionic Balance	Bicarbonate ion (HCO3-)	Carbonate ion	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total Oxidised) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Reactive Phosphorus as P	Phosphorus (Total)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL						10	5	1	1	1	1	1	1	1	1	1	0.01	0.01	0.01	1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)																500[#1]							11.29[#2]	0.91[#3]					
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)							**6**															**0.01165[#4]**			**0.04**	**0.35**		**0.008**	**0.025**
Package	**Location**	**Date**	**Field ID**	**Sample Type**	**Lab Report**																								
		07 Aug 2024	BH145R	Normal	ES2425825	*10000*	**53**	<1	1050	2830	217	556	18	3240	6070	332	198	199	0.29	1050	<1	2.30	0.01	<0.01	0.01	**2.8**	2.8	<0.01	**0.07**
		11 Sep 2024	BH145R	Normal	ES2429962	*11100*	**25**	<1	1050	2690	209	526	18	3100	6320	333	189	206	4.34	1050	<1	2.17	<0.01	<0.01	<0.01	**2.3**	2.3	<0.01	**0.04**
			GWDUP1	Field_D	ES2429962	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistics																													
Number of Results						93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	94	94	94	94	94	94	90	94
Number of Detects						93	93	0	93	93	93	93	93	93	93	93	93	93	93	93	2	85	72	38	74	94	93	21	93
Minimum Concentration						1840	12	<1	250	21	5	2	2	336	183	32	15.1	16.3	0.06	250	<1	0.01	0.01	0.01	0.01	0.2	<0.1	0.01	<0.01
Minimum Detect						1840	12	ND	250	21	5	2	2	336	183	32	15.1	16.3	0.06	250	11	0.01	0.01	0.01	0.01	0.2	0.3	0.01	0.02
Maximum Concentration						16500	12800	<1	1600	4320	335	847	46	3880	8520	2090	256	275	13.1	1600	89	3.14	88.8	2	89.6	107	23.8	0.36	3.51
Maximum Detect						16500	12800	ND	1600	4320	335	847	46	3880	8520	2090	256	275	13.1	1600	89	3.14	88.8	2	89.6	107	23.8	0.36	3.51
Average Concentration *						6219	634	0.5	1081	1343	125	251	20	1772	2689	460	104	107	3.2	1080	1.6	1.1	6	0.13	6.1	8.6	2.5	0.024	0.24
Median Concentration *						5010	89	0.5	1050	974	121	183	17	1530	2410	210	87.4	88.2	2.53	1050	0.5	1.32	0.26	0.005	0.315	2.6	1.9	0.005	0.1
Standard Deviation *						3977	1841	0	323	1039	87	203	11	990	2130	564	63	65	2.6	321	9.2	0.95	16	0.34	17	19	3.4	0.06	0.52
95% UCL (Student's-t) *						6904	951.2	0.5	1137	1522	139.8	285.5	21.7	1942	3056	556.9	115.3	118.4	3.666	1136	3.155	1.312	8.777	0.187	8.938	11.89	3.077	0.0348	0.326

* A Non Detect Multiplier of 0.5 has been applied.

Comments
#1 Not specifically guideline value: >500mg/L can have purgative effects
#2 Guideline value calculated by dividing Nitrate (as Nitrate) value (50 mg/L) by 4.427
#3 Guideline value calculated by dividing Nitrite (as Nitrite) value (0.3 mg/L) by molecular weight (3.2967033).
#4 Calculated from ammonia NH4
#5 Loss of production expected at 5000 mg/L for beef cattle, 4000 mg/L dairy cattle, 10000 mg/L sheep, 6000 mg/L horses and pigs, 3000 mg/L poultry
#6 400 mg/L divided by molecular weight, stock may tolerate higher nitrate concentrations if nitrate in feed are not high, water containing >1500 mg/L (as NO3) is likely to be toxic.
#7 30 mg/L divided by molecular weight
#8 >0.5 mg/L hazardous to sheep, >1 mg/L for cattle, >5 mg/L pigs and poulty
#9 Measured as NH3-N at pH 8
#10 Values taken from "Updating nitrate toxicity effects on freshwater aquatic species, 2013"
#11 In absence of total As guideline, As (V) guideline has been adopted.
#12 In absence of total Cr guideline, Cr (VI) guideline has been adopted.
#13 Not limiting: Derived water HSL exceeds water solubility limit
#14 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#15 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards
National Health and Medical Research Council, January 2022, ADWG 2011 Health (v3.7 updated 2022)
Department of Agriculture and Water Resources, 2018 updated July 2021, ANZG (2018) - FW - 95% (updated 26 July 2021)

					Metals										BTEXN								TRH - NEPM 2013						
					Arsenic (filtered)	Cadmium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Iron (filtered)	Lead (filtered)	Manganese (filtered)	Mercury (filtered)	Nickel (filtered)	Zinc (filtered)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Naphthalene (BTEXN suite)	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)
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001	0.005	1	2	2	2	2	2	1	5	20	20	100	100	100	100	100
ADWG 2011 Health (v3.7 updated 2022)					0.01	0.002		2		0.01	0.5	0.001	0.02		1	800	300			600										
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																													
Package	**Location**	**Date**	**Field ID**	**Sample Type**																									
M12 - West	BH104	15 Aug 2022	BH104	Normal	<0.001	<0.0001	<0.001	0.081	<0.05	<0.001	0.135	<0.0001	0.008	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	<0.001	<0.0001	<0.001	0.084	-	<0.001	-	<0.0001	0.008	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Sep 2022	BH104	Normal	<0.001	<0.0001	<0.001	0.087	<0.05	<0.001	0.124	<0.0001	0.071	0.016	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	<0.001	<0.0001	<0.001	0.088	-	<0.001	-	<0.0001	0.073	0.016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20 Oct 2022	BH104	Normal	<0.001	<0.0001	<0.001	0.028	<0.05	<0.001	0.139	<0.0001	0.010	0.011	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		16 Nov 2022	BH104	Normal	<0.001	<0.0001	<0.001	0.036	<0.05	<0.001	0.278	<0.0001	0.008	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	<0.001	<0.0001	<0.001	0.036	-	<0.001	-	<0.0001	0.008	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH104R	16 Dec 2022	BH104R	Normal	0.004	<0.0001	<0.001	<0.001	0.83	<0.001	0.342	<0.0001	0.001	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	0.004	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18 Jan 2023	BH104R	Normal	0.005	<0.0001	<0.001	<0.001	1.47	<0.001	0.314	<0.0001	0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.005	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	0.005	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Feb 2023	BH104R	Normal	0.003	<0.0001	<0.001	<0.001	1.38	<0.001	0.254	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.003	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	0.003	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		03 Mar 2023	BH104R	Normal	0.002	<0.0001	<0.001	<0.001	1.33	<0.001	0.250	<0.0001	0.001	0.067	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.003	<0.0001	<0.001	0.001	-	<0.001	-	<0.0001	<0.001	0.068	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04 Apr 2023	BH104R	Normal	0.003	<0.0001	<0.001	<0.001	1.27	<0.001	0.269	<0.0001	0.014	0.008	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.003	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.012	0.009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		02 May 2023	BH104R	Normal	0.003	<0.0001	<0.001	<0.001	1.24	<0.001	0.194	<0.0001	0.004	0.036	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.003	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.004	0.035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jun 2023	BH104R	Normal	0.001	<0.0001	<0.001	0.002	0.48	<0.001	0.198	<0.0001	0.003	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	0.002	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jul 2023	BH104R	Normal	0.002	<0.0001	<0.001	<0.001	0.91	<0.001	0.178	<0.0001	0.003	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	0.002	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09 Aug 2023	BH104R	Normal	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.154	<0.0001	0.002	0.012	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	0.014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05 Sep 2023	BH104R	Normal	0.001	<0.0001	<0.001	<0.001	0.92	<0.001	0.178	<0.0001	0.001	0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	0.002	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Oct 2023	BH104R	Normal	0.002	<0.0001	<0.001	<0.001	0.70	<0.001	0.158	<0.0001	0.023	0.023	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		08 Nov 2023	BH104R	Normal	0.002	<0.0001	<0.001	0.002	0.70	<0.001	0.120	<0.0001	0.001	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		06 Dec 2023	BH104R	Normal	0.002	<0.0001	<0.001	<0.001	1.13	<0.001	0.115	<0.0001	<0.001	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		19 Jan 2024	BH104R	Normal	0.003	<0.0001	<0.001	<0.001	1.40	<0.001	0.126	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	0.003	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13 Feb 2024	BH104R	Normal	0.002	<0.0001	<0.001	<0.001	1.04	<0.001	0.124	<0.0001	0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		15 Mar 2024	BH104R	Normal	0.004	<0.0001	<0.001	<0.001	1.91	<0.001	0.190	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	0.004	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11 Apr 2024	BH104R	Normal	0.003	<0.0001	<0.001	<0.001	1.03	<0.001	0.103	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		15 May 2024	BH104R	Normal	0.003	<0.0001	<0.001	<0.001	1.43	<0.001	0.103	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.003	<0.0001	<0.001	0.001	-	<0.001	-	<0.0001	0.002	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Jun 2024	BH104R	Normal	0.003	<0.0001	<0.001	0.003	1.38	<0.001	0.099	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		11 Jul 2024	BH104R	Normal	0.003	<0.0001	<0.001	<0.001	1.38	<0.001	0.095	<0.0001	<0.001	0.008	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.003	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Aug 2024	BH104R	Normal	0.003	<0.0001	<0.001	<0.001	1.58	<0.001	0.096	<0.0001	0.011	0.018	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	0.003	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.010	0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Sep 2024	BH104R	Normal	0.003	<0.0001	<0.001	<0.001	1.24	<0.001	0.072	<0.0001	0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	0.003	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.001	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

					Metals										BTEXN								TRH - NEPM 2013						
					Arsenic (filtered)	Cadmium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Iron (filtered)	Lead (filtered)	Manganese (filtered)	Mercury (filtered)	Nickel (filtered)	Zinc (filtered)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Naphthalene (BTEXN suite)	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)
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001	0.005	1	2	2	2	2	2	1	5	20	20	100	100	100	100	100
ADWG 2011 Health (v3.7 updated 2022)					0.01	0.002		2		0.01	0.5	0.001	0.02		1	800	300			600										
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																													
Package	**Location**	**Date**	**Field ID**	**Sample Type**																									
	BH107	15 Aug 2022	BH107	Normal	<0.001	<0.0001	<0.001	0.004	<0.05	<0.001	<0.001	<0.0001	<0.001	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		19 Sep 2022	BH107	Normal	<0.001	<0.0001	<0.001	0.004	<0.05	<0.001	<0.001	<0.0001	<0.001	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		20 Oct 2022	BH107	Normal	<0.001	<0.0001	<0.001	0.005	<0.05	<0.001	0.122	<0.0001	0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16 Nov 2022	BH107	Normal	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.086	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.003	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH107R	16 Dec 2022	BH107R	Normal	0.003	<0.0001	<0.001	0.003	<0.05	<0.001	0.168	<0.0001	0.002	0.012	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.003	<0.0001	<0.001	0.002	-	<0.001	-	<0.0001	0.002	0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Feb 2023	BH107R	Normal	<0.001	<0.0001	<0.001	0.006	<0.05	<0.001	0.074	<0.0001	0.001	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		03 Mar 2023	BH107R	Normal	<0.001	<0.0001	<0.001	0.004	<0.05	<0.001	0.091	<0.0001	0.002	0.125	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	0.001	<0.0002	<0.001	0.005	-	<0.001	-	<0.0001	0.002	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04 Apr 2023	BH107R	Normal	<0.001	<0.0001	<0.001	0.005	<0.05	<0.001	0.089	<0.0001	0.006	0.010	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		05 Apr 2023	GWDUP2	Interlab_D	0.001	<0.0002	<0.001	0.004	-	<0.001	-	<0.0001	0.005	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		02 May 2023	BH107R	Normal	<0.001	<0.0001	<0.001	0.005	<0.05	<0.001	0.042	<0.0001	0.010	0.026	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.006	-	<0.001	-	<0.0001	0.008	0.025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jul 2023	BH107R	Normal	<0.001	<0.0001	0.001	0.005	<0.05	<0.001	0.033	<0.0001	0.002	0.012	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	<0.001	<0.0001	<0.001	0.005	-	<0.001	-	<0.0001	0.001	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09 Aug 2023	BH107R	Normal	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.033	<0.0001	0.002	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.004	-	<0.001	-	<0.0001	0.002	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05 Sep 2023	BH107R	Normal	<0.001	<0.0001	<0.001	0.009	<0.05	<0.001	0.018	<0.0001	0.002	0.009	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	<0.001	<0.0001	<0.001	0.009	-	<0.001	-	<0.0001	0.002	0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Oct 2023	BH107R	Normal	<0.001	<0.0001	<0.001	0.004	<0.05	<0.001	0.030	<0.0001	0.006	0.018	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.003	-	<0.001	-	<0.0001	0.006	0.014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Nov 2023	BH107R	Normal	<0.001	<0.0001	<0.001	0.007	<0.05	<0.001	0.010	<0.0001	0.005	0.018	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.005	-	<0.001	-	<0.0001	0.004	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Dec 2023	BH107R	Normal	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.007	<0.0001	0.002	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.002	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Jan 2024	BH107R	Normal	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.025	<0.0001	0.001	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		13 Feb 2024	BH107R	Normal	<0.001	<0.0001	<0.001	0.001	<0.05	<0.001	0.012	<0.0001	0.001	0.010	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 Mar 2024	BH107R	Normal	<0.001	<0.0001	<0.001	0.003	<0.05	<0.001	0.005	<0.0001	0.002	0.011	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		11 Apr 2024	BH107R	Normal	<0.001	<0.0001	<0.001	0.001	<0.05	<0.001	0.004	<0.0001	<0.001	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.001	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 May 2024	BH107R	Normal	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.006	<0.0001	0.001	0.009	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		16 May 2024	GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.001	0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Jun 2024	BH107R	Normal	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.003	<0.0001	0.001	0.008	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		11 Jul 2024	BH107R	Normal	<0.001	<0.0001	<0.001	0.003	<0.05	<0.001	0.002	<0.0001	0.001	0.013	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.003	-	<0.001	-	<0.0001	0.001	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Aug 2024	BH107R	Normal	<0.001	<0.0001	<0.001	0.001	<0.05	<0.001	0.007	<0.0001	0.010	0.017	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.008	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Sep 2024	BH107R	Normal	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.004	<0.0001	<0.001	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
BH112		15 Aug 2022	BH112	Normal	<0.001	<0.0001	<0.001	0.003	<0.05	<0.001	0.007	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	<0.001	0.003	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Sep 2022	BH112	Normal	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.002	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	<0.001	<0.0002	0.003	0.003	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20 Oct 2022	BH112	Normal	<0.001	<0.0001	<0.001	0.006	<0.05	<0.001	0.525	<0.0001	0.005	0.049	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.001	<0.0001	<0.001	0.003	-	<0.001	-	<0.0001	0.006	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16 Nov 2022	BH112	Normal	<0.001	<0.0001	<0.001	0.003	<0.05	<0.001	0.051	<0.0001	0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100

					Metals										BTEXN								TRH - NEPM 2013						
					Arsenic (filtered)	Cadmium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Iron (filtered)	Lead (filtered)	Manganese (filtered)	Mercury (filtered)	Nickel (filtered)	Zinc (filtered)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Naphthalene (BTEXN suite)	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)
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001	0.005	1	2	2	2	2	2	1	5	20	20	100	100	100	100	100
ADWG 2011 Health (v3.7 updated 2022)					0.01	0.002		2		0.01	0.5	0.001	0.02		1	800	300			600										
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																													
Package	**Location**	**Date**	**Field ID**	**Sample Type**																									
	BH112R	09 Aug 2023	BH112R	Normal	0.018	<0.0001	<0.001	0.001	<0.05	<0.001	0.130	<0.0001	0.018	0.008	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		05 Sep 2023	BH112R	Normal	0.014	<0.0001	<0.001	0.013	<0.05	<0.001	0.152	<0.0001	0.047	0.019	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		06 Oct 2023	BH112R	Normal	0.011	<0.0001	<0.001	0.016	<0.05	<0.001	0.133	<0.0001	0.016	0.048	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.010	<0.0001	<0.001	0.014	-	<0.001	-	<0.0001	0.016	0.046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Nov 2023	BH112R	Normal	0.008	<0.0001	<0.001	0.006	<0.05	<0.001	0.114	<0.0001	0.009	0.012	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.008	<0.0001	<0.001	0.008	-	<0.001	-	<0.0001	0.009	0.017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Dec 2023	BH112R	Normal	0.006	<0.0001	<0.001	<0.001	<0.05	<0.001	0.109	<0.0001	0.008	0.016	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		19 Jan 2024	BH112R	Normal	0.006	<0.0001	<0.001	0.004	<0.05	<0.001	0.098	<0.0001	0.007	0.013	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		13 Feb 2024	BH112R	Normal	0.004	<0.0001	<0.001	0.006	<0.05	<0.001	0.099	<0.0001	0.007	0.014	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.004	<0.0001	<0.001	0.006	-	<0.001	-	<0.0001	0.007	0.013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 Mar 2024	BH112R	Normal	0.003	<0.0001	<0.001	0.009	<0.05	<0.001	0.086	<0.0001	0.006	0.017	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		11 Apr 2024	BH112R	Normal	0.003	<0.0001	<0.001	0.007	<0.05	<0.001	0.094	<0.0001	0.006	0.009	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.004	<0.0001	<0.001	0.008	-	<0.001	-	<0.0001	0.006	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 May 2024	BH112R	Normal	0.004	<0.0001	<0.001	0.005	<0.05	<0.001	0.090	<0.0001	0.006	0.015	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		12 Jun 2024	BH112R	Normal	0.002	<0.0001	<0.001	0.006	<0.05	<0.001	0.087	<0.0001	0.005	0.034	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP2	Interlab_D	0.003	<0.0002	<0.001	0.007	-	<0.001	-	<0.0001	0.005	0.042	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11 Jul 2024	BH112R	Normal	0.002	<0.0001	<0.001	0.005	<0.05	<0.001	0.079	<0.0001	0.005	0.013	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		06 Aug 2024	BH112R	Normal	0.002	<0.0001	<0.001	0.005	0.30	0.001	0.094	<0.0001	0.048	0.033	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		12 Sep 2024	BH112R	Normal	0.002	<0.0001	<0.001	0.004	<0.05	<0.001	0.077	<0.0001	0.005	0.013	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
M12 - Central	BH144	15 Nov 2022	BH144	Normal	<0.001	<0.0001	<0.001	0.007	0.29	<0.001	0.074	<0.0001	0.003	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
	BH145	15 Aug 2022	BH145	Normal	<0.001	<0.0001	<0.001	0.001	0.06	<0.001	0.755	<0.0001	0.003	0.102	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		19 Sep 2022	BH145	Normal	<0.001	<0.0001	<0.001	0.002	0.13	<0.001	0.908	<0.0001	0.002	0.075	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		20 Oct 2022	BH145	Normal	<0.001	<0.0001	<0.001	0.007	<0.05	<0.001	1.03	<0.0001	0.003	0.101	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		15 Nov 2022	BH145	Normal	<0.001	<0.0001	<0.001	0.005	<0.05	<0.001	0.672	<0.0001	0.002	0.068	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		14 Dec 2022	BH145	Normal	<0.001	<0.0001	<0.001	0.004	<0.05	<0.001	0.837	<0.0001	0.002	0.072	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		17 Jan 2023	BH145	Normal	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	1.07	<0.0001	0.003	0.058	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		07 Feb 2023	BH145	Normal	<0.001	<0.0001	<0.001	0.003	<0.05	<0.001	1.23	<0.0001	0.003	0.061	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		02 Mar 2023	BH145	Normal	<0.001	<0.0001	<0.001	0.005	1.30	0.001	1.56	<0.0001	0.005	0.034	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
	BH145R	05 Apr 2023	BH145R	Normal	0.016	<0.0001	<0.001	<0.001	3.66	<0.001	0.639	<0.0001	0.026	<0.005	1	3	<2	<2	<2	<2	4	<5	<20	<20	<100	<100	<100	<100	<100
		02 May 2023	BH145R	Normal	0.016	<0.0001	<0.001	<0.001	3.32	<0.001	0.494	<0.0001	0.005	0.006	1	3	<2	<2	<2	<2	4	<5	<20	<20	<100	<100	<100	<100	<100
		06 Jun 2023	BH145R	Normal	0.012	<0.0001	<0.001	<0.001	5.08	<0.001	0.508	<0.0001	0.002	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.010	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jul 2023	BH145R	Normal	0.006	<0.0001	<0.001	0.002	4.40	<0.001	0.352	<0.0001	0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		09 Aug 2023	BH145R	Normal	0.008	<0.0001	<0.001	<0.001	4.82	<0.001	0.348	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		06 Sep 2023	BH145R	Normal	0.005	<0.0001	<0.001	<0.001	4.42	<0.001	0.283	<0.0001	0.025	0.006	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		06 Oct 2023	BH145R	Normal	0.003	<0.0001	<0.001	<0.001	4.03	<0.001	0.249	<0.0001	0.022	0.023	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		09 Nov 2023	BH145R	Normal	<0.001	<0.0001	<0.001	<0.001	2.83	<0.001	0.185	<0.0001	<0.001	0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		05 Dec 2023	BH145R	Normal	<0.001	<0.0001	<0.001	<0.001	2.98	<0.001	0.158	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.001	<0.0001	0.002	<0.001	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Jan 2024	BH145R	Normal	0.002	<0.0001	<0.001	<0.001	3.65	<0.001	0.150	<0.0001	0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.002	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14 Feb 2024	BH145R	Normal	<0.001	<0.0001	<0.001	<0.001	0.31	<0.001	0.154	<0.0001	0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		14 Mar 2024	BH145R	Normal	0.003	<0.0001	<0.001	<0.001	3.23	<0.001	0.136	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.003	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Apr 2024	BH145R	Normal	0.002	<0.0001	<0.001	0.001	0.70	<0.001	0.238	<0.0001	0.002	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		16 May 2024	BH145R	Normal	0.004	<0.0001	<0.001	0.001	3.00	<0.001	0.166	<0.0001	<0.001	0.008	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		06 Jun 2024	BH145R	Normal	0.002	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	<0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.002	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	<0.001	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10 Jul 2024	BH145R	Normal	0.007	<0.0001	<0.001	0.001	1.75	<0.001	0.131	<0.0001	0.001	0.008	3	<2	<2	<2	<2	<2	3	<5	<20	<20	<100	<100	<100	<100	<100

					Metals											BTEXN								TRH - NEPM 2013						
					Arsenic (filtered)	Cadmium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Iron (filtered)	Lead (filtered)	Manganese (filtered)	Mercury (filtered)	Nickel (filtered)	Zinc (filtered)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Naphthalene (BTEXN suite)	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)
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001	0.005	1	2	2	2	2	2	1	5	20	20	100	100	100	100	100
ADWG 2011 Health (v3.7 updated 2022)					0.01	0.002		2		0.01	0.5	0.001	0.02		1	800	300			600										
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																														
Package	**Location**	**Date**	**Field ID**	**Sample Type**																										
		07 Aug 2024	BH145R	Normal	0.003	<0.0001	<0.001	<0.001	3.13	<0.001	0.136	<0.0001	0.024	0.015	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
		11 Sep 2024	BH145R	Normal	0.002	<0.0001	<0.001	<0.001	2.43	<0.001	0.099	<0.0001	0.001	0.007	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
			GWDUP1	Field_D	0.002	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistics																														
Number of Results					147	147	147	147	94	147	94	147	147	147	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Number of Detects					84	0	3	90	43	2	92	0	114	99	3	2	0	0	0	0	3	0	0	0	0	0	0	0	0
Minimum Concentration					0.001	<0.0001	0.001	0.001	<0.05	0.001	<0.001	<0.0001	0.001	0.005	1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100
Minimum Detect					0.001	ND	0.001	0.001	0.06	0.001	0.002	ND	0.001	0.005	1	3	ND	ND	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration					0.018	<0.0002	0.003	0.088	5.08	0.001	1.56	<0.0001	0.073	0.125	3	3	<2	<2	<2	<2	4	<5	<20	<20	<100	<100	<100	<100	<100
Maximum Detect					0.018	ND	0.003	0.088	5.08	0.001	1.56	ND	0.073	0.125	3	3	ND	ND	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration *					0.0026	0.000059	0.00053	0.0055	0.87	0.00051	0.21	0.00005	0.0055	0.015	0.54	1	1	1	1	1	0.6	2.5	10	10	50	50	50	50	50
Median Concentration *					0.002	0.00005	0.0005	0.002	0.025	0.0005	0.123	0.00005	0.002	0.007	0.5	1	1	1	1	1	0.5	2.5	10	10	50	50	50	50	50
Standard Deviation *					0.0032	0.000019	0.00024	0.014	1.3	0.000058	0.28	0	0.011	0.022	0.27	0.29	0	0	0	0	0.56	0	0	0	0	0	0	0	0
95% UCL (Student's-t) *					0.003	0.000061457	0.00056377	0.0075	1.095	0.00051474	0.26	0.00005	0.00692	0.0183	0.582	1.091	1	1	1	1	0.696	2.5	10	10	50	50	50	50	50

* A Non Detect Multiplier of 0.5 has been applied.

Comments
#1 Not specifically guideline value: >500mg/L can have purgative effects
#2 Guideline value calculated by dividing Nitrate (as Nitrate) value (50 mg/L) by 4.427
#3 Guideline value calculated by dividing Nitrite (as Nitrite) value (0.3 mg/L) by molecular weight (3.2967033).
#4 Calculated from ammonia NH4
#5 Loss of production expected at 5000 mg/L for beef cattle, 4000 mg/L dairy cattle, 10000 mg/L sheep, 6000 mg/L horses and pigs, 3000 mg/L poultry
#6 400 mg/L divided by molecular weight, stock may tolerate higher nitrate concentrations if nitrate in feed are not high, water containing >1500 mg/L (as NO3) is likely to be toxic.
#7 30 mg/L divided by molecular weight
#8 >0.5 mg/L hazardous to sheep, >1 mg/L for cattle, >5 mg/L pigs and poulty
#9 Measured as NH3-N at pH 8
#10 Values taken from "Updating nitrate toxicity effects on freshwater aquatic species, 2013"
#11 In absence of total As guideline, As (V) guideline has been adopted.
#12 In absence of total Cr guideline, Cr (VI) guideline has been adopted.
#13 Not limiting: Derived water HSL exceeds water solubility limit
#14 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#15 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards
National Health and Medical Research Council, January 2022, ADWG 2011 Health (v3.7 updated 2022)
Department of Agriculture and Water Resources, 2018 updated July 2021, ANZG (2018) - FW - 95% (updated 26 July 2021)

					TRH - NEPM 1999					PAHs - standard 16															Phenols - Halogenated							Phenols - Non-Halogenated				
					C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)/zero LOR) - Lab Calc	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	Phenol	2-Nitrophenol	2-Methylphenol (o-Cresol)	3,4-Methylphenol (m,p-cresol)	2,4-Dimethylphenol
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					20	50	100	50	50	1	1	1	1	0.5	1	1	1	1	1	1	1	1	1	1	1	0.5	0.5	1	1	1	1	1	1	2	1	1	1	2	1
ADWG 2011 Health (v3.7 updated 2022)														0.01											0.01		300	200		20			10					
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																					
Package	**Location**	**Date**	**Field ID**	**Sample Type**																																	
M12 - West	BH104	15 Aug 2022	BH104	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Sep 2022	BH104	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20 Oct 2022	BH104	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16 Nov 2022	BH104	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH104R	16 Dec 2022	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18 Jan 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Feb 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		03 Mar 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04 Apr 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		02 May 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jun 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jul 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09 Aug 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05 Sep 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Oct 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Nov 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Dec 2023	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Jan 2024	BH104R	Normal	<20	<50	<100	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13 Feb 2024	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 Mar 2024	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11 Apr 2024	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 May 2024	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Jun 2024	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11 Jul 2024	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Aug 2024	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Sep 2024	BH104R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

					TRH - NEPM 1999					PAHs - standard 16															Phenols - Halogenated							Phenols - Non-Halogenated				
					C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)/zero LOR) - Lab Calc	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	Phenol	2-Nitrophenol	2-Methylphenol (o-Cresol)	3,4-Methylphenol (m,p-cresol)	2,4-Dimethylphenol
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					20	50	100	50	50	1	1	1	1	0.5	1	1	1	1	1	1	1	1	1	1	1	0.5	0.5	1	1	1	1	1	1	2	1	1	1	2	1
ADWG 2011 Health (v3.7 updated 2022)														0.01											0.01		300	200		20			10					
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																					
Package	**Location**	**Date**	**Field ID**	**Sample Type**																																	
	BH107	15 Aug 2022	BH107	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Sep 2022	BH107	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20 Oct 2022	BH107	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16 Nov 2022	BH107	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH107R	16 Dec 2022	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Feb 2023	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		03 Mar 2023	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04 Apr 2023	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05 Apr 2023	GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		02 May 2023	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jul 2023	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09 Aug 2023	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05 Sep 2023	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Oct 2023	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Nov 2023	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Dec 2023	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Jan 2024	BH107R	Normal	<20	<50	<100	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0
		13 Feb 2024	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 Mar 2024	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11 Apr 2024	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 May 2024	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16 May 2024	GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Jun 2024	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11 Jul 2024	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Aug 2024	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Sep 2024	BH107R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH112	15 Aug 2022	BH112	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Sep 2022	BH112	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20 Oct 2022	BH112	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16 Nov 2022	BH112	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

					TRH - NEPM 1999					PAHs - standard 16															Phenols - Halogenated							Phenols - Non-Halogenated				
					C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	Phenol	2-Nitrophenol	2-Methylphenol (o-Cresol)	3,4-Methylphenol (m,p-cresol)	2,4-Dimethylphenol
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					20	50	100	50	50	1	1	1	1	0.5	1	1	1	1	1	1	1	1	1	1	1	0.5	0.5	1	1	1	1	1	1	2	1	1	1	2	1
ADWG 2011 Health (v3.7 updated 2022)														0.01											0.01		300	200		20			10					
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																					
Package	**Location**	**Date**	**Field ID**	**Sample Type**																																	
	BH112R	09 Aug 2023	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05 Sep 2023	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Oct 2023	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08 Nov 2023	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Dec 2023	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Jan 2024	BH112R	Normal	<20	<50	<100	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0
		13 Feb 2024	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 Mar 2024	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11 Apr 2024	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 May 2024	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Jun 2024	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP2	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11 Jul 2024	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Aug 2024	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Sep 2024	BH112R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M12 - Central	BH144	15 Nov 2022	BH144	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH145	15 Aug 2022	BH145	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Sep 2022	BH145	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20 Oct 2022	BH145	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15 Nov 2022	BH145	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14 Dec 2022	BH145	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		17 Jan 2023	BH145	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Feb 2023	BH145	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		02 Mar 2023	BH145	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH145R	05 Apr 2023	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		02 May 2023	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Jun 2023	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07 Jul 2023	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09 Aug 2023	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Sep 2023	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Oct 2023	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09 Nov 2023	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05 Dec 2023	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19 Jan 2024	BH145R	Normal	<20	<50	<100	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<2.0	<1.0
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14 Feb 2024	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14 Mar 2024	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		12 Apr 2024	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16 May 2024	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		06 Jun 2024	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10 Jul 2024	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

					TRH - NEPM 1999					PAHs - standard 16																Phenols - Halogenated							Phenols - Non-Halogenated				
					C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	Phenol	2-Nitrophenol	2-Methylphenol (o-Cresol)	3,4-Methylphenol (m,p-cresol)	2,4-Dimethylphenol
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					20	50	100	50	50	1	1	1	1	0.5	1	1	1	1	1	1	1	1	1	1	1	0.5	0.5	1	1	1	1	1	1	2	1	1	1	2	1
ADWG 2011 Health (v3.7 updated 2022)														0.01											0.01		300	200		20			10					
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																				
Package	**Location**	**Date**	**Field ID**	**Sample Type**																																
		07 Aug 2024	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11 Sep 2024	BH145R	Normal	<20	<50	<100	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			GWDUP1	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistics

Number of Results	95	95	95	95	95	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<2	<1
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<20	<50	<100	<50	<50	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<2	<1
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration *	10	25	50	25	25	0.5	0.5	0.5	0.5	0.25	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	1	0.5
Median Concentration *	10	25	50	25	25	0.5	0.5	0.5	0.5	0.25	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	1	0.5
Standard Deviation *	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95% UCL (Student's-t) *	10	25	50	25	25	0.5	0.5	0.5	0.5	0.25	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.25	0.25	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	1	0.5

* A Non Detect Multiplier of 0.5 has been applied.

Comments
#1 Not specifically guideline value: >500mg/L can have purgative effects
#2 Guideline value calculated by dividing Nitrate (as Nitrate) value (50 mg/L) by 4.427
#3 Guideline value calculated by dividing Nitrite (as Nitrite) value (0.3 mg/L) by molecular weight (3.2967033).
#4 Calculated from ammonia NH4
#5 Loss of production expected at 5000 mg/L for beef cattle, 4000 mg/L dairy cattle, 10000 mg/L sheep, 6000 mg/L horses and pigs, 3000 mg/L poultry
#6 400 mg/L divided by molecular weight, stock may tolerate higher nitrate concentrations if nitrate in feed are not high, water containing >1500 mg/L (as NO3) is likely to be toxic.
#7 30 mg/L divided by molecular weight
#8 >0.5 mg/L hazardous to sheep, >1 mg/L for cattle, >5 mg/L pigs and poulty
#9 Measured as NH3-N at pH 8
#10 Values taken from "Updating nitrate toxicity effects on freshwater aquatic species, 2013"
#11 In absence of total As guideline, As (V) guideline has been adopted.
#12 In absence of total Cr guideline, Cr (VI) guideline has been adopted.
#13 Not limiting: Derived water HSL exceeds water solubility limit
#14 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#15 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards
National Health and Medical Research Council, January 2022, ADWG 2011 Health (v3.7 updated 2022)
Department of Agriculture and Water Resources, 2018 updated July 2021, ANZG (2018) - FW - 95% (updated 26 July 2021)

						Inorganics		Acidity & Alkalinity			Major Ions									Minor Ions		Nutrients								Metals									
						Total Dissolved Solids	Total Suspended Solids	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Hardness as CaCO3 (filtered)	Calcium (filtered)	Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)	Chloride	Sulfate (filtered)	Cations Total	Anions Total	Ionic Balance	Bicarbonate ion (HCO_3^-)	Carbonate ion	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total Oxidised) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Reactive Phosphorus as P	Phosphorus (Total)	Arsenic (filtered)	Cadmium (filtered)	Chromium (III+VI) (filtered)	Copper (filtered)	Iron (filtered)	Lead (filtered)	Manganese (filtered)	Mercury (filtered)	Nickel (filtered)	Zinc (filtered)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL						10	5	1	1	1	1	1	1	1	1	1	0.01	0.01	0.01	1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001	0.005
ADWG 2011 Health (v3.7 updated 2022)																500[#1]						11.29[#2]	0.91[#3]							0.01	0.002		2		0.01	0.5	0.001	0.02	
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)							**6**															**0.01165[#4]**			**0.04**	**0.35**		**0.008**	**0.025**									
ANZECC 2000 - Stock Watering						*5000[#5]*					*1000*					*1000*							*90[#6]*	*9.1[#7]*							*0.5*	*0.01*	*1*	*1[#8]*		*0.1*		*0.002*	*1*	*20*
ANZG (2018) - FW - 95% (updated 26 July 2021)																						*0.9[#9]*	*2.4[#10]*							*0.013[#11]*	*0.0002*	*0.001[#12]*	*0.0014*		*0.0034*	*1.9*	*0.0006*	*0.011*	*0.008*
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																						
>=2m, <4m																																						
>=4m, <8m																																						
>=8m																																						
Package	**Location**	**Date**	**Field ID**	**Sample Type**	**Lab Report**																																		
M12 - West	BH104R	11 Apr 2024	BH104R	Normal	ES2411734	4860	**72**	<1	1090	787	99	131	16	1550	2190	208	83.6	87.9	2.53	1090	<1	**1.56**	<0.01	<0.01	<0.01	**1.8**	1.8	<0.01	**0.10**	0.003	<0.0001	<0.001	<0.001	1.03	<0.001	0.103	<0.0001	<0.001	<0.005
		15 May 2024	BH104R	Normal	ES2415903	4840	**89**	<1	993	809	108	131	17	1620	2060	220	87.1	82.5	2.68	993	<1	**1.70**	<0.01	0.01	<0.01	**2.0**	2.0	<0.01	**0.12**	0.003	<0.0001	<0.001	<0.001	1.43	<0.001	0.103	<0.0001	<0.001	<0.005
			GWDUP1	Field_D	ES2415903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003	<0.0001	<0.001	0.001	-	<0.001	-	<0.0001	0.002	<0.005
		12 Jun 2024	BH104R	Normal	ES2419514	4840	**64**	<1	1010	798	102	132	17	1610	2300	216	86.4	89.6	1.78	1010	<1	**1.72**	<0.01	<0.01	<0.01	**1.7**	1.7	<0.01	**0.07**	0.003	<0.0001	<0.001	0.003	1.38	<0.001	0.099	<0.0001	<0.001	<0.005
		11 Jul 2024	BH104R	Normal	ES2422922	4910	**72**	<1	1070	742	96	122	14	1340	1810	214	73.5	76.9	2.27	1070	<1	**1.92**	0.03	<0.01	0.03	**2.1**	2.1	<0.01	**0.08**	0.003	<0.0001	<0.001	<0.001	1.38	<0.001	0.095	<0.0001	<0.001	0.008
			GWDUP1	Field_D	ES2422922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	<0.005
		06 Aug 2024	BH104R	Normal	ES2425825	4100	**52**	<1	1100	779	106	125	17	1610	1800	218	86.0	77.3	5.36	1100	<1	**1.78**	<0.01	<0.01	<0.01	**2.2**	2.2	<0.01	**0.08**	0.003	<0.0001	<0.001	<0.001	1.58	<0.001	0.096	<0.0001	0.011	0.018
			GWDUP2	Interlab_D	1127260	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.010	0.010
		12 Sep 2024	BH104R	Normal	ES2429962	4620	**38**	<1	1090	732	100	117	17	1540	1980	224	82.0	82.3	0.16	1090	<1	**1.81**	<0.01	<0.01	<0.01	**2.0**	2.0	<0.01	**0.06**	0.003	<0.0001	<0.001	<0.001	1.24	<0.001	0.072	<0.0001	0.001	<0.005
			GWDUP2	Interlab_D	1139072	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.001	0.005
	BH107R	11 Apr 2024	BH107R	Normal	ES2411734	2330	**28**	<1	1600	536	38	107	15	739	308	200	43.2	44.8	1.80	1600	<1	**0.02**	2.20	<0.01	**2.20**	**2.6**	0.4	**0.02**	**0.03**	<0.001	<0.0001	<0.001	0.001	<0.05	<0.001	0.004	<0.0001	<0.001	0.006
			GWDUP2	Interlab_D	1087440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.001	0.015
		15 May 2024	BH107R	Normal	ES2415903	2160	**17**	<1	1440	547	41	108	15	735	301	210	43.3	41.6	1.95	1440	<1	**0.19**	2.30	<0.01	**2.30**	**2.6**	0.3	<0.01	**0.04**	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.006	<0.0001	0.001	0.009
		16 May 2024	GWDUP2	Interlab_D	1099024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.001	0.010
		12 Jun 2024	BH107R	Normal	ES2419514	2260	**27**	<1	1370	526	39	104	14	708	315	207	41.6	40.6	1.33	1370	<1	**0.02**	2.24	<0.01	**2.24**	**2.6**	0.4	<0.01	<0.01	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.003	<0.0001	0.001	0.008
		11 Jul 2024	BH107R	Normal	ES2422922	2270	**12**	<1	1530	507	35	102	12	593	351	175	36.2	44.1	9.80	1530	<1	<0.01	2.22	<0.01	**2.22**	**2.6**	0.4	**0.01**	0.02	<0.001	<0.0001	<0.001	0.003	<0.05	<0.001	0.002	<0.0001	0.001	0.013
			GWDUP2	Interlab_D	1117977	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	0.003	-	<0.001	-	<0.0001	0.001	0.012
		06 Aug 2024	BH107R	Normal	ES2425825	2120	**24**	<1	1570	531	41	104	15	754	325	205	43.8	44.8	1.15	1570	<1	**0.04**	1.99	<0.01	**1.99**	**2.4**	0.4	<0.01	**0.04**	<0.001	<0.0001	<0.001	0.001	<0.05	<0.001	0.007	<0.0001	0.010	0.017
			GWDUP1	Field_D	ES2425825	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.008	<0.005
		12 Sep 2024	BH107R	Normal	ES2429962	2270	**22**	<1	1570	522	41	102	15	754	323	228	43.6	45.2	1.81	1570	<1	**0.02**	2.45	<0.01	**2.45**	**2.8**	0.3	<0.01	**0.04**	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.004	<0.0001	<0.001	0.007
	BH112R	11 Apr 2024	BH112R	Normal	ES2411734	*10100*	**22**	<1	1340	2130	192	401	41	2930	4040	*1490*	171	172	0.20	1340	<1	**2.55**	0.24	0.10	**0.34**	**3.0**	2.7	**0.07**	**0.15**	0.003	<0.0001	<0.001	0.001	0.94	<0.001	0.094	<0.0001	0.006	0.009
			GWDUP1	Field_D	ES2411734	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.004	<0.0001	<0.001	0.008	-	<0.001	-	<0.0001	0.006	0.012
		15 May 2024	BH112R	Normal	ES2415903	*10100*	**51**	<1	1230	2220	202	416	42	2970	4110	*2090*	174	184	2.63	1230	<1	**2.70**	0.26	0.05	**0.31**	**3.1**	2.8	**0.06**	**0.11**	0.004	<0.0001	<0.001	0.005	<0.05	<0.001	0.090	<0.0001	0.006	0.015
		12 Jun 2024	BH112R	Normal	ES2419514	*10000*	**115**	<1	1150	2110	193	395	40	2880	4130	*1600*	168	173	1.28	1150	<1	**2.57**	0.40	0.05	**0.45**	**3.2**	2.7	**0.05**	**0.14**	0.002	<0.0001	<0.001	0.006	<0.05	<0.001	0.087	<0.0001	0.005	0.034
			GWDUP2	Interlab_D	1109038	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003	<0.0002	<0.001	0.007	-	<0.001	-	<0.0001	0.005	0.042
		11 Jul 2024	BH112R	Normal	ES2422922	*10400*	**46**	<1	1310	2130	191	401	35	2600	4670	*1600*	156	191	9.98	1310	<1	**2.14**	0.88	0.05	**0.93**	**3.5**	2.6	**0.05**	**0.09**	0.002	<0.0001	<0.001	0.005	<0.05	<0.001	0.079	<0.0001	0.005	0.013
		06 Aug 2024	BH112R	Normal	ES2425825	*9370*	**49**	<1	1340	2300	222	425	42	3050	4420	*1850*	180	190	2.75	1340	<1	**2.50**	0.29	0.03	**0.32**	**3.4**	3.1	**0.04**	**0.11**	0.002	<0.0001	<0.001	0.005	0.30	0.001	0.094	<0.0001	0.048	0.033
		12 Sep 2024	BH112R	Normal	ES2429962	*9860*	**24**	<1	1320	2220	211	410	41	2880	3890	*1860*	170	175	1.23	1320	<1	**2.40**	0.39	0.01	**0.40**	**3.0**	2.6	**0.04**	**0.11**	0.002	<0.0001	<0.001	0.004	<0.05	<0.001	0.077	<0.0001	0.005	0.013
M12 - Central	BH145R	12 Apr 2024	BH145R	Normal	ES2411734	*8570*	**34**	<1	788	1900	141	377	16	2270	4110	280	137	138	0.11	788	<1	**1.77**	0.79	0.02	**0.81**	**3.0**	2.2	<0.01	**0.05**	0.002	<0.0001	<0.001	0.001	0.70	<0.001	0.238	<0.0001	0.002	<0.005
		16 May 2024	BH145R	Normal	ES2415903	*10500*	**44**	<1	891	2590	200	508	18	3020	5230	333	184	172	3.19	891	<1	**2.24**	0.04	<0.01	**0.04**	**2.2**	2.2	<0.01	**0.04**	0.004	<0.0001	<0.001	0.001	3.00	<0.001	0.166	<0.0001	<0.001	0.008
		06 Jun 2024	BH145R	Normal	ES2418682	*10800*	**38**	<1	1010	2750	202	546	17	3050	5560	341	188	184	1.07	1010	<1	**2.10**	0.02	<0.01	0.02	**2.0**	2.0	<0.01	**0.03**	0.002	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	<0.001	<0.005
			GWDUP1	Field_D	ES2418682	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	<0.001	0.008
		10 Jul 2024	BH145R	Normal	ES2422922	*6030*	**464**	<1	896	1400	112	271	11	1840	3650	208	108	125	7.28	896	<1	**3.14**	<0.01	<0.01	<0.01	**3.7**	3.7	<0.01	**0.12**	0.007	<0.0001	<0.001	0.001	1.75	<0.001	0.131	<0.0001	0.001	0.008
		07 Aug 2024	BH145R	Normal	ES2425825	*10000*	**53**	<1	1050	2830	217	556	18	3240	6070	332	198	199	0.29	1050	<1	**2.30**	0.01	<0.01	0.01	**2.8**	2.8	<0.01	**0.07**	0.003	<0.0001	<0.001	<0.001	3.13	<0.001	0.136	<0.0001	0.024	0.015
		11 Sep 2024	BH145R	Normal	ES2429962	*11100*	**25**	<1	1050	2690	209	526	18	3100	6320	333	189	206	4.34	1050	<1	**2.17**	<0.01	<0.01	<0.01	**2.3**	2.3	<0.01	**0.04**	0.002	<0.0001	<0.001	<0.001	2.43	<0.001	0.099	<0.0001	0.001	0.007
			GWDUP1	Field_D	ES2429962	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	0.007

Statistics

Number of Results	113	113	24	24	24	24	24	24	24	24	24	24	24	24	24	24	113	113	113	113	113	113	113	113	36	36	36	36	23	36	23	36	36	36		
Number of Detects	113	105	0	24	24	24	24	24	24	24	24	24	24	24	24	0	104	99	58	100	113	113	61	112	26	0	0	23	12	1	23	0	27	27		
Minimum Concentration	128	5	<1	788	507	35	102	11	593	301	175	36.2	40.6	0.11	788	<1	0.01	0.01	0.01	0.01	0.6	0.3	0.01	<0.01	<0.001	<0.0001	<0.001	0.001	<0.05	0.001	0.002	<0.0001	0.001	0.005		
Minimum Detect	128	5	ND	788	507	35	102	11	593	301	175	36.2	40.6	0.11	788	ND	0.01	0.01	0.01	0.01	0.6	0.3	0.01	0.02	0.002	ND	ND	0.001	0.3	0.001	0.002	ND	0.001	0.005		
Maximum Concentration	11100	517	<1	1600	2830	222	556	42	3240	6320	2090	198	206	9.98	1600	<1	3.14	4.29	0.23	4.43	6.7	4.2	0.6	0.75	0.007	<0.0002	<0.001	0.008	3.13	0.001	0.238	<0.0001	0.048	0.042		
Maximum Detect	11100	517	ND	1600	2830	222	556	42	3240	6320	2090	198	206	9.98	1600	ND	3.14	4.29	0.23	4.43	6.7	4.2	0.6	0.75	0.007	ND	ND	0.008	3.13	0.001	0.238	ND	0.048	0.042		
Average Concentration *	1904	50	0.5	1200	1462	131	276	22	1974	2928	618	116	119	2.8	1200	0.5	0.43	0.75	0.024	0.77	2.4	1.6	0.095	0.23	0.0023	0.000058	0.0005	0.0022	0.85	0.00051	0.082	0.00005	0.0047	0.011		
Median Concentration *	698	22	0.5	1125	1104.5	110	201.5	17	1730	2975	226	97.55	107.3	1.88	1125	0.5	0.08	0.52	0.01	0.56	2.3	1.4	0.01	0.13	0.002	0.00005	0.0005	0.001	0.3	0.0005	0.094	0.00005	0.001	0.008		
Standard Deviation *	2930	83	0	235	878	69	174	11	956	1997	676	59	61	2.7	235	0	0.78	0.84	0.035	0.85	1.1	0.78	0.16	0.21	0.0014	0.000019	0	0.0022	1	0.000083	0.058	0	0.0088	0.0092		
95% UCL (Student's-t) *	2361	62.53	0.5	1282	1769	155	336.5	25.65	2309	3626	855	136.1	140.9	3.752	1282	0.5	0.554	0.881	0.0296	0.904	2.567	1.75	0.12	0.268	0.00265	0.000063655	0.0005	0.00286	1.216	0.00053736	0.103	0.00005	0.00721	0.0133		

* A Non Detect Multiplier of 0.5 has been applied.

Comments

#1 Not specifically guideline value: >500mg/L can have purgative effects
#2 Guideline value calculated by dividing Nitrate (as Nitrate) value (50 mg/L) by 4.427
#3 Guideline value calculated by dividing Nitrite (as Nitrite) value (0.3 mg/L) by molecular weight (3.2967033).
#4 Calculated from ammonia NH4
#5 Loss of production expected at 5000 mg/L for beef cattle, 4000 mg/L dairy cattle, 10000 mg/L sheep, 6000 mg/L horses and pigs, 3000 mg/L poultry
#6 400 mg/L divided by molecular weight, stock may tolerate higher nitrate concentrations if nitrate in feed are not high, water containing >1500 mg/L (as NO3) is likely to be toxic.
#7 30 mg/L divided by molecular weight
#8 >0.5 mg/L hazardous to sheep, >1 mg/L for cattle, >5 mg/L pigs and poulty
#9 Measured as NH3-N at pH 8
#10 Values taken from "Updating nitrate toxicity effects on freshwater aquatic species, 2013"
#11 In absence of total As guideline, As (V) guideline has been adopted.
#12 In absence of total Cr guideline, Cr (VI) guideline has been adopted.
#13 Not limiting: Derived water HSL exceeds water solubility limit
#14 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#15 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

National Health and Medical Research Council, January 2022, ADWG 2011 Health (v3.7 updated 2022)
Department of Agriculture and Water Resources, 2018 updated July 2021, ANZG (2018) - FW - 95% (updated 26 July 2021)

| | | | | | BTEXN | | | | | | | | TRH - NEPM 2013 | | | | | | | TRH - NEPM 1999 | | | | | PAHs - standard 16 | | | | | | | |

Well ID	Sampling Event	Date Measured	SWL (mbTOC)	LNAPL present	Temp (°C)	pH	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Corrected Redox Potential* (mV)	Comments (sheen, colour, turbidity, sediment, odour)
BH104	Event 4 - July 2019	16/07/2019	9.74	Absent	18.7	6.07	17121	1.13	114.1	319.1	Clear, slight organic sheen
BH104	Event 5 - August 2019	20/08/2019	9.895	Absent	18.9	6.64	16734	1.04	10.04	215.04	Clear, no sheen, no odour
BH104	Event 6 - September 2019	24/09/2019	9.114	Absent	19.3	6.9	16787	2.19	-33	172	Grey-brown, slightly turbid, no sheen, no odour
BH104	Event 7 - October 2019	22/10/2019	10.32	Absent	21.3	7	18174	1.32	-51.4	153.6	Grey, slightly cloudy, no sheen, no odour
BH104	Event 8 - November 2019	07/11/2019	10.25	Absent	20.8	6.22	17997	1.88	47.8	252.8	Grey-brown, turbid, no sheen, no odour
BH104	Event 9 - December 2019	12/12/2019	10.555	Absent	20.1	6.32	17318	1.13	-8.8	196.2	Light grey, slight sheen, no odour
BH104	Event 10 - January 2020	16/01/2020	10.730	Absent	20.1	5.93	17195	1.47	2.6	207.6	Black, cloudy, no sheen, no odour
BH104	Event 11 - February 2020	18/02/2020	10.62	Absent	22.6	5.88	14411	1.01	61.2	266.2	Dark, grey, cloudy, no sheen, no odour
BH104	Event 12 - March 2020	12/03/2020	10.956	Absent	22.1	6.36	8946	1.74	190.6	395.6	Clear, slight organic sheen, no odour
BH104	Event 13 - April 2020	23/04/2020	10.995	Absent	20.3	7.01	12722	1.64	70.5	275.5	Clear, slight organic sheen, no odour
BH104	Event 14 - May 2020	19/05/2020	Not recorded	Absent	-	-	-	-	-	-	No data, grab sample collected
BH104	Event 16 - July 2020	30/07/2020	12.09	Absent	18.8	6.19	11525	0.36	64.8	269.8	Clear, no sheen, no odour
BH104	Event 17 - August 2020	11/08/2020	12.08	Absent	18.4	6.2	4255	1.18	129	334	Clear, no sheen, no odour
BH104	Event 18 - September 2020	10/09/2020	12.420	Absent	20.1	5.99	43.9	3.68	-60.5	144.5	Clear, no sheen, no odour, poor recharge, DO probe malfunction during purging
BH104	Event 19 - October 2020	09/10/2020	12.370	Absent	19.4	6.55	13327	1.40	-90.1	114.9	Clear, no sheen, no odour, poor recharge
BH104	Event 20 - November 2020	13/11/2020	12.400	Absent	20.0	6.23	14403	0.32	-110.5	94.5	Clear, slight organic sheen, no odour, poor recharge
BH104	Event 21 - December 2020	08/12/2020	12.560	Absent	21.0	5.79	15155	11.25	-162.3	42.7	Clearn, no sheen, no odour, poor recharge
BH104	Event 22 - January 2021	14/01/2021	12.740	Absent	20.1	6.26	14179	0.33	-139	66	Clearn, no sheen, no odour, poor recharge
BH104	Event 23 - February 2021	11/02/2021	12.850	Absent	19.9	6.50	14596	0.46	-121.2	83.8	Slightly turbid grey, effluent odour, poor recharge
BH104	Event 24 - March 2021	10/03/2021	12.935	Absent	19.7	6.42	14777	0.38	-121	84	Grey, cloudy, organic odour, no sheen
BH104	Event 25 - April 2021	07/04/2021	11.470	Absent	19.8	6.81	7572	0.58	-46.3	158.7	Dark grey colour
BH104	Event 26 - May 2021	03/05/2021	12.780	Absent	18.4	6.70	12444	1.00	23.4	228.4	Clear, no sheen, no odour, poor recharge
BH104	Event 27 - June 2021	08/06/2021	11.990	Absent	18.2	6.38	12364	7.52	-54.5	150.5	Very dark, black colour, no odour, no sheen, heavy sediment load
BH104	Event 28 - July 2021	07/07/2021	12.400	Absent	18.9	6.20	13097	6.21	-24	181	Clear water with grey tinge, low sediment load, no odour, no sheen, slow purge
BH104	Event 29 - August 2021	13/08/2021	12.430	Absent	18.3	6.21	12451	0.25	45	250	Grey, black tinge, low sediment load, no sheen, no odour, poor recharge, slow flow
BH104	Event 30 - September 2021	01/09/2021	12.450	Absent	19.1	6.64	12683	0.26	-74.3	130.7	Dark grey colour, slightly turbid, no odour, no sheen, poor recharge, slow purge
BH104	Event 31 - October 2021	15/10/2021	12.750	Absent	19.0	6.24	7169	1.02	-70.7	134.3	Black, sooty water. High sediment load, No odour/sheen. Slow recharge
BH104	Event 32 - November 2021	08/11/2021	13.170	Absent	18.4	6.55	12603	0.46	-86.1	118.9	Black, dark grey. High sediment (black silt), no odour/sheen. Good recharge
BH104	Event 33 - December 2021	08/12/2021	14.230	Absent	19.2	6.58	12059	0.21	-81.8	123.2	Clear water, dark grey sediment. No odour/sheen. Slow recharge.
BH104	Event 34 - January 2022	13/01/2022	12.720	Absent	19.4	6.71	11439	12.33	-103.3	101.7	Black, turbid water. Very dark grey sediment. No odour/sheen
BH104	Event 35 - February 2022	10/02/2022	13.900	Absent	19.2	6.64	7550	0.25	-112.6	92.4	Black/dark grey, high turbidity. No odour/sheen.
BH104	Event 36 - March 2022	18/03/2022	12.270	Absent	19	6.95	7451	1.15	-132.6	72.4	Black, no odour/sheen, Good recharge
BH104	Event 38 - May 2022	25/05/2022	12.005	Absent	19.4	6.88	12842	1.97	102.70	307.7	Cloudy, no sheen, no odour, bailer sampled.
BH104	Event 39 - June 2022	27/06/2022	11.55	Absent	18.7	6.47	20281	2.78	189.00	394	Grey tinge, slightly cloudy, no sheen, no odour.
BH104	Event 40 - July 2022	20/07/2022	11.1	Absent	18.5	6.26	23501	1.44	173.60	378.6	Grey/brown, cloudy, non-transparent, no odour, no sheen
BH107	Event 4 - July 2019	18/07/2019	10.705	Absent	-	-	-	-	-	-	No data, grab sample collected
BH107	Event 5 - August 2019	20/08/2019	10.735	Absent	19.7	7.05	8853	1.35	11.7	216.7	Grey, slightly cloudy, no sheen, no odour
BH107	Event 6 - September 2019	24/09/2019	10.754	Absent	18.9	6.85	4102	1.59	88	293	Grey-brown, slightly turbid, no sheen, no odour
BH107	Event 7 - October 2019	22/10/2019	10.755	Absent	20.0	7.08	9226	1.20	23.7	228.7	Grey, slightly turbid, no sheen, no odour
BH107	Event 8 - November 2019	07/11/2019	10.725	Absent	22.7	6.85	9870	1.96	75.9	280.9	Light grey, slightly turbid, no sheen, no odour
BH107	Event 9 - December 2019	12/12/2019	10.795	Absent	21.9	6.89	9387	1.56	7.3	212.3	Light brown, cloudy, no sheen, no odour
BH107	Event 11 - February 2020	20/02/2020	10.836	Absent	22.6	6.84	9375	1.46	32.7	237.7	Grey, slightly cloudy, no sheen, no odour
BH107	Event 13 - April 2020	23/04/2020	10.845	Absent	19.4	6.77	9183	1.18	10.1	215.1	Grey, slightly turbid, no sheen, no odour
BH107	Event 14 - May 2020	21/05/2020	11.182	Absent	18.5	6.77	9247	1.91	172.7	377.7	Turbid, no sheen, no odour
BH107	Event 16 - July 2020	30/07/2020	10.69	Absent	18.8	6.23	7605	0.33	79.1	284.1	Clear, no sheen, no odour
BH107	Event 17 - August 2020	11/08/2020	10.67	Absent	18.6	6.42	9110	1.61	93.1	298.1	Grey, turbid, no sheen, no odour
BH107	Event 18 - September 2020	10/09/2020	10.72	Absent	19.2	6.66	48	2.68	-25.8	179.2	Clear, no sheen, no odour, poor recharge, DO probe malfunction during purging
BH107	Event 19 - October 2020	09/10/2020	10.69	Absent	20.0	6.78	9596	1.24	51.1	256.1	Clear, no sheen, no odour, poor recharge
BH107	Event 21 - December 2020	08/12/2020	10.71	Absent	19.6	6.57	9963	11.15	-170.2	34.8	Clear, no sheen, no odour, poor recharge
BH107	Event 22 - January 2021	14/01/2021	10.710	Absent	22.2	6.70	9349	0.67	-100.1	104.9	Clear, no sheen, no odour, poor recharge
BH107	Event 23 - February 2021	11/02/2021	10.720	Absent	21.0	6.55	9620	0.60	-24.5	180.5	Slight orange tint to clear, poor recharge
BH107	Event 24 - March 2021	10/03/2021	10.770	Absent	19.6	6.80	9607	0.65	-113.2	91.8	Grey, cloudy, organic odour, no sheen
BH107	Event 25 - April 2021	07/04/2021	10.680	Absent	19.7	6.59	6653	0.69	-46.3	158.7	-
BH107	Event 26 - May 2021	03/05/2021	10.63	Absent	20.2	6.91	6651	5.19	125.4	330.4	Light grey colour, fairly clear, no odour, no sheen, slow recharge rate
BH107	Event 27 - June 2021	08/06/2021	9.31	Absent	18.5	6.60	7320	7.62	-53.7	151.3	Very dark, black/grey colour, high sedimet load, no odour or sheen

Well ID	Sampling Event	Date Measured	SWL (mbTOC)	LNAPL present	Temp (°C)	pH	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Corrected Redox Potential* (mV)	Comments (sheen, colour, turbidity, sediment, odour)
BH107	Event 28 - July 2021	07/07/2021	10.600	Absent	18.8	6.30	7496	6.13	56.7	261.7	Clear water, slight grey tinge, no odour, no sheen, low sediment load, slow purge rate
BH107	Event 29 - August 2021	13/08/2021	10.570	Absent	18.7	6.88	8092	0.72	15.3	220.3	Very dark grey/black water, no odour, no sheen, low sediment load
BH107	Event 30 - September 2021	01/09/2021	10.560	Absent	19.2	6.78	8070	1.30	-18.9	186.1	Very dark grey colour, high sediment load, poor recharge, no odour, no sheen
BH107	Event 31 - October 2021	15/10/2021	10.800	Absent	19.3	6.54	4654	1.37	-87	118	Black water. High sediment load, No odour/sheen. Good recharge
BH107	Event 32 - November 2021	08/11/2021	11.070	Absent	18.4	6.69	7411	0.44	-64.3	140.7	Dark grey. High sediment. No odour/sheen. Good recharge.
BH107	Event 33 - December 2021	08/12/2021	11.060	Absent	19.2	6.70	7582	0.44	-14.2	190.8	Clear, dark grey sediment. Silty. No odour/sheen. Good recharge
BH107	Event 34 - January 2022	13/01/2022	10.090	Absent	20.0	5.98	5555	12.53	25.4	230.4	Micro-purge issues. Grab sample taken.
BH107	Event 35 - February 2022	10/02/2022	11.450	Absent	20.2	6.62	6002	0.34	39.7	244.7	Dark grey. High turbidity. No odour/sheen
BH107	Event 36 - March 2022	18/03/2022	10.160	Absent	18.3	6.98	1549	1.13	-59	146	Black, no odour/sheen, Good recharge. Water became clear after 2L
BH107	Event 38 - May 2022	25/05/2022	9.57	Absent	19.1	7.36	4245	2.12	103.30	308.3	Brown, cloudy, no sheen, no odour, bailer sampled.
BH107	Event 39 - June 2022	27/06/2022	9.655	Absent	18.7	7.2	4524	4.83	105.50	310.5	Brown, cloudy, no sheen, no odour, bailer sampled.
BH107	Event 40 - July 2022	20/07/2022	9.64	Absent	19.1	6.97	4068	3.53	86.40	291.4	Grab sample taken, one set of parameters recorded
BH112	Event 4 - July 2019	18/07/2019	17.57	Absent	-	-	-	-	-	-	No data, grab sample collected
BH112	Event 5 - August 2019	20/08/2019	17.625	Absent	19.7	6.59	10985	1.39	67.6	272.6	Brown, turbid, poor recharge
BH112	Event 6 - September 2019	25/09/2019	17.585	Absent	20.4	6.72	11553	1.79	76.7	281.7	Grey-brown, turbid, no sheen, no odour
BH112	Event 7 - October 2019	22/10/2019	17.582	Absent	19.8	6.49	11726	0.92	64.6	269.6	Brown-grey, turbid, no sheen, no odour, poor recharge
BH112	Event 8 - November 2019	07/11/2019	17.580	Absent	22.3	6.60	12865	1.12	48	253	Light brown, cloudy, no sheen, no odour
BH112	Event 9 - December 2019	12/12/2019	17.58	Absent	20.4	6.33	11883	0.97	74.4	279.4	Grey, cloudy, slight sheen
BH112	Event 11 - February 2020	20/02/2020	17.590	Absent	21.1	6.46	12693	1.42	74	279	Brown, no sheen, no odour
BH112	Event 13 - April 2020	21/04/2020	17.601	Absent	20.0	6.49	12419	1.22	169.6	374.6	Grey-brown, turbid, slight organic sheen, no odour
BH112	Event 14 - May 2020	21/05/2020	17.580	Absent	-	-	-	-	-	-	No data, too much sediment, grab sample collected
BH112	Event 16 - July 2020	30/07/2020	17.550	Absent	18.9	6.20	11966	0.49	70.2	275.2	Brown, turbid, no sheen, no odour, poor recharge
BH112	Event 17 - August 2020	13/08/2020	17.590	Absent	18.9	6.26	12274	0.76	99.3	304.3	Grey, turbid, no sheen, no odour, poor recharge
BH112	Event 18 - September 2020	10/09/2020	17.590	Absent	18.9	6.44	38.1	2.01	42.1	247.1	Clear, no sheen, no odour, poor recharge, DO probe malfunction during purging
BH112	Event 19 - October 2020	09/10/2020	17.590	Absent	19.9	6.46	12521	1.45	85.9	290.9	Low sediment load, no sheen, no odour, poor recharge
BH112	Event 21 - December 2020	08/12/2020	17.580	Absent	19.7	6.25	12848	10.74	67.5	272.5	Clear, no sheen, no odour, poor recharge
BH112	Event 22 - January 2021	14/01/2021	17.580	Absent	22.1	6.54	12760	0.49	36.2	241.2	Slightly turbid brown, no sheen, no odour, poor recharge
BH112	Event 23 - February 2021	11/02/2021	17.800	Absent	21.7	6.52	13061	1.08	60.4	265.4	Turbid brown, no sheen, no odour, poor recharge
BH112	Event 24 - March 2021	10/03/2021	17.590	Absent	19.6	6.66	12724	0.54	17.1	222.1	Grey, some sediment, no sheen, no odour
BH112	Event 25 - April 2021	07/04/2021	17.050	Absent	19.9	6.77	4873	0.22	111.8	316.8	light grey tinge
BH112	Event 26 - May 2021	03/05/2021	17.390	Absent	18.0	6.58	8682	1.69	36.7	241.7	brown murky tinge, no odour, no sheen, low sediment load
BH112	Event 27 - June 2021	08/06/2021	17.500	Absent	18.8	6.57	7550	7.58	-17.6	187.4	light grey colour, no odour, no sheen, high sediment load, slow recharge, slow flow
BH112	Event 28 - July 2021	07/07/2021	17.560	Absent	19.3	7.10	8444	5.45	-2.5	202.5	very turbid, brown murky water, no odour, no sheen, slow purge rate, good recharge
BH112	Event 29 - August 2021	13/08/2021	17.590	Absent	18.7	6.52	8007	0.32	444	649	Dark grey/black colour, no odour, no sheen, low sediment load
BH112	Event 30 - September 2021	01/09/2021	17.600	Absent	19.4	6.67	9130	0.72	21	226	Very turbid, brown water, high sediment load, no odour, no sheen, poor recharge
BH112	Event 31 - October 2021	15/10/2021	17.590	Absent	19.3	6.67	9145	0.50	24	229	Very turbid brown/black water. High sediment load. No odour/sheen. Poor recharge
BH112	Event 32 - November 2021	08/11/2021	18.290	Absent	18.4	6.56	9513	0.57	-20.7	184.3	Silty brown colour, High sediment, No odour/sheen
BH112	Event 33 - December 2021	08/12/2021	18.650	Absent	19.4	6.31	9961	1.50	20.7	225.7	Dark sediment. Very silty. No odour/sheen. Poor recharge
BH112	Event 34 - January 2022	13/01/2022	19.090	Absent	19.8	6.55	9987	12.32	6.7	211.7	Light grey. No odour/sheen. Poor recharge
BH112	Event 35 - February 2022	10/02/2022	18.540	Absent	20.6	6.48	10728	1.78	72	277	Light brown. Moderate turbidity. No odour/sheen
BH112	Event 36 - March 2022	18/03/2022	16.090	Absent	18.6	7.00	4150	1.05	31	236	Grey, no odour/sheen, water became clear after 2.5L
BH112	Event 38 - May 2022	25/05/2022	15.235	Absent	19.8	7.1	3233	1.91	98.10	303.1	Brown, cloudy, some sediemnt, no sheen, no odour, bailer sampled
BH112	Event 39 - June 2022	27/06/2022	15.005	Absent	18.7	7.01	3190	5.88	104.30	309.3	Brown, cloudy, no sheen, no odour, bailer sampled.
BH112	Event 40 - July 2022	20/07/2022	13.97	Absent	19.4	6.89	3921	4.30	94.90	299.9	Grab sample taken, one set of parameters recorded. Pale yellow, no odour, no sheen
BH145	Event 3 - June 2019	13/06/2019	16.350	Absent	17.2	6.7	7307	1.23	165	370	Grey-brown, cloudy, no sheen, no odour, poor recharge
BH145	Event 4 - July 2019	17/07/2019	18.250	Absent	-	-	-	-	-	-	No data, grab sample collected
BH145	Event 5 - August 2019	21/08/2019	18.270	Absent	-	-	-	-	-	-	No data, grab sample collected
BH145	Event 6 - September 2019	26/09/2019	18.317	Absent	-	-	-	-	-	-	No data, grab sample collected
BH145	Event 7 - October 2019	23/10/2019	Not recorded	Absent	20.6	7.09	5334.4	2.94	129.5	334.5	Not recorded
BH145	Event 8 - November 2019	08/11/2019	18.587	Absent	-	-	-	-	-	-	Bailer lost, no sample or data collected
BH145	Event 9 - December 2019	12/12/2019	18.715	Absent	-	-	-	-	-	-	No data, grab sample collected
BH145	Event 14 - May 2020	21/05/2020	16.54	Absent	17.5	6.28	5045	1.15	203.4	408.4	Slightly turbid, no sheen, no odour
BH145	Event 16 - July 2020	30/07/2020	13.93	Absent	16.5	5.57	3145	0.26	179.1	384.1	Brown, turbid, no sheen, no odour, poor recharge

Well ID	Sampling Event	Date Measured	SWL (mbTOC)	LNAPL present	Temp (°C)	pH	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Corrected Redox Potential* (mV)	Comments (sheen, colour, turbidity, sediment, odour)
BH145	Event 17 - August 2020	13/08/2020	16.42	Absent	17.1	6.03	4669	1.26	65.7	270.7	Clear, no sheen, no odour, poor and insufficient recharge - grab sample taken
BH145	Event 18 - September 2020	09/09/2020	17.7	Absent	18.8	6.29	3802	0.11	-46.3	158.7	Brown, turbid, no sheen, no odour, poor recharge, DO probe malfunction
BH145	Event 19 - October 2020	08/10/2020	18.96	Absent	19.8	6.46	7948	1.38	80.9	285.9	Brown, turbid, high sediment load, no sheen, no odour, poor recharge
BH145	Event 20 - November 2020	11/11/2020	14.51	Absent	18.9	6.09	2913	0.33	-19.2	185.8	Brown, tubrid, no sheen, no odour, poor recharge
BH145	Event 21 - December 2020	09/12/2020	16.625	Absent	19.8	6.16	3612	0.59	-50.7	154.3	Turbid brown, no sheen, no odour, poor recharge
BH145	Event 22 - January 2021	12/01/2021	18.015	Absent	-	-	-	-	-	-	No data, grab sample collected
BH145	Event 23 - February 2021	09/02/2021	18.21	Absent	-	-	-	-	-	-	No data, grab sample collected
BH145	Event 24 - March 2021	10/03/2021	18.43	Absent	20.1	6.6	6075	0.81	59.3	264.3	Brown, cloudy, some sediemnt, no sheen, no odour
BH145	Event 25 - April 2021	07/04/2021	17.595	Absent	18.6	6.23	3740	0.69	3.7	208.7	Dark brown, turbid
BH145	Event 26 - May 2021	03/05/2021	19.85	Absent	-	-	-	-	-	-	Unable to purge, well was dry, no water coming up due to low SWL
BH145	Event 27 - June 2021	08/06/2021	19.49	Absent	-	-	-	-	-	-	Bailer used for grab sample, less than 1m of water available, very muddy. No data recorded. Half set of samples.
BH145	Event 28 - July 2021	07/07/2021	19.41	Absent	-	-	-	-	-	-	Bailer used for grab sample, less than 1m of water available. No data recorded
BH145	Event 29 - August 2021	13/08/2021	-	-	-	-	-	-	-	-	not sampled
BH145	Event 30 - September 2021	01/09/2021	19.17	Absent	-	-	-	-	-	-	not enough water to purge, took grab sample.
BH145	Event 31 - October 2021	15/10/2021	19.47	Absent	-	-	-	-	-	-	Bailer used for grab sample. No data recorded
BH145	Event 32 - November 2021	08/11/2021	19.32	Absent	-	-	-	-	-	-	Bailer used for grab sample. No data recorded
BH145	Event 33 - December 2021	08/12/2021	19.19	Absent	-	-	-	-	-	-	Bailer used for grab sample. No data recorded
BH145	Event 34 - January 2022	13/01/2022	19.1	Absent	-	-	-	-	-	-	Bailer used for grab sample. No data recorded
BH145	Event 35 - February 2022	10/02/2022	19.17	Absent	-	-	-	-	-	-	Bailer used for grab sample. No data recorded
BH145	Event 36 - March 2022	18/03/2022	18.63	Absent	-	-	-	-	-	-	Bailer used for grab sample. No data recorded
BH145	Event 38 - May 2022	25/05/2022	18.655	Absent	15.8	6.03	4587	0.62	125.60	330.6	Cloudy, no sheen, no odour, bailer sampled.
BH145	Event 39 - June 2022	27/06/2022	19.065	Absent	-	-	-	-	-	-	No data, grab sample collected
BH145	Event 40 - July 2022	20/07/2022	18.402	Absent	15.4	6.1	2978	4.90	101.80	306.8	Grab sample taken, one set of parameters recorded. Pale yellow, no odour, no sheen

*Corrected for standard hydrogen electrode (SHE) by adding 205 mV to YSI redox potential reading

Well ID	Sampling Event	Date Measured	SWL (mbTOC)	LNAPL present	Temp (°C)	pH	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Corrected Redox Potential* (mV)	Comments (sheen, colour, turbidity, sediment, odour)
BH104	Event 41 - August 2022	15/08/2022	10.800	Absent	18.6	6.11	21707	3.00	176.10	381.1	Slightly grey, slightly turbid, no odour/sheen
BH104	Event 42 - September 2022	19/09/2022	10.770	Absent	19.5	6.8	21616	1.20	148.00	353	Clear, no odour/sheen
BH104	Event 43 - October 2022	20/10/2022	10.480	Absent	18.9	6.5	20836	0.80	165.70	370.7	Clear, no sediment, no odour/sheen. Slight pale yellow tinge, no sediment, clear, no odour/sheen.
BH104	Event 44 - November 2022	16/11/2022	10.140	Absent	18.3	6.6	32098	0.52	152.10	357.1	Clear, no odour/sheen.
BH104R	Event 45 - December 2022	16/12/2022	8.310	Absent	18.6	6.98	6344	0.82	-73.70	131.3	Grey-brown, very cloudy, no sediment, no odour/sheen.
BH104R	Event 46 - January 2023	18/01/2023	8.618	Absent	19.40	6.74	5687	0.09	-74.90	130.1	Clear, no sediment, no odour/sheen.
BH104R	Event 47 - February 2023	08/02/2023	8.795	Absent	19.3	6.76	7700	0.75	-80.20	124.8	Grey, cloudy, no odour or sheen.
BH104R	Event 48 - March 2023	03/03/2023	9.300	Absent	19.5	6.79	6017	0.74	-30.10	174.9	Grey, cloudy, no odour or sheen.
BH104R	Event 49 - April 2023	04/04/2023	9.367	Absent	19.5	6.89	5049	0.13	19.50	224.5	Yellow tinge, cloudy, no odour/sheen.
BH104R	Event 50 - May 2023	02/05/2023	9.440	Absent	18.8	6.52	8072	3.10	-7.00	198	Mostly clear, no sediment, slight organic odour, no sheen. Good recharge.
BH104R	Event 51 - June 2023	07/06/2023	9.850	Absent	20.1	6.84	9508	5.20	32.20	237.2	Clear, no odour, no sediment, no sheen.
BH104R	Event 52 - July 2023	05/07/2023	10.330	Absent	18.9	6.80	8110	0.11	38.40	243.4	Clear, no odour, no sheen, no sediment.
BH104R	Event 53 - August 2023	09/08/2023	11.570	Absent	18.3	7.15	8154	9.39	10.40	215.4	Mostly clear, no sediment, no odour, no sheen. Good recharge.
BH104R	Event 54 - September 2023	05/09/2023	11.563	Absent	19.1	6.81	8350	2.81	-28.80	176.2	Light brown tinge, mostly clear, no odour or sheen.
BH104R	Event 55 - October 2023	06/10/2023	11.790	Absent	19.4	6.66	7707	0.00	-33.50	171.5	Clear, no odour or sheen.
BH104R	Event 56 - November 2023	08/11/2023	11.620	Absent	19.6	6.68	9152	0.12	7.00	212	Mostly clear, pale yellow tinge, no odour, no sheen, sediment.
BH104R	Event 57 - December 2023	06/12/2023	11.465	Absent	21.1	6.78	8611	0.08	-97.90	107.1	Clear, no odour, no sheen, no sediment. Great recharge.
BH104R	Event 58 - January 2024	19/01/2024	11.135	Absent	20.2	6.96	7518	0.03	-72.80	132.2	Clear, slight sulphide odour, no sheen, no sediment
BH104R	Event 59 - February 2024	13/02/2024	11.075	Absent	21.8	6.68	8312	0.25	-112.90	92.10	White, slightly cloudy, no odour, no sheen, no sediment
BH104R	Event 60 - March 2024	15/03/2024	11.050	Absent	19.5	6.56	7763	0.00	-102.40	102.60	Clear, no odour, no sheen, no sediment.
BH104R	Event 61 - April 2024	11/04/2024	10.940	Absent	21.6	6.82	8187	0.22	-30.80	174.20	Pale yellow tinge, slighty cloudy, no odour, no sheen, no sediment. Good recharge.
BH104R	Event 62 - May 2024	15/05/2024	11.05	Absent	19.9	6.77	7707	0.17	-120.20	84.80	Clear, no odour, no sheen, no sediment. Good recharge.
BH104R	Event 63 - June 2024	12/06/2024	11.020	Absent	19.2	6.74	7120	0.16	-64.80	140.20	Clear, no odour, no sheen, no sediment. Great recharge.
BH104R	Event 64 - July 2024	11/07/2024	11.180	Absent	18.1	6.76	7210	0.00	-84.70	120.30	Slight pale grey, somewhat cloudy, no sediment, hydrogen sulphide odour, no sheen.
BH104R	Event 65 - August 2024	06/08/2024	11.26	Absent	18.2	6.81	6863	0.35	-81.50	123.50	Clear, colourless,no sheen,no sediment, sulfuric odour. Good recharge.
BH104R	Event 66 - September 2024	12/09/2024	11.33	Absent	18.4	6.87	6865	0.05	-88.20	116.8	Clear, no sediment, slight sulfuric odour, no sheen
BH107	Event 41 - August 2022	15/08/2022	9.530	Absent	19.3	6.89	4428	4.40	106.40	311.4	Bailer used for grab sample. Clear, no odour/sheen
BH107	Event 42 - September 2022	19/09/2022	10.010	Absent	23.2	7.6	4643	4.59	76.10	281.1	pale yellow, no sediment, no odour/sheen
BH107	Event 43 - October 2022	20/10/2022	9.775	Absent	18.8	6.9	4780	0.94	96.00	301	Pale brown, cloudy, no odour/sheen. Clear, no odour/sheen
BH107	Event 44 - November 2022	16/11/2022	9.515	Absent	18.7	7.4	6707	0.98	45.30	250.3	Pale grey tinge, turbid, no sediment, no odour/sheen.
BH107R	Event 45 - December 2022	16/12/2022	6.870	Absent	18.1	7.37	2651	3.15	70.60	275.6	Brown, no sediment, no odour/sheen
BH107R	Event 46 - January 2023	18/01/2023	-	Absent	-	-	-	-	-	-	No access to sampling location for this round.
BH107R	Event 47 - February 2023	08/02/2023	7.025	Absent	19.3	7.19	3021	0.12	31.10	236.1	Clear, no odour/sheen.
BH107R	Event 48 - March 2023	03/03/2023	7.060	Absent	19.4	7.18	2824	0.12	37.80	242.8	Grey, cloudy, no odour or sheen.
BH107R	Event 49 - April 2023	04/04/2023	7.110	Absent	19.4	7.66	2542	0.24	36.90	241.9	Clear, no odour/sheen.
BH107R	Event 50 - May 2023	02/05/2023	7.150	Absent	18.8	6.83	3023	7.73	115.30	320.3	Clear, no sediment, no odour, no sheen.
BH107R	Event 51 - June 2023	07/06/2023	-	-	-	-	-	-	-	-	CPB determined no safe access across alignment from, southern side to northern side where BH107R is located.
BH107R	Event 52 - July 2023	05/07/2023	7.450	Absent	18.1	7.20	2568	1.42	440.10	645.1	Clear, no odour, no sheen, no sediment, poor recharge.
BH107R	Event 53 - August 2023	09/08/2023	7.620	Absent	18.7	7.41	3107	9.65	71.80	276.8	Clear, no odour, no sheen, no sediment.
BH107R	Event 54 - September 2023	05/09/2023	7.579	Absent	18.4	7.15	3144	4.96	60.60	265.6	Pale brown tinge, slightly turbid, no odour or sheen.
BH107R	Event 55 - October 2023	06/10/2023	7.698	Absent	18.9	7.31	3110	9.91	108.30	313.3	Pale brown tinge, slightly turbid, no odour or sheen.
BH107R	Event 56 - November 2023	08/11/2023	7.800	Absent	19.5	7.11	3438	3.63	101.90	306.9	Mostly clear, pale yellow tinge, no odour, no sheen, no sediment.
BH107R	Event 57 - December 2023	06/12/2023	7.810	Absent	20.6	7.06	3457	2.76	87.50	292.5	Clear, no odour, no sheen, no sediment, poor to no recharge.
BH107R	Event 58 - January 2024	19/01/2024	7.760	Absent	20.1	7.2	3373	0.32	81.40	286.4	Pale brown tinge, slightly cloudy, no odour or sheen. Poor recharge.
BH107R	Event 59 - February 2024	13/02/2024	7.730	Absent	21.6	6.97	3542	0.63	53.50	258.50	Clear, no odour, no sheen, no sediment
BH107R	Event 60 - March 2024	15/03/2024	7.795	Absent	19.6	6.87	3193	1.87	43.80	248.80	Pale brown, cloudy, no odour or sheen. Poor recharge.
BH107R	Event 61 - April 2024	11/04/2024	7.615	Absent	20.6	7.11	3608	0.94	106.90	311.90	Clear, very slightly cloudy, no odour, no sheen, no sediment. Poor to moderate recharge.
BH107R	Event 62 - May 2024	15/05/2024	7.77	Absent	19.7	6.97	3367	0.67	56.50	261.50	Clear, no sediment, no odour or sheen. moderate to poor recharge.
BH107R	Event 63 - June 2024	12/06/2024	7.700	Absent	18.8	6.98	3140	0.81	49.20	254.20	Clear, no odour, no sediment, no sheen.
BH107R	Event 64 - July 2024	11/07/2024	7.745	Absent	17.9	6.99	3193	0.84	37.10	242.10	Clear, no odour or sheen.
BH107R	Event 65 - August 2024	06/08/2024	7.73	Absent	18.1	7.14	3060	7.14	13.20	218.20	Faintly cloudy, colourless, odourless, no sheen, no sediment.
BH107R	Event 66 - September 2024	12/09/2024	7.66	Absent	18.8	7.07	3123	0.29	11.70	216.7	Clear, no colour, no odour, no sheen, no sediment

Well ID	Sampling Event	Date Measured	SWL (mbTOC)	LNAPL present	Temp (°C)	pH	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Corrected Redox Potential* (mV)	Comments (sheen, colour, turbidity, sediment, odour)
BH112	Event 41 - August 2022	15/08/2022	13.560	Absent	19.1	6.72	3226	4.34	109.80	314.8	Bailer used for grab sample. Slight grey tinge, no sediment, no odour/sheen
BH112	Event 42 - September 2022	19/09/2022	13.460	Absent	24.2	7.4	3629	4.56	68.60	273.6	Pale yellow, very cloudy, no sediment, no odour/sheen
BH112	Event 43 - October 2022	20/10/2022	13.300	Absent	18.6	7.0	3117	2.63	151.10	356.1	Dark brown, very cloudy, non-transparent, no odour/sheen. Able to purge groundwater as CPB haul road established
BH112	Event 44 - November 2022	16/11/2022	14.180	Absent	18.9	7.2	4722	1.17	81.80	286.8	Pale brown, very turbid, some sediment load, no odour/sheen. Pale brown tinge, mostly clear, no odour/sheen.
BH112R	Event 45 - December 2022	16/12/2022	-	-	-	-	-	-	-	-	No access to sampling location for this round.
BH112R	Event 46 - January 2023	18/01/2023	-	-	-	-	-	-	-	-	No access to sampling location for this round.
BH112R	Event 47 - February 2023	08/02/2023	-	-	-	-	-	-	-	-	No access to sampling location for this round.
BH112R	Event 48 - March 2023	03/03/2023	-	-	-	-	-	-	-	-	No access to sampling location for this round.
BH112R	Event 49 - April 2023	04/04/2023	-	-	-	-	-	-	-	-	No access to sampling location for this round.
BH112R	Event 50 - May 2023	02/05/2023	-	-	-	-	-	-	-	-	No access to sampling location for this round.
BH112R	Event 51 - June 2023	07/06/2023	Dry	Absent	-	-	-	-	-	-	Replacement well of replacement well BH112R. Well measured as Dry.
BH112R	Event 52 - July 2023	05/07/2023	12.000	Absent	-	-	-	-	-	-	Well not developed at this stage. Presence of water alerted to CPB and well to be developed.
BH112R	Event 53 - August 2023	09/08/2023	12.425	Absent	19.7	6.88	14408	8.38	113.00	318	Mostly clear, no odour, no sheen, no sediment. Poor recharge
BH112R	Event 54 - September 2023	05/09/2023	12.407	Absent	19.9	6.71	14971	0.31	55.10	260.1	Light brown, moderate turbidity, moderate sediment, no odour, no sheen
BH112R	Event 55 - October 2023	06/10/2023	12.700	Absent	18.8	6.89	13124	6.89	119.90	324.9	Pale brown tinge, slightly turbid, no odour or sheen.
BH112R	Event 56 - November 2023	08/11/2023	12.905	Absent	19.4	6.66	15954	0.08	58.30	263.3	Mostly clear, slightly cloudy, no odour, no sheen, no sediment.
BH112R	Event 57 - December 2023	06/12/2023	13.020	Absent	21.9	6.66	16111	0.24	69.50	274.5	Clear, no odour, no sheen, no sediment.
BH112R	Event 58 - January 2024	19/01/2024	13.045	Absent	21.1	6.79	14444	0.26	100.30	305.3	Clear, no odour, no sheen, no sediment.
BH112R	Event 59 - February 2024	13/02/2024	13.095	Absent	21.2	6.55	13913	0.42	74.10	279.10	Mostly clear, no odour, no sheen, no sediment
BH112R	Event 60 - March 2024	15/03/2024	13.141	Absent	22.1	6.37	15400	0.96	104.40	309.40	Clear, no odour, no sheen, no sediment. Good recharge.
BH112R	Event 61 - April 2024	11/04/2024	13.070	Absent	19.9	6.62	14890	0.57	121.40	326.40	Clear, no odour or sheen, no sediment load. Moderate recharge.
BH112R	Event 62 - May 2024	15/05/2024	13.07	Absent	20.5	6.55	14698	0.42	81.00	286.00	Clear, no odour, no sheen, no sediment. Moderate recharge.
BH112R	Event 63 - June 2024	12/06/2024	12.960	Absent	19.1	6.55	13336	0.36	73.70	278.70	Clear, no odour, no sediment, no sheen. Moderate recharge.
BH112R	Event 64 - July 2024	11/07/2024	13.025	Absent	19.2	6.51	14136	0.17	93.10	298.10	Clear, no sediment,no odour or sheen.
BH112R	Event 65 - August 2024	06/08/2024	13.065	Absent	19.0	6.56	13369	0.68	52.90	257.90	Clear, no sediment, no odour or sheen
BH112R	Event 66 - September 2024	12/09/2024	13.085	Absent	19.5	6.61	13518	0.18	62.20	267.2	Clear, no sediment, no odour or sheen
BH144	Event 44 - November 2022	15/11/2022	16.560	Absent	20.2	6.2	2360	0.42	83.80	288.8	Pale brown, very turbid, no sediment, no odour/sheen.
BH145	Event 41 - August 2022	15/08/2022	18.660	Absent	-	-	-	-	-	-	Bailer used for grab sample. No data recorded. Brown, turbid, no odour/sheen
BH145	Event 42 - September 2022	20/09/2022	18.905	Absent	-	-	-	-	-	-	Bailer used due to low SWL. No parameters recorded due to preference of samples
BH145	Event 43 - October 2022	19/10/2022	18.470	Absent	19.1	6.2	4165	3.29	158.70	363.7	Low water level, one set parameters taken and samples collected.
BH145	Event 44 - November 2022	15/11/2022	18.615	Absent	20.9	6.3	6486	2.07	151.30	356.3	One set parameters recorded and grab sample due to low. amount of water available
BH145	Event 45 - December 2022	14/12/2022	18.980	Absent	-	-	-	-	-	-	No parameters recorded due to low standing water level. All samples collected.
BH145	Event 46 - January 2023	17/01/2023	19.200	Absent	-	-	-	-	-	-	Brown, turbid, no odour/sheen. No parameters recorded due to low amount of water available.
BH145	Event 47 - February 2023	07/02/2023	19.225	Absent	-	-	-	-	-	-	Brown, turbid, no odour/sheen. No parameters recorded due to low. water available.
BH145	Event 48 - March 2023	02/03/2023	19.300	Absent	-	-	-	-	-	-	Dark brown/grey, cloudy, high sediment, no odour/sheen. Low water level, grab samples taken, no parameters recorded due to lack of water available.
BH145R	Event 49 - April 2023	05/04/2023	11.920	Absent	18.6	7.54	3815	0.17	-152.60	52.4	Clear, no odour/sheen.
BH145R	Event 50 - May 2023	02/05/2023	12.030	Absent	18.9	6.61	10273	0.50	-120.00	85	Pale grey tinge, mostly clear, slight unidentified odour.
BH145R	Event 51 - June 2023	06/06/2023	11.980	Absent	18.3	6.93	12863	0.16	-143.00	62	Mostly clear, organic odour, no sediment, no sheen.
BH145R	Event 52 - July 2023	05/07/2023	11.810	Absent	18.5	6.40	12419	0.12	-83.90	121.1	Light grey tinge, mostly clear.
BH145R	Event 53 - August 2023	09/08/2023	11.906	Absent	19.1	6.78	13966	2.27	-79.70	125.3	Grab sample, one set of parameters collected as geocontrol, pump is faulty.
BH145R	Event 54 - September 2023	06/09/2023	11.777	Absent	18.3	6.71	14262	0.40	-72.20	132.8	Sightly brown, low turbidity, low sediment, no odour or sheen, great recharge
BH145R	Event 55 - October 2023	06/10/2023	11.760	Absent	19.3	6.65	14187	0.10	-92.80	112.2	Clear, no odour or sheen.
BH145R	Event 56 - November 2023	09/11/2023	11.650	Absent	19.7	6.58	18021	0.02	-84.00	121	Clear, no odour, no sheen, no sediment. Good recharge.
BH145R	Event 57 - December 2023	05/12/2023	11.525	Absent	19.6	6.6	16963	0.03	-93.80	111.2	Clear, slight sulfuric odour, no sheen, great recharge.

Well ID	Sampling Event	Date Measured	SWL (mbTOC)	LNAPL present	Temp (°C)	pH	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Corrected Redox Potential* (mV)	Comments (sheen, colour, turbidity, sediment, odour)
BH145R	Event 58 - January 2024	18/01/2024	11.260	Absent	19.8	6.75	16065	0.01	-80.70	124.3	Clear, no sediment, no odour or sheen, good recharge.
BH145R	Event 59 - February 2024	14/02/2024	11.300	Absent	20.4	6.51	17357	0.39	-85.10	119.90	Clear, no odour or sheen, no sediment, low turbidity
BH145R	Event 60 - March 2024	14/03/2024	11.270	Absent	19.7	6.29	17323	0.00	-107.80	97.20	Pale grey tinge, most clear, slight sulfuric odour, no sheen.
BH145R	Event 61 - April 2024	12/04/2024	11.215	Absent	20.1	6.67	13412	0.41	39.30	244.30	Clear, no sediment load, no odour or sheen. Good recharge
BH145R	Event 62 - May 2024	16/05/2024	11.275	Absent	19.4	6.56	15664	0.23	-72.10	132.90	Clear, no odour, no sheen, no sediment. Excellent recharge.
BH145R	Event 63 - June 2024	06/06/2024	11.180	Absent	18.0	6.49	15145	0.19	-62.00	143.00	Clear, no odour, no sheen, no sediment. Great recharge.
BH145R	Event 64 - July 2024	10/07/2024	11.140	Absent	20.5	6.62	16733	2.03	-41.70	163.30	Pale yellow grey, no sediment, very slight sulfuric odour, no sheen.
BH145R	Event 65 - August 2024	07/08/2024	11.22	Absent	18.6	6.93	15307	8.61	-44.90	160.10	Very pale grey, slightly cloudy, no odour, no sheen. Good recharge.
BH145R	Event 66 - September 2024	11/09/2024	11.22	Absent	19.0	6.58	15388	0.05	-74.30	130.7	Clear, colourless, slight sulfuric odour, no sheen

*Corrected for standard hydrogen electrode (SHE) by adding 205 mV to YSI redox potential reading

Well ID	Sampling Event	Date Measured	SWL (mbTOC)	LNAPL present	Temp (°C)	pH	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Corrected Redox Potential* (mV)	Comments (sheen, colour, turbidity, sediment, odour)
BH104R	Event 61 - April 2024	11/04/2024	10.940	Absent	21.6	6.82	8187	0.22	-30.80	174.20	Pale yellow tinge, slighty cloudy, no odour, no sheen, no sediment. Good recharge.
BH104R	Event 62 - May 2024	15/05/2024	11.05	Absent	19.9	6.77	7707	0.17	-120.20	84.80	Clear, no odour, no sheen, no sediment. Good recharge.
BH104R	Event 63 - June 2024	12/06/2024	11.020	Absent	19.2	6.74	7120	0.16	-64.80	140.20	Clear, no odour, no sheen, no sediment. Great recharge.
BH104R	Event 64 - July 2024	11/07/2024	11.180	Absent	18.1	6.76	7210	0.00	-84.70	120.30	Slight pale grey, somewhat cloudy, no sediment, hydrogen sulphide odour, no sheen.
BH104R	Event 65 - August 2024	06/08/2024	11.26	Absent	18.2	6.81	6863	0.35	-81.50	123.50	Clear, colourless,no sheen,no sediment, sulfuric odour. Good recharge.
BH104R	Event 66 - September 2024	12/09/2024	11.33	Absent	18.4	6.87	6865	0.05	-88.20	116.8	Clear, no sediment, slight sulfuric odour, no sheen
BH107R	Event 61 - April 2024	11/04/2024	7.615	Absent	20.6	7.11	3608	0.94	106.90	311.90	Clear, very slightly cloudy, no odour, no sheen, no sediment. Poor to moderate recharge.
BH107R	Event 62 - May 2024	15/05/2024	7.77	Absent	19.7	6.97	3367	0.67	56.50	261.50	Clear, no sediment, no odour or sheen. moderate to poor recharge.
BH107R	Event 63 - June 2024	12/06/2024	7.700	Absent	18.8	6.98	3140	0.81	49.20	254.20	Clear, no odour, no sediment, no sheen.
BH107R	Event 64 - July 2024	11/07/2024	7.745	Absent	17.9	6.99	3193	0.84	37.10	242.10	Clear, no odour or sheen.
BH107R	Event 65 - August 2024	06/08/2024	7.73	Absent	18.1	7.14	3060	7.14	13.20	218.20	Faintly cloudy, colourless, odourless, no sheen, no sediment.
BH107R	Event 66 - September 2024	12/09/2024	7.66	Absent	18.8	7.07	3123	0.29	11.70	216.7	Clear, no colour, no odour, no sheen, no sediment
BH112R	Event 61 - April 2024	11/04/2024	13.070	Absent	19.9	6.62	14890	0.57	121.40	326.40	Clear, no odour or sheen, no sediment load. Moderate recharge.
BH112R	Event 62 - May 2024	15/05/2024	13.07	Absent	20.5	6.55	14698	0.42	81.00	286.00	Clear, no odour, no sheen, no sediment. Moderate recharge.
BH112R	Event 63 - June 2024	12/06/2024	12.960	Absent	19.1	6.55	13336	0.36	73.70	278.70	Clear, no odour, no sediment, no sheen. Moderate recharge.
BH112R	Event 64 - July 2024	11/07/2024	13.025	Absent	19.2	6.51	14136	0.17	93.10	298.10	Clear, no sediment,no odour or sheen.
BH112R	Event 65 - August 2024	06/08/2024	13.065	Absent	19.0	6.56	13369	0.68	52.90	257.90	Clear, no sediment, no odour or sheen
BH112R	Event 66 - September 2024	12/09/2024	13.085	Absent	19.5	6.61	13518	0.18	62.20	267.2	Clear, no sediment, no odour or sheen
BH145R	Event 61 - April 2024	12/04/2024	11.215	Absent	20.1	6.67	13412	0.41	39.30	244.30	Clear, no sediment load, no odour or sheen. Good recharge
BH145R	Event 62 - May 2024	16/05/2024	11.275	Absent	19.4	6.56	15664	0.23	-72.10	132.90	Clear, no odour, no sheen, no sediment. Excellent recharge.
BH145R	Event 63 - June 2024	06/06/2024	11.180	Absent	18.0	6.49	15145	0.19	-62.00	143.00	Clear, no odour, no sheen, no sediment. Great recharge.
BH145R	Event 64 - July 2024	10/07/2024	11.140	Absent	20.5	6.62	16733	2.03	-41.70	163.30	Pale yellow grey, no sediment, very slight sulfuric odour, no sheen.
BH145R	Event 65 - August 2024	07/08/2024	11.22	Absent	18.6	6.93	15307	8.61	-44.90	160.10	Very pale grey, slightly cloudy, no odour, no sheen. Good recharge.
BH145R	Event 66 - September 2024	11/09/2024	11.22	Absent	19.0	6.58	15388	0.05	-74.30	130.7	Clear, colourless, slight sulfuric odour, no sheen

*Corrected for standard hydrogen electrode (SHE) by adding 205 mV to YSI redox potential reading

Appendix B
Table B8
Heavy Metal Concentrations and Hardness-Modified Trigger Values (HMTV)

Well ID	Phase	Date	Hardness mg/L	Cadmium µg/L		Chromium µg/L		Lead µg/L		Nickel µg/L		Zinc µg/L	
ANZECC (2000) Freshwater Trigger Value				*0.2*	***HMTV***	*1.0*	***HMTV***	*3.4*	***HMTV***	*11*	***HMTV***	*8*	***HMTV***
BH104 / BH104R	Baseline	10/09/2020	1,550	<0.1	*6.7*	<1	*25.4*	<1	*510*	22	*315*	61	*229*
		9/10/2020	1,610	<0.1	*6.9*	<1	*26.2*	<1	*535*	31	*325*	25	*236*
		13/11/2020	2,020	<0.1	*8.5*	<1	*31.6*	<1	*713*	137	*394*	25	*286*
		8/12/2020	2,090	<0.1	*8.7*	2	*32.5*	<1	*745*	105	*405*	93	*295*
		14/01/2021	1,900	<0.1	*8.0*	<1	*30.0*	<1	*660*	175	*374*	19	*272*
		11/02/2021	2,110	<0.1	*8.8*	<1	*32.7*	<1	*754*	81	*409*	<5	*297*
		10/03/2021	2,190	<0.1	*9.1*	<1	*33.7*	<1	*790*	57	*422*	25	*307*
		7/04/2021	833	<0.1	*3.9*	<1	*15.3*	<1	*232*	40	*186*	8	*135*
		4/05/2021	1,490	<0.1	*6.5*	<1	*24.6*	<1	*485*	108	*304*	30	*221*
		8/06/2021	1,860	<0.1	*7.9*	<1	*29.5*	<1	*642*	81	*367*	62	*267*
		7/07/2021	1,860	<0.1	*7.9*	<1	*29.5*	<1	*642*	11	*367*	7	*267*
		13/08/2021	1,910	<0.1	*8.1*	<1	*30.1*	<1	*664*	57	*376*	92	*273*
		1/09/2021	1,590	<0.1	*6.8*	<1	*25.9*	<1	*526*	33	*321*	7	*234*
		15/10/2021	1,860	<0.1	*7.9*	2	*29.5*	<1	*642*	43	*367*	39	*267*
		8/11/2021	1,680	<0.1	*7.2*	<1	*27.1*	<1	*565*	35	*337*	19	*245*
		8/12/2021	1,400	<0.1	*6.1*	<1	*23.4*	<1	*448*	23	*288*	149	*210*
		13/01/2022	1,470	<0.1	*6.4*	<1	*24.3*	<1	*476*	35	*301*	11	*219*
		10/02/2022	637	<0.1	*3.0*	<1	*12.3*	<1	*165*	60	*148*	<5	*107*
		18/03/2022	645	<0.1	*3.1*	<1	*12.4*	<1	*167*	192	*149*	8	*109*
		25/05/2022	2,540	<0.1	*10.4*	<1	*38.1*	<1	*954*	3	*479*	8	*348*
		27/06/2022	3,730	<0.1	*14.6*	<1	*52.2*	<1	*1555*	24	*663*	8	*482*
		20/07/2022	3,540	0.3	*14.0*	2	*50.0*	<1	*1455*	11	*635*	11	*462*
	Construction	15/08/2022	3980	<0.1	*15.5*	<1	*55.0*	<1	*1688*	8	*701*	6	*510*
		19/09/2022	4140	<0.1	*16.1*	<1	*56.8*	<1	*1775*	71	*725*	16	*527*
		20/10/2022	4020	<0.1	*15.6*	<1	*55.5*	<1	*1710*	10	*707*	11	*514*
		16/11/2022	4320	<0.1	*16.7*	<1	*58.9*	<1	*1873*	8	*752*	7	*547*
		16/12/2022	823	<0.1	*3.8*	<1	*15.1*	<1	*228*	1	*184*	6	*134*
		18/01/2023	1180	<0.1	*5.3*	<1	*20.3*	<1	*360*	1	*249*	<5	*181*
		8/02/2023	1060	<0.1	*4.8*	<1	*18.6*	<1	*315*	<1	*228*	<5	*166*
		3/03/2023	1300	<0.1	*5.7*	<1	*22.0*	<1	*408*	1	*271*	67	*197*
		4/04/2023	1380	<0.1	*6.0*	<1	*23.1*	<1	*440*	14	*285*	8	*207*
		2/05/2023	1180	<0.1	*5.3*	<1	*20.3*	<1	*360*	4	*249*	36	*181*
		7/06/2023	1520	<0.1	*6.6*	<1	*25.0*	<1	*497*	3	*309*	7	*225*
		7/07/2023	1360	<0.1	*6.0*	<1	*22.8*	<1	*432*	3	*281*	<5	*205*
		9/08/2023	1570	<0.1	*6.8*	<1	*25.7*	<1	*518*	2	*318*	12	*231*
		5/09/2023	1190	<0.1	*5.3*	<1	*20.5*	<1	*364*	1	*251*	5	*183*
		6/10/2023	1370	<0.1	*6.0*	<1	*23.0*	<1	*436*	23	*283*	23	*206*
		8/11/2023	1100	<0.1	*4.9*	<1	*19.2*	<1	*330*	1	*235*	6	*171*
		6/12/2023	888	<0.1	*4.1*	<1	*16.1*	<1	*251*	<1	*196*	6	*142*
		19/01/2024	936	<0.1	*4.3*	<1	*16.8*	<1	*269*	<1	*205*	<5	*149*
		13/02/2024	882	<0.1	*4.1*	<1	*16.0*	<1	*249*	1	*195*	<5	*142*
		15/03/2024	920	<0.1	*4.2*	<1	*16.6*	<1	*263*	<1	*202*	<5	*147*
		11/04/2024	787	<0.1	*3.7*	<1	*14.6*	<1	*215*	<1	*177*	<5	*129*
		15/05/2024	809	<0.1	*3.8*	<1	*14.9*	<1	*223*	<1	*181*	<5	*132*
		12/06/2024	798	<0.1	*3.7*	<1	*14.7*	<1	*219*	<1	*179*	<5	*130*
		11/07/2024	742	<0.1	*3.5*	<1	*13.9*	<1	*200*	<1	*168*	8	*122*
		6/08/2024	779	<0.1	*3.6*	<1	*14.4*	<1	*213*	11	*175*	18	*127*
		12/09/2024	732	<0.1	*3.4*	<1	*13.7*	<1	*197*	1	*166*	<5	*121*
BH107 / BH107R	Baseline	10/09/2020	1,650	<0.1	*7.1*	<1	*26.7*	2	*552*	23	*332*	85	*241*
		9/10/2020	1,530	0.1	*6.6*	<1	*25.1*	3	*501*	55	*311*	122	*226*
		8/12/2020	1,600	<0.1	*6.9*	<1	*26.1*	<1	*531*	109	*323*	34	*235*
		14/01/2021	1,500	<0.1	*6.5*	<1	*24.7*	<1	*489*	68	*306*	17	*222*
		11/02/2021	1,650	0.6	*7.1*	<1	*26.7*	3	*552*	90	*332*	168	*241*
		10/03/2021	1,570	0.2	*6.8*	<1	*25.7*	2	*518*	56	*318*	84	*231*
		7/04/2021	997	<0.1	*4.5*	<1	*17.7*	<1	*291*	41	*216*	17	*157*
		3/05/2021	926	<0.1	*4.2*	<1	*16.6*	<1	*265*	11	*203*	46	*148*
		8/06/2021	1,280	<0.1	*5.6*	<1	*21.7*	<1	*400*	96	*267*	28	*194*
		7/07/2021	1,230	<0.1	*5.5*	<1	*21.0*	<1	*380*	4	*258*	8	*188*
		13/08/2021	1,400	<0.1	*6.1*	<1	*23.4*	<1	*448*	21	*288*	12	*210*
		1/09/2021	1,260	<0.1	*5.6*	<1	*21.4*	<1	*392*	50	*264*	9	*192*
		15/10/2021	1,290	<0.1	*5.7*	<1	*21.8*	<1	*404*	50	*269*	57	*196*
		8/11/2021	1,180	<0.1	*5.3*	<1	*20.3*	<1	*360*	24	*249*	<5	*181*
		8/12/2021	1,230	<0.1	*5.5*	<1	*21.0*	<1	*380*	9	*258*	679	*188*
		13/01/2022	376	<0.1	*1.9*	<1	*8.0*	<1	*84*	70	*94*	78	*69*
		10/02/2022	806	<0.1	*3.7*	<1	*14.9*	<1	*222*	73	*180*	5	*131*
		18/03/2022	131	<0.1	*0.7*	<1	*3.3*	<1	*22*	61	*39*	22	*28*
		25/05/2022	543	<0.1	*2.6*	<1	*10.7*	<1	*135*	1	*129*	6	*94*
		27/06/2022	569	<0.1	*2.7*	<1	*11.2*	<1	*143*	2	*134*	6	*98*
		20/07/2022	366	<0.1	*1.9*	<1	*7.8*	<1	*81*	<1	*92*	6	*67*
	Construction	15/08/2022	516	<0.1	*2.5*	<1	*10.3*	<1	*126*	<1	*123*	7	*90*
		19/09/2022	485	<0.1	*2.4*	<1	*9.8*	<1	*117*	<1	*117*	6	*85*
		20/10/2022	575	<0.1	*2.8*	<1	*11.3*	<1	*145*	1	*135*	<5	*98*
		16/11/2022	555	<0.1	*2.7*	<1	*10.9*	<1	*138*	<1	*131*	<5	*96*
		16/12/2022	360	<0.1	*1.8*	<1	*7.7*	<1	*80*	2	*91*	12	*66*
		8/02/2023	380	<0.1	*1.9*	<1	*8.0*	<1	*85*	1	*95*	7	*69*
		3/03/2023	437	<0.1	*2.2*	<1	*9.0*	<1	*102*	2	*107*	125	*78*
		4/04/2023	427	<0.1	*2.1*	<1	*8.8*	<1	*99*	6	*105*	10	*76*
		2/05/2023	397	<0.1	*2.0*	<1	*8.3*	<1	*90*	10	*99*	26	*72*
		7/07/2023	447	<0.1	*2.2*	1	*9.2*	<1	*105*	2	*109*	12	*79*
		9/08/2023	470	<0.1	*2.3*	<1	*9.5*	<1	*112*	2	*114*	6	*83*
		5/09/2023	503	<0.1	*2.5*	<1	*10.1*	<1	*122*	2	*121*	9	*88*
		6/10/2023	508	<0.1	*2.5*	<1	*10.2*	<1	*124*	6	*122*	18	*89*

Appendix B
Table B8
Heavy Metal Concentrations and Hardness-Modified Trigger Values (HMTV)

Well ID	Phase	Date	Hardness mg/L	Cadmium µg/L		Chromium µg/L		Lead µg/L		Nickel µg/L		Zinc µg/L	
ANZECC (2000) Freshwater Trigger Value				*0.2*	***HMTV***	*1.0*	***HMTV***	*3.4*	***HMTV***	*11*	***HMTV***	*8*	***HMTV***
		8/11/2023	512	<0.1	*2.5*	<1	*10.2*	<1	*125*	5	*123*	18	*89*
		6/12/2023	511	<0.1	*2.5*	<1	*10.2*	<1	*125*	2	*122*	7	*89*
		19/01/2024	535	<0.1	*2.6*	<1	*10.6*	<1	*132*	1	*127*	6	*93*
		13/02/2024	515	<0.1	*2.5*	<1	*10.3*	<1	*126*	1	*123*	10	*90*
		15/03/2024	568	<0.1	*2.7*	<1	*11.2*	<1	*142*	2	*134*	11	*97*
		11/04/2024	536	<0.1	*2.6*	<1	*10.6*	<1	*132*	<1	*128*	6	*93*
		15/05/2024	547	<0.1	*2.6*	<1	*10.8*	<1	*136*	1	*130*	9	*94*
		12/06/2024	526	<0.1	*2.6*	<1	*10.5*	<1	*129*	1	*126*	8	*91*
		11/07/2024	507	<0.1	*2.5*	<1	*10.2*	<1	*123*	1	*122*	13	*88*
		6/08/2024	531	<0.1	*2.6*	<1	*10.6*	<1	*131*	10	*127*	17	*92*
		12/09/2024	522	<0.1	*2.5*	<1	*10.4*	<1	*128*	<1	*125*	7	*91*
BH112 / BH112R	Baseline	10/09/2020	1,740	<0.1	*7.4*	<1	*27.9*	1	*590*	80	*347*	104	*252*
		9/10/2020	1,640	0.2	*7.0*	<1	*26.6*	3	*548*	62	*330*	146	*240*
		8/12/2020	1,700	<0.1	*7.3*	<1	*27.4*	<1	*573*	101	*340*	149	*247*
		14/01/2021	1,720	<0.1	*7.3*	<1	*27.7*	<1	*582*	120	*344*	35	*250*
		11/02/2021	1,700	<0.1	*7.3*	<1	*27.4*	<1	*573*	48	*340*	11	*247*
		10/03/2021	1,710	<0.1	*7.3*	<1	*27.5*	2	*577*	40	*342*	86	*249*
		7/04/2021	402	<0.1	*2.0*	<1	*8.4*	<1	*92*	36	*100*	9	*73*
		4/05/2021	792	<0.1	*3.7*	<1	*14.6*	<1	*217*	182	*178*	58	*129*
		8/06/2021	804	<0.1	*3.7*	<1	*14.8*	<1	*221*	56	*180*	34	*131*
		7/07/2021	825	<0.1	*3.8*	<1	*15.1*	<1	*229*	10	*184*	7	*134*
		13/08/2021	972	<0.1	*4.4*	<1	*17.3*	<1	*282*	43	*212*	29	*154*
		1/09/2021	957	<0.1	*4.4*	<1	*17.1*	<1	*276*	38	*209*	10	*152*
		15/10/2021	1,690	<0.1	*7.2*	3	*27.3*	4	*569*	71	*338*	118	*246*
		8/11/2021	1,180	<0.1	*5.3*	<1	*20.3*	<1	*360*	33	*249*	7	*181*
		8/12/2021	1,210	<0.1	*5.4*	<1	*20.7*	<1	*372*	50	*255*	655	*185*
		13/01/2022	1,180	<0.1	*5.3*	<1	*20.3*	<1	*360*	65	*249*	14	*181*
		10/02/2022	1,340	<0.1	*5.9*	<1	*22.5*	<1	*424*	141	*278*	13	*202*
		18/03/2022	364	<0.1	*1.8*	<1	*7.7*	<1	*81*	130	*92*	<5	*67*
		25/05/2022	286	<0.1	*1.5*	<1	*6.4*	<1	*60*	7	*75*	22	*54*
		27/06/2022	264	<0.1	*1.4*	<1	*5.9*	<1	*54*	<1	*70*	<5	*51*
		20/07/2022	251	<0.1	*1.3*	<1	*5.7*	<1	*50*	<1	*67*	5	*49*
	Construction	15/08/2022	261	<0.1	*1.4*	<1	*5.9*	<1	*53*	<1	*69*	<5	*50*
		19/09/2022	268	<0.1	*1.4*	<1	*6.0*	<1	*55*	<1	*71*	<5	*51*
		20/10/2022	283	<0.1	*1.5*	<1	*6.3*	<1	*59*	5	*74*	49	*54*
		16/11/2022	260	<0.1	*1.4*	<1	*5.9*	<1	*53*	1	*69*	<5	*50*
		9/08/2023	2630	<0.1	*10.7*	<1	*39.2*	<1	*997*	18	*493*	8	*359*
		5/09/2023	2360	<0.1	*9.7*	<1	*35.9*	<1	*869*	47	*450*	19	*327*
		6/10/2023	2290	<0.1	*9.5*	<1	*35.0*	<1	*837*	16	*438*	48	*319*
		8/11/2023	2100	<0.1	*8.8*	<1	*32.6*	<1	*749*	9	*407*	12	*296*
		6/12/2023	2270	<0.1	*9.4*	<1	*34.7*	<1	*827*	8	*435*	16	*316*
		19/01/2024	2460	<0.1	*10.1*	<1	*37.1*	<1	*916*	7	*466*	13	*339*
		13/02/2024	1930	<0.1	*8.1*	<1	*30.4*	<1	*673*	7	*379*	14	*276*
		15/03/2024	2330	<0.1	*9.6*	<1	*35.5*	<1	*855*	6	*445*	17	*323*
		11/04/2024	2130	<0.1	*8.9*	<1	*33.0*	<1	*763*	6	*412*	9	*300*
		15/05/2024	2220	<0.1	*9.2*	<1	*34.1*	<1	*804*	6	*427*	15	*310*
		12/06/2024	2110	<0.1	*8.8*	<1	*32.7*	<1	*754*	5	*409*	34	*297*
		11/07/2024	2130	<0.1	*8.9*	<1	*33.0*	<1	*763*	5	*412*	13	*300*
		6/08/2024	2300	<0.1	*9.5*	<1	*35.1*	1	*841*	48	*440*	33	*320*
		12/09/2024	2220	<0.1	*9.2*	<1	*34.1*	<1	*804*	5	*427*	13	*310*
BH145	Baseline	9/09/2020	223	0.1	*1.2*	<1	*5.2*	<1	*43*	129	*61*	2620	*44*
		8/10/2020	264	<0.1	*1.4*	<1	*5.9*	<1	*54*	20	*70*	643	*51*
		11/11/2020	65	<0.1	*0.4*	<1	*1.9*	<1	*9*	43	*21*	10700	*15*
		9/12/2020	65	<0.1	*0.4*	<1	*1.9*	<1	*9*	82	*21*	1330	*15*
		12/01/2021	88	<0.1	*0.5*	4	*2.4*	14	*13*	11	*27*	1030	*20*
		9/02/2021	80	<0.1	*0.5*	<1	*2.2*	<1	*12*	8	*25*	1620	*18*
		10/03/2021	119	<0.1	*0.7*	<1	*3.1*	<1	*20*	68	*35*	297	*26*
		7/04/2021	65	<0.1	*0.4*	<1	*1.9*	<1	*9*	13	*21*	1380	*15*
		1/09/2021	211	0.4	*1.1*	<1	*5.0*	<1	*40*	46	*58*	694	*42*
		15/10/2021	86	<0.1	*0.5*	<1	*2.4*	<1	*13*	<1	*27*	<5	*20*
		8/11/2021	234	0.2	*1.2*	<1	*5.4*	<1	*46*	28	*63*	556	*46*
		8/12/2021	228	0.5	*1.2*	<1	*5.3*	<1	*45*	14	*62*	568	*45*
		13/01/2022	154	<0.1	*0.9*	<1	*3.8*	<1	*27*	8	*44*	824	*32*
		10/02/2022	131	0.1	*0.7*	<1	*3.3*	<1	*22*	6	*39*	498	*28*
		18/03/2022	149	0.1	*0.8*	<1	*3.7*	<1	*26*	6	*43*	567	*31*
		25/05/2022	106	<0.1	*0.6*	<1	*2.8*	<1	*17*	4	*32*	210	*23*
		27/06/2022	113	<0.1	*0.7*	<1	*3.0*	<1	*18*	2	*34*	142	*25*
		20/07/2022	48	<0.1	*0.3*	<1	*1.5*	<1	*6*	3	*16*	138	*12*
	Construction	15/08/2022	60	<0.1	*0.4*	<1	*1.8*	<1	*8*	3	*20*	102	*14*
		19/09/2022	97	<0.1	*0.6*	<1	*2.6*	<1	*15*	2	*30*	75	*22*
		20/10/2022	215	<0.1	*1.2*	<1	*5.0*	<1	*41*	3	*59*	101	*43*
		15/11/2022	70	<0.1	*0.4*	<1	*2.0*	<1	*10*	2	*23*	68	*16*
		14/12/2022	94	<0.1	*0.6*	<1	*2.6*	<1	*15*	2	*29*	72	*21*
		7/02/2023	118	<0.1	*0.7*	<1	*3.1*	<1	*19*	3	*35*	61	*26*
BH145R	Construction	5/04/2023	974	<0.1	*4.4*	<1	*17.4*	<1	*282*	26	*212*	<5	*154*
		2/05/2023	1170	<0.1	*5.2*	<1	*20.2*	<1	*357*	5	*248*	6	*180*
		6/06/2023	1580	<0.1	*6.8*	<1	*25.8*	<1	*522*	2	*320*	<5	*232*
		7/07/2023	1830	<0.1	*7.8*	<1	*29.1*	<1	*629*	1	*362*	<5	*263*
		9/08/2023	2380	<0.1	*9.8*	<1	*36.1*	<1	*879*	<1	*453*	<5	*329*
		6/09/2023	2090	<0.1	*8.7*	<1	*32.5*	<1	*745*	25	*405*	6	*295*
		6/10/2023	2510	<0.1	*10.3*	<1	*37.7*	<1	*940*	22	*474*	23	*345*

Appendix B
Table B8
Heavy Metal Concentrations
and Hardness-Modified Trigger Values (HMTV)

Well ID	Phase	Date	Hardness mg/L	Cadmium µg/L		Chromium µg/L		Lead µg/L		Nickel µg/L		Zinc µg/L	
ANZECC (2000) Freshwater Trigger Value				*0.2*	***HMTV***	*1.0*	***HMTV***	*3.4*	***HMTV***	*11*	***HMTV***	*8*	***HMTV***
		9/11/2023	2500	<0.1	*10.2*	<1	*37.6*	<1	*935*	<1	*472*	5	*343*
		5/12/2023	2610	<0.1	*10.6*	<1	*38.9*	<1	*988*	<1	*490*	<5	*356*
		19/01/2024	2890	<0.1	*11.7*	<1	*42.3*	<1	*1124*	1	*534*	<5	*388*
		14/02/2024	2460	<0.1	*10.1*	<1	*37.1*	<1	*916*	1	*466*	<5	*339*
		14/03/2024	2920	<0.1	*11.8*	<1	*42.7*	<1	*1139*	<1	*539*	<5	*392*
		12/04/2024	1900	<0.1	*8.0*	<1	*30.0*	<1	*660*	2	*374*	<5	*272*
		16/05/2024	2590	<0.1	*10.6*	<1	*38.7*	<1	*978*	<1	*487*	8	*354*
		6/06/2024	2750	<0.1	*11.2*	<1	*40.6*	<1	*1056*	<1	*512*	<5	*372*
		10/07/2024	1400	<0.1	*6.1*	<1	*23.4*	<1	*448*	1	*288*	8	*210*
		7/08/2024	2830	<0.1	*11.4*	<1	*41.6*	<1	*1095*	24	*525*	15	*382*
		11/09/2024	2690	<0.1	*10.9*	<1	*39.9*	<1	*1026*	1	*502*	7	*365*

Note:

Heavy metal concentrations equal to or exceeds HMTV

Package	Well ID	Sampling Event	Sampled	Date monitored	SWL (mbTOC)	Base (mbTOC)	Data logger present?	Data logger recorded?	Comments
Central	BH155	Event 51 - June 2023	Yes	6/06/2023	DRY	-	-	-	DRY
Central	BH155	Event 53 - August 2023	Yes	8/08/2023	DRY		No	-	DRY
Central	BH155	Event 55 - October 2023	Yes	4/10/2023	DRY	-	-	-	
Central	BH155	Event 57 - December 2023	No	5/12/2023	-	-	-	-	Destroyed
Central	BH219	Event 51 - June 2023	Yes	6/06/2023	0.300	18.260	Yes	Yes	
Central	BH219	Event 53 - August 2023	Yes	8/08/2023	0.540	18.270	Yes	Yes	
Central	BH219	Event 55 - October 2023	Yes	4/10/2023	0.495	18.280	Yes	Yes	
Central	BH219	Event 57 - December 2023	Yes	5/12/2023	0.380	18.280	Yes	Yes	
Central	BH219	Event 59 - February 2024	Yes	14/02/2024	0.565	18.236	Yes	Yes	
Central	BH219	Event 61 - April 2024	No	12/04/2024	0.300	18.245	Yes	No	Reader equipment issues, 12:58PM
Central	BH219	Event 63 - June 2024	No	6/06/2024	0.020	18.275	Yes	Yes	
Central	BH219	Event 65 - August 2024	No	7/08/2024	-	-	-	-	Could not access BH219 due to construction work - refer to photos.
Central	BH219	Event 66 - September 2024	No	11/09/2024	-	-	-	-	Attempted to gauge due to access issues in Event 65. Well destroyed - refer to photos.
Central	WSP_BH06	Event 55 - October 2023	Yes	4/10/2023	7.430	10.820	No	No	A monitoring well adjacent to the sealed local road from Clifton Ave, near the M12 site. Have not previously travelled down this road.
East	BH162	Event 51 - June 2023	Yes	6/06/2023	5.615	18.180	Yes	Yes	
East	BH162	Event 53 - August 2023	Yes	8/08/2023	6.000	18.190	Yes	Yes	
East	BH162	Event 55 - October 2023	Yes	4/10/2023	6.075	18.200	Yes	Yes	
East	BH162	Event 57 - December 2023	No	5/12/2023	-	-	-	-	Confirmed destroyed, JH cleared vegetetion and access track first observed November.
East	BH170	Event 51 - June 2023	Attempt to locate	6/06/2023	-	-	-	-	Not located.
East	BH170	Event 53 - August 2023	Attempt to locate	8/08/2023	-	-	-	-	Not located.
East	BH170	Event 55 - October 2023	No	4/10/2023	-	-	-	-	Not located.
East	BH170	Event 57 - December 2023	No	5/12/2023	-	-	-	-	Not located.
East	BH170	Event 59 - February 2024	No	14/02/2024	-	-	-	-	Not located.
East	BH175	Event 51 - June 2023	Yes	6/06/2023	4.180	18.020	Yes	No	Logger could not be downloaded as per previous rounds, likely dead logger.
East	BH175	Event 53 - August 2023	Yes	8/08/2023	4.600	18.010	Yes	No	Data logger replaced with Solinst logger since existing logger was dead.
East	BH175	Event 55 - October 2023	Yes	4/10/2023	4.631	17.940	Yes	Yes	
East	BH175	Event 57 - December 2023	Yes	5/12/2023	4.920	17.940	Yes	Yes	
East	BH175	Event 59 - February 2024	Yes	14/02/2024	5.143	17.861	Yes	Yes	Not likely to be impacted by future works, track maintenance, clearing, and earthworks visible near the location.
East	BH175	Event 61 - April 2024	No	10/04/2024	5.115	17.925	Yes	Yes	12:13PM
East	BH175	Event 63 - June 2024	No	6/06/2024	4.595	18.005	Yes	Yes	
East	BH175	Event 65 - August 2024	No	7/08/2024	4.265	18.080	Yes	Yes	

Appendix C

Field Parameter Graphs

Groundwater Quality Parameter Graphs

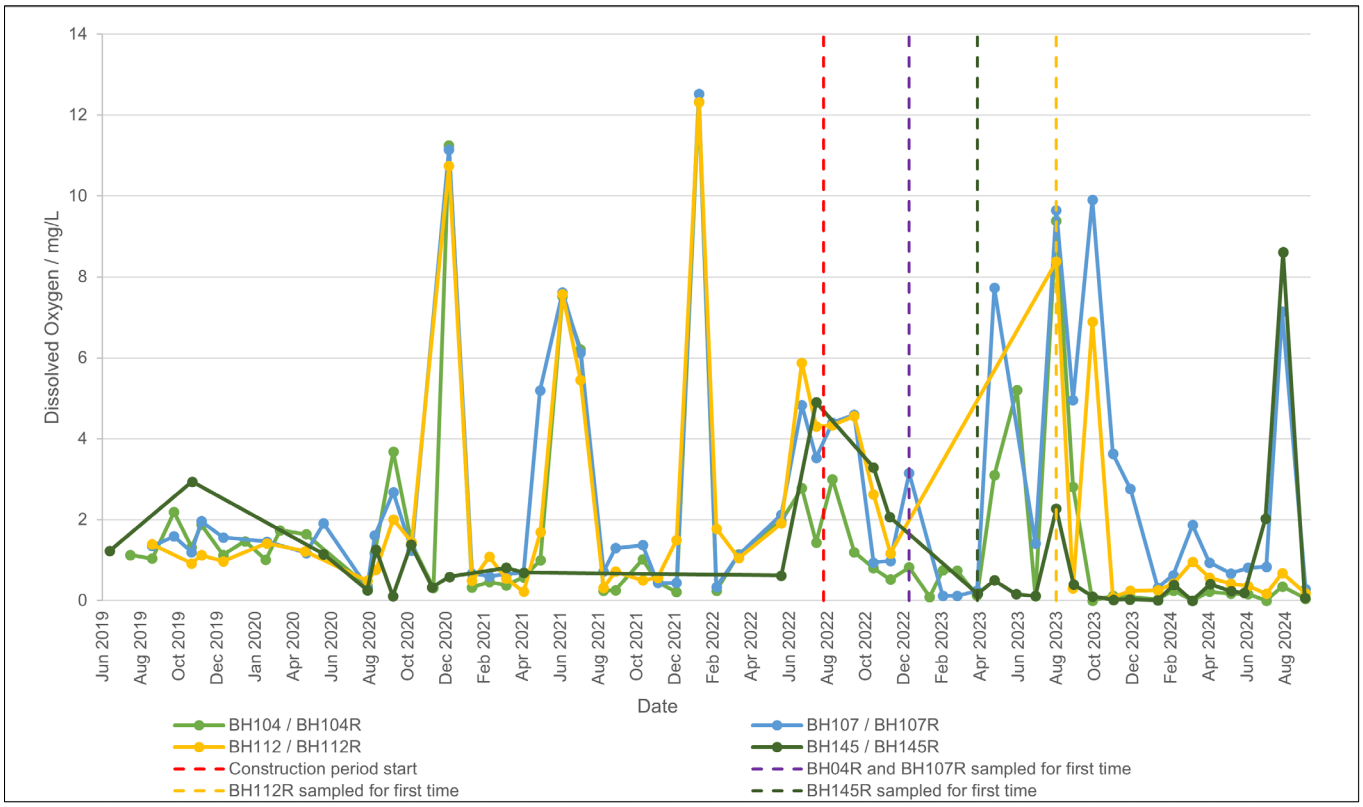


Figure 1 *Dissolved oxygen in groundwater wells over time*

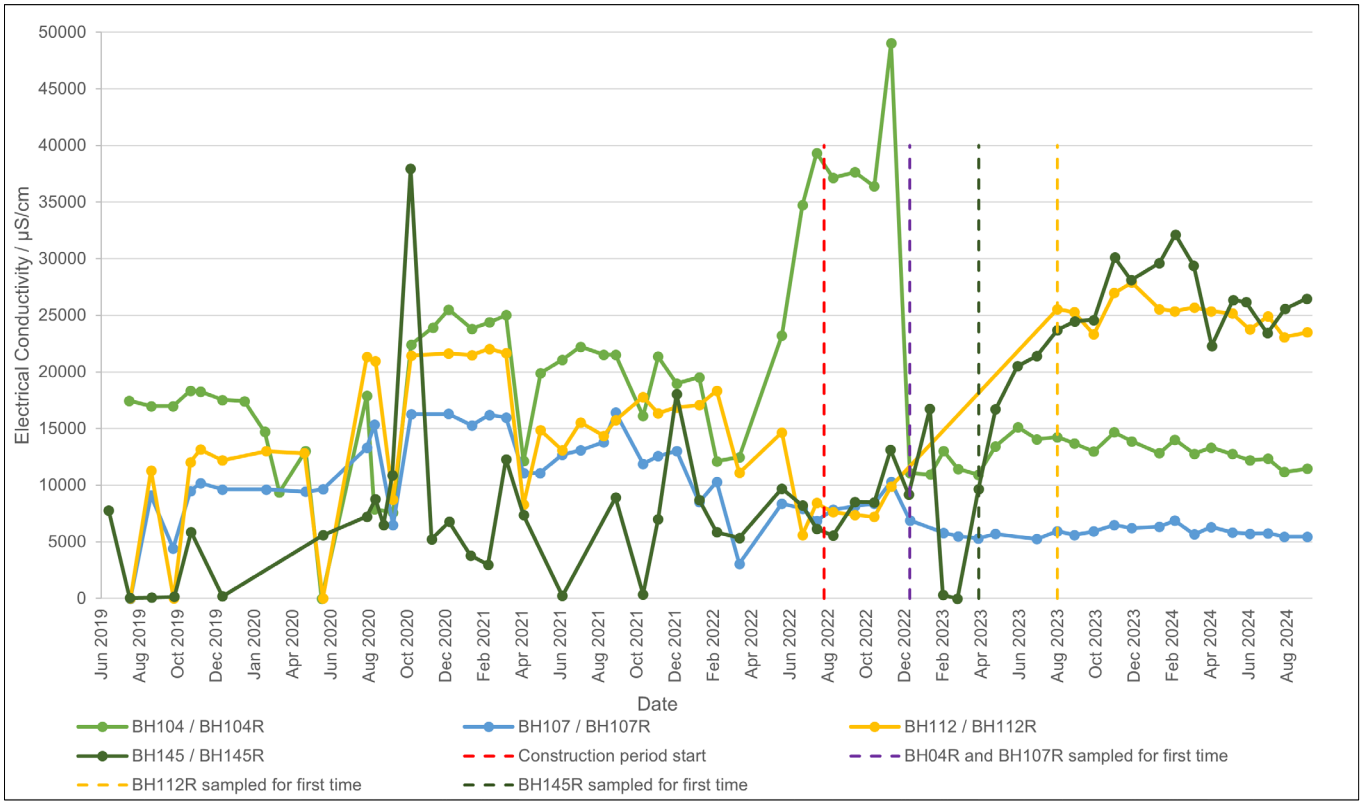


Figure 2 *Electrical conductivity in groundwater wells over time*

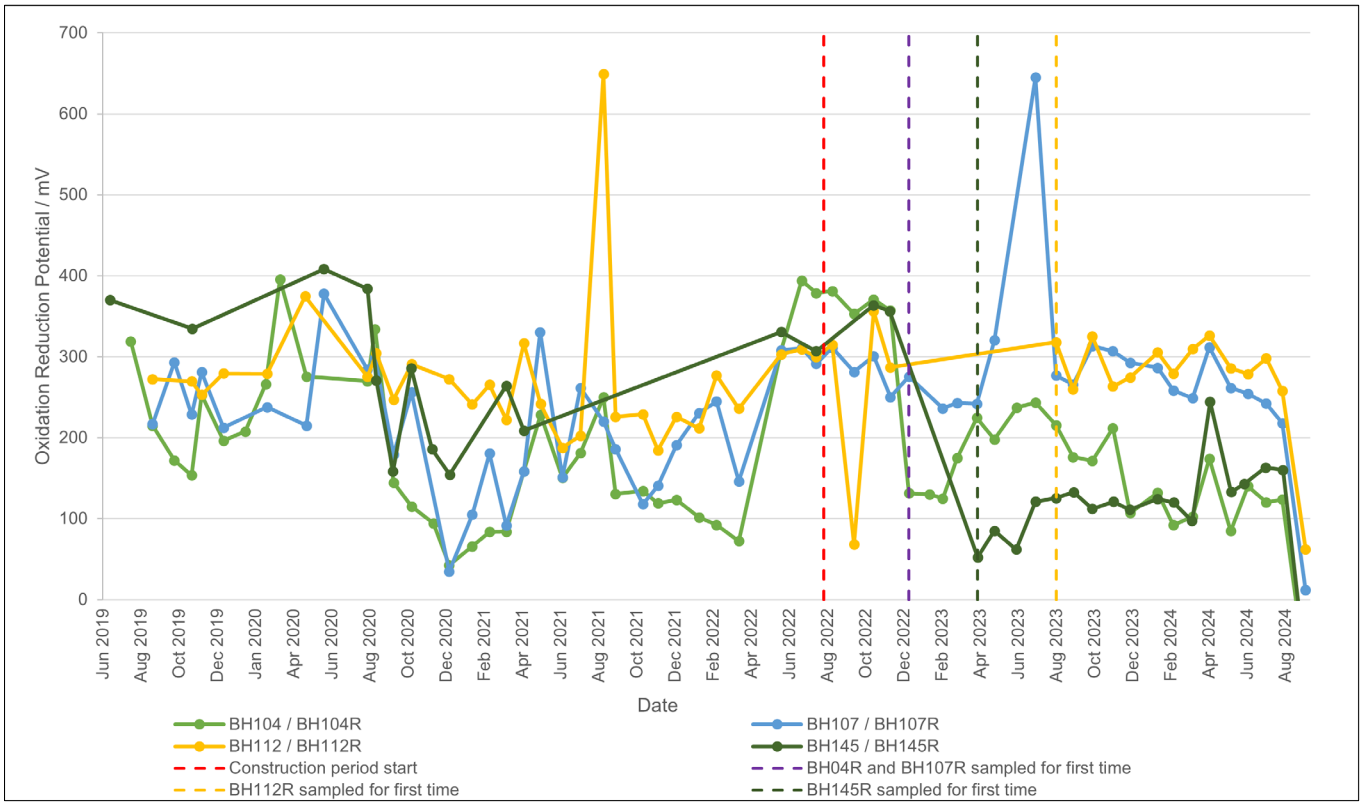


Figure 3 ***Redox in groundwater wells over time***

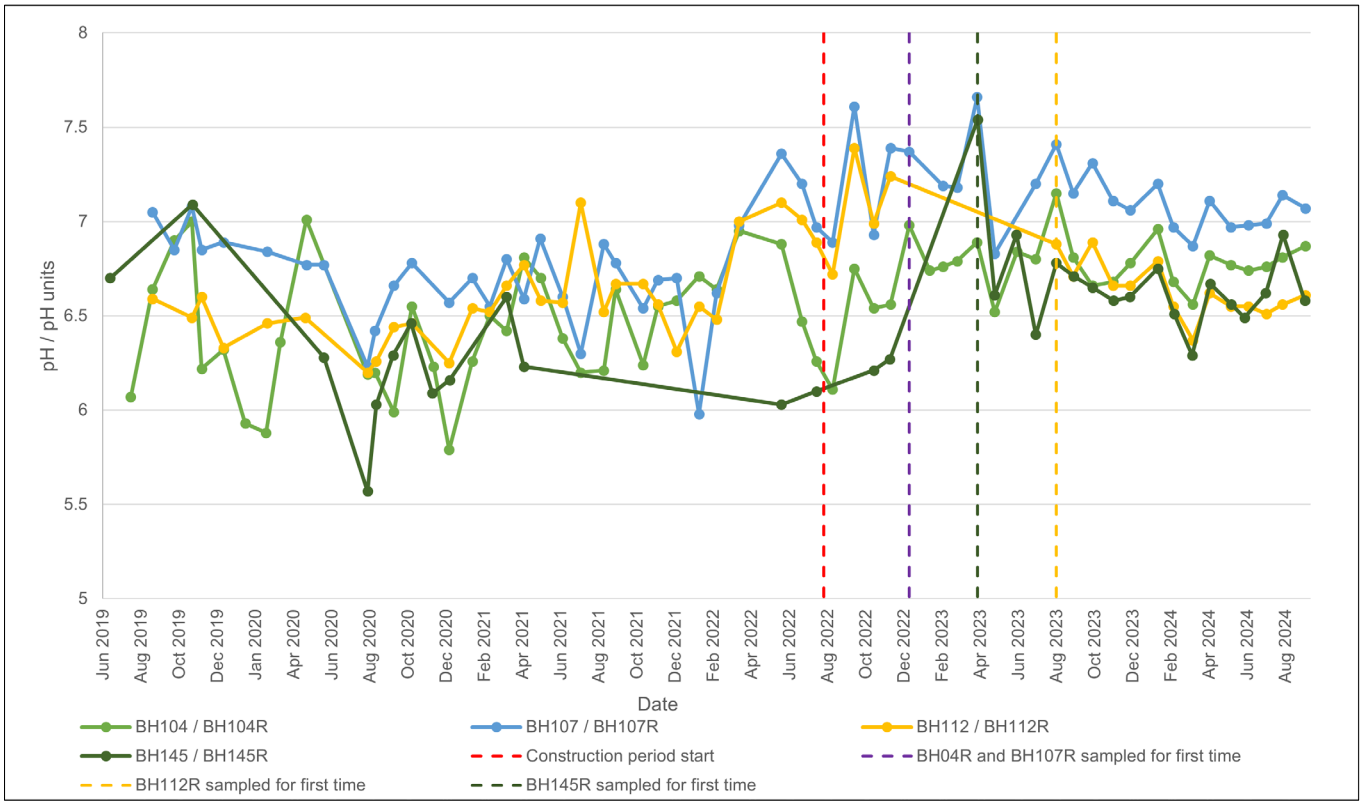


Figure 4 ***pH in groundwater wells over time***

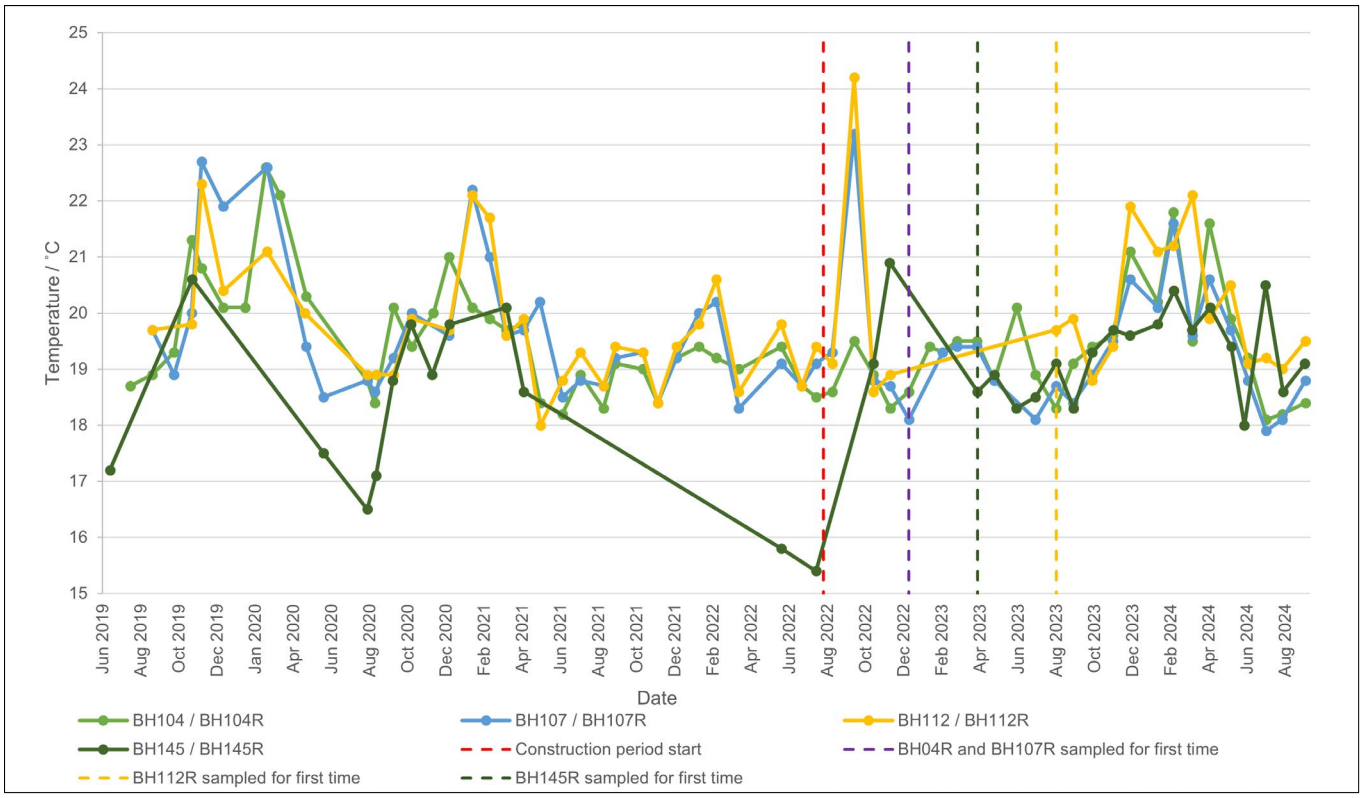


Figure 5 ***Temperature in groundwater wells over time***

Appendix D

Boxplot Graphs

Boxplot graphs for selected analytes

pH

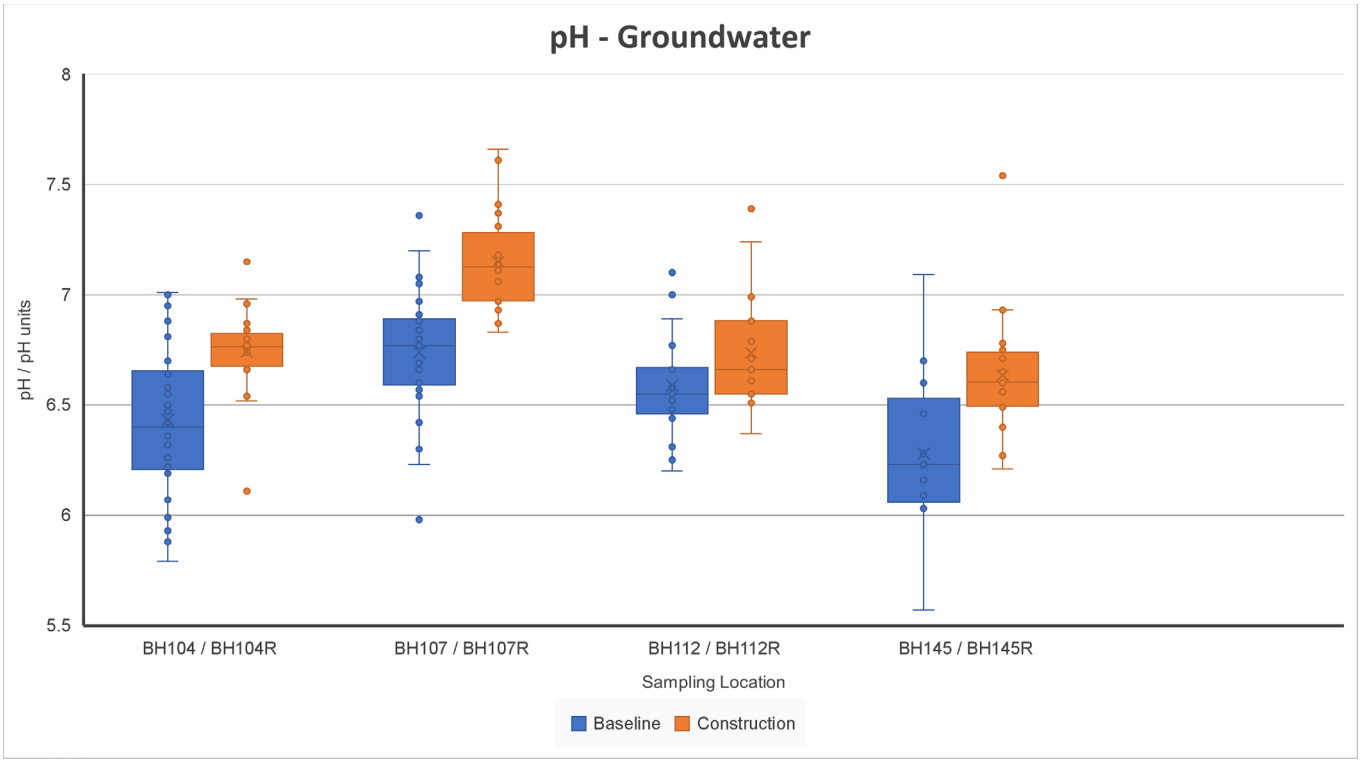


Figure 1 *Summary of field recorded pH for the baseline and construction phases to September 2024*

Electrical Conductivity

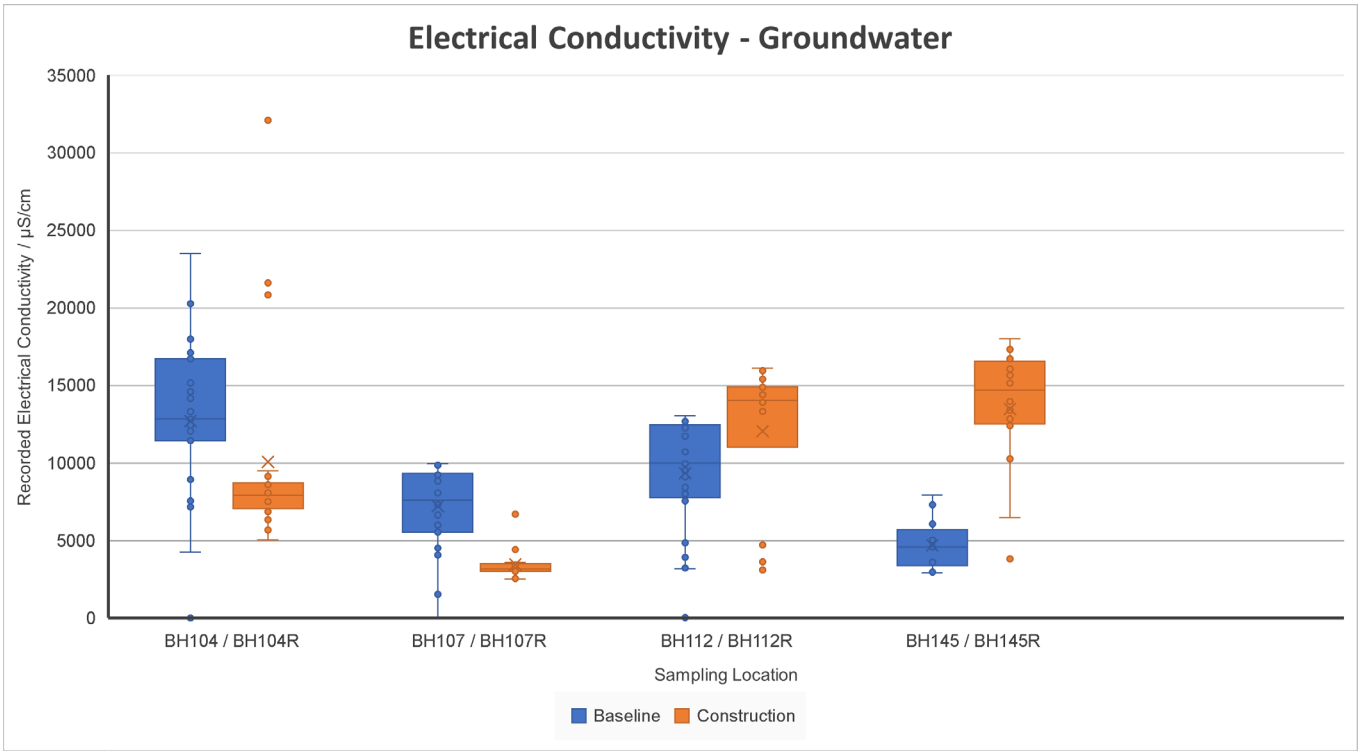
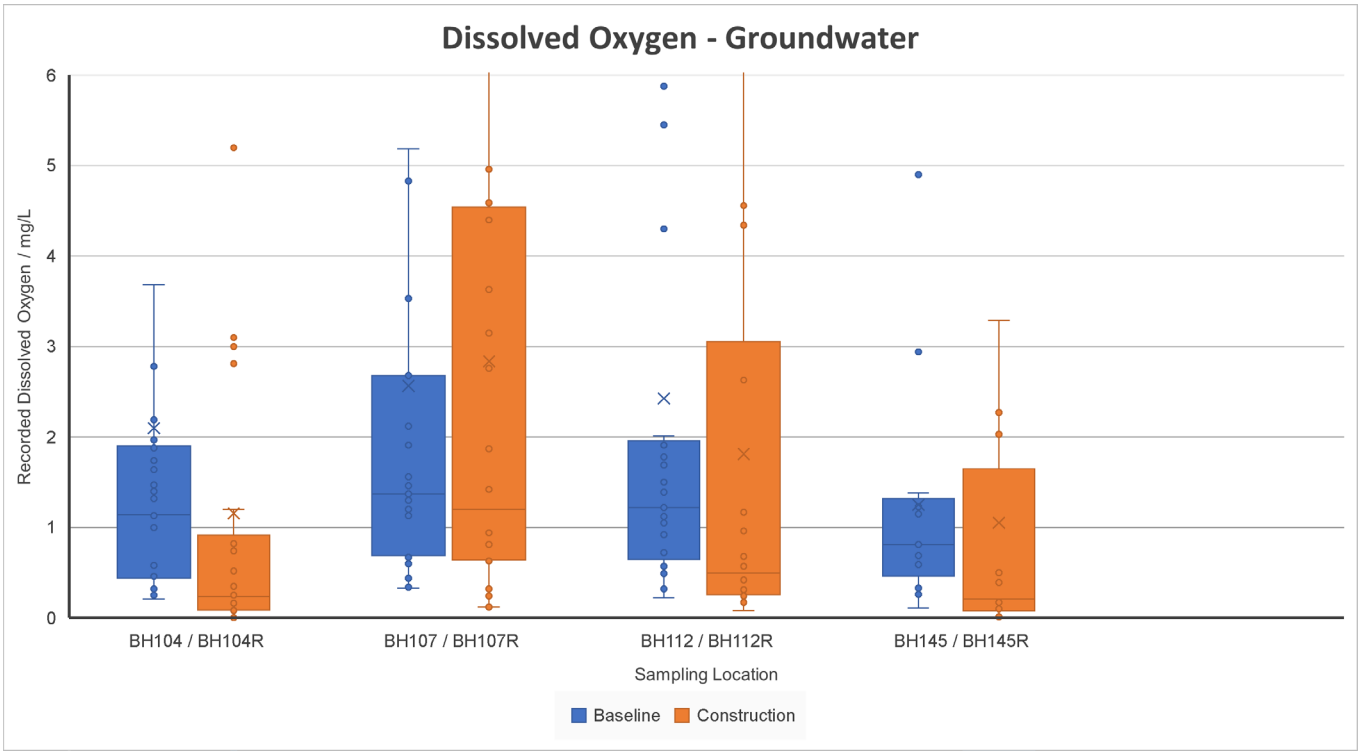


Figure 2 *Summary of field recorded electrical conductivity for the baseline and construction phases to September 2024*

Dissolved Oxygen



Note: Some outliers have been hidden

Figure 3 *Summary of field recorded dissolved oxygen for the baseline and construction phases to September 2024*

Total Dissolved Solids

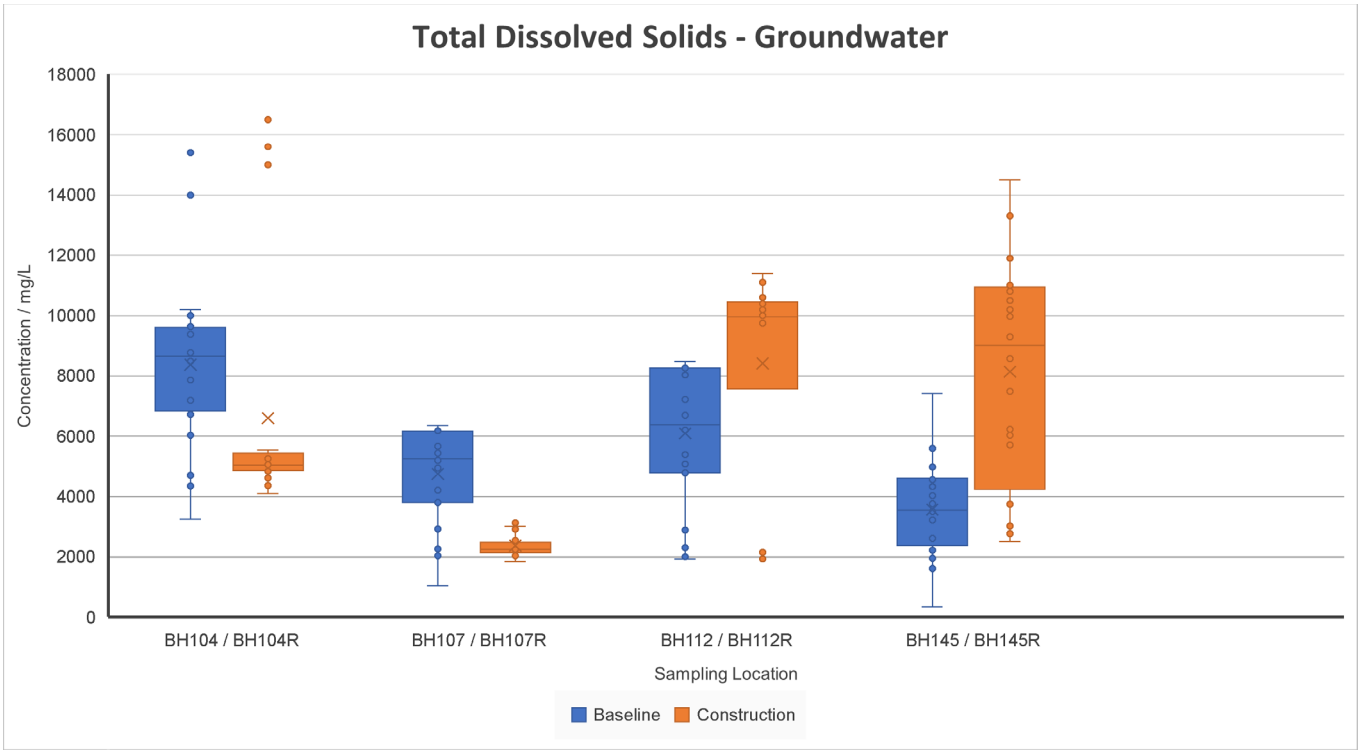
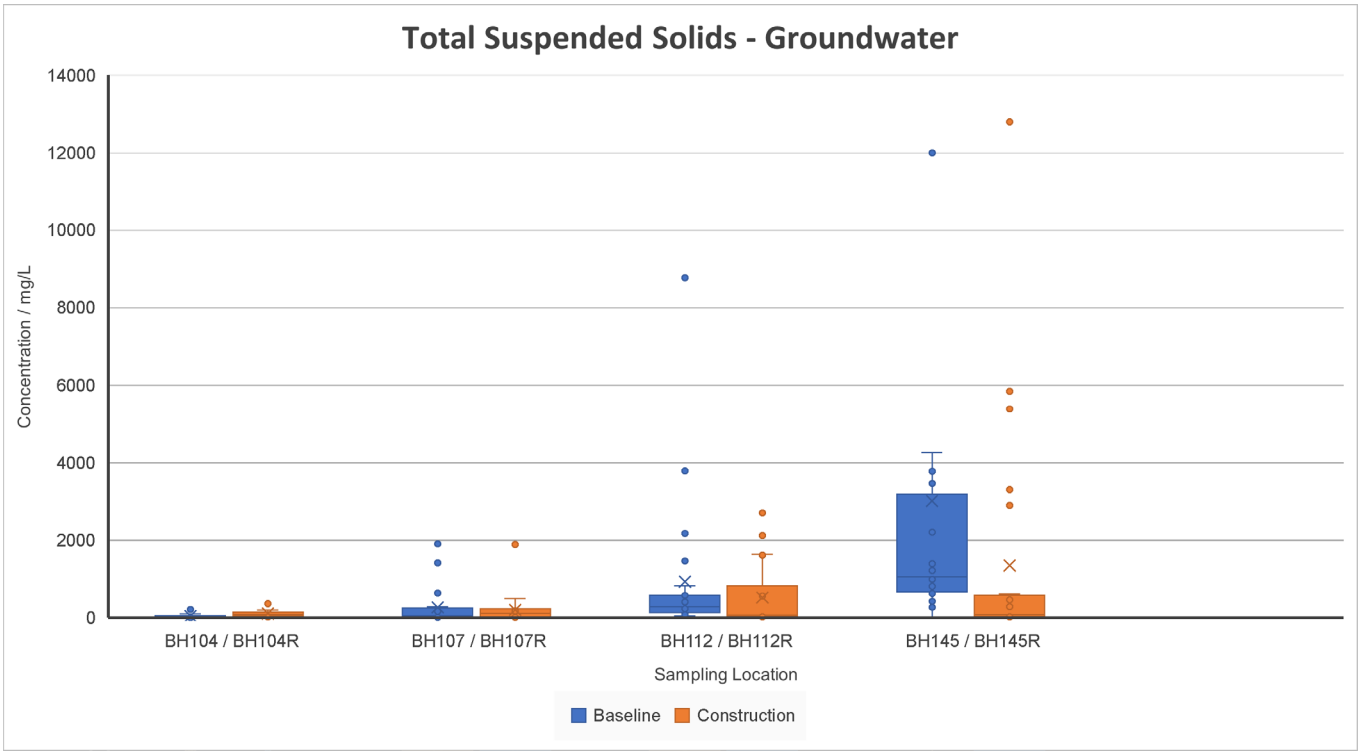


Figure 4 *Summary of total dissolved solids concentrations for the baseline and construction phases to September 2024*

Total Suspended Solids



Note: Some outliers have been hidden

Figure 5 ***Summary of total suspended solids concentrations for the baseline and construction phases to September 2024***

Ammonia

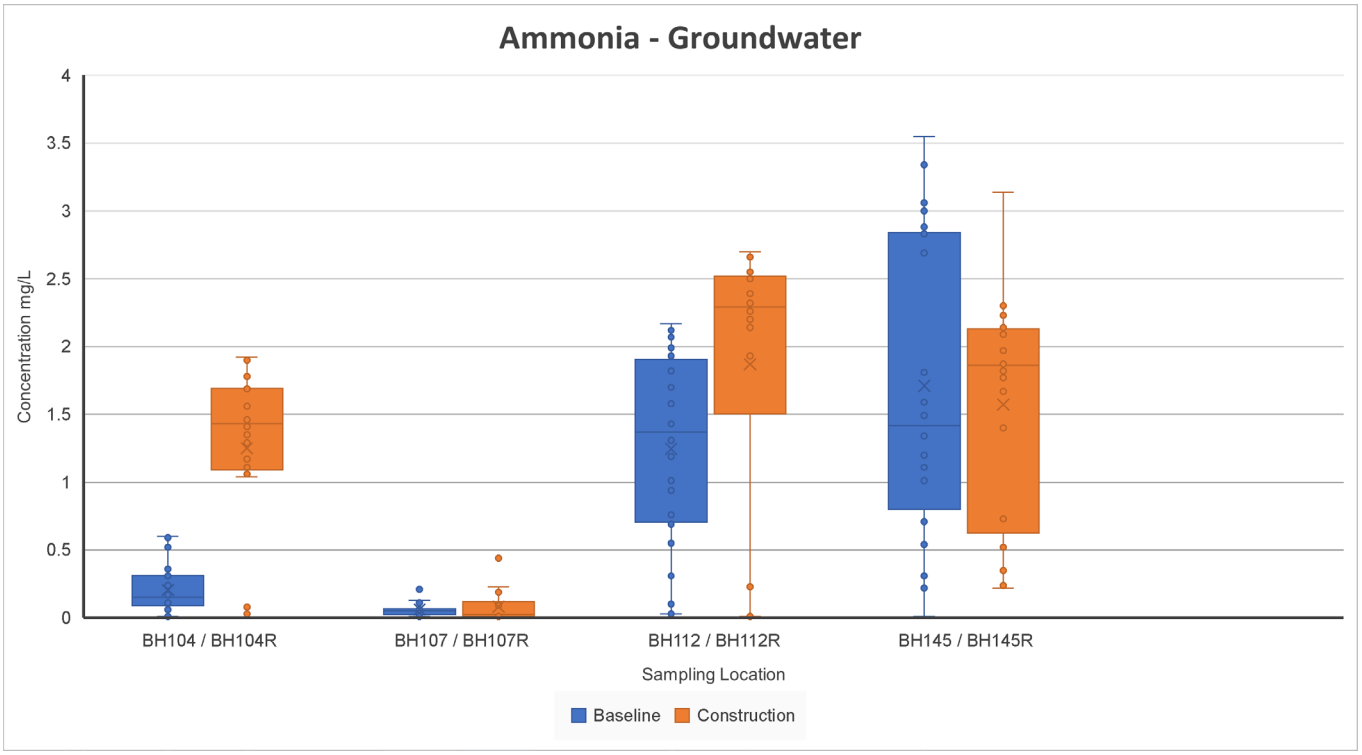


Figure 6 ***Summary of ammonia concentrations for the baseline and construction phases to September 2024***

Nitrate

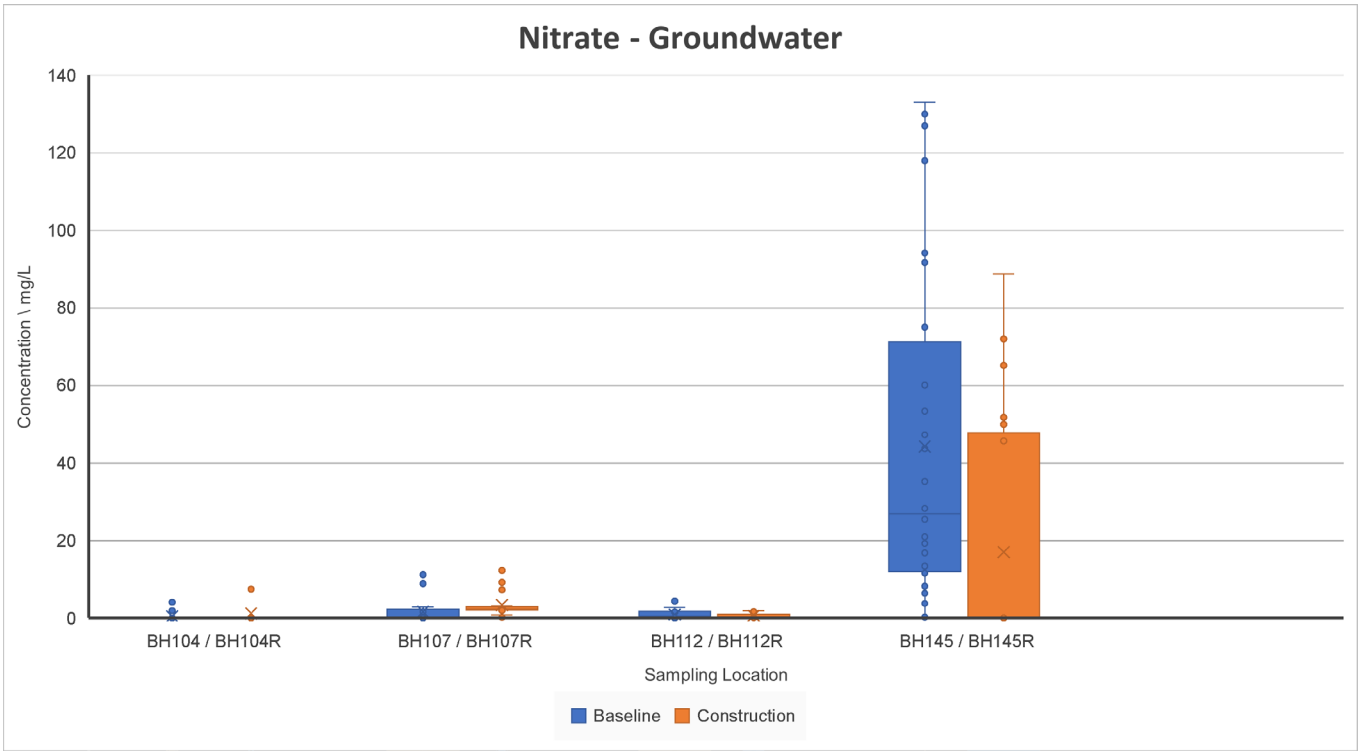


Figure 7 *Summary of nitrate concentrations for the baseline and construction phases to September 2024*

Total Oxidised Nitrogen

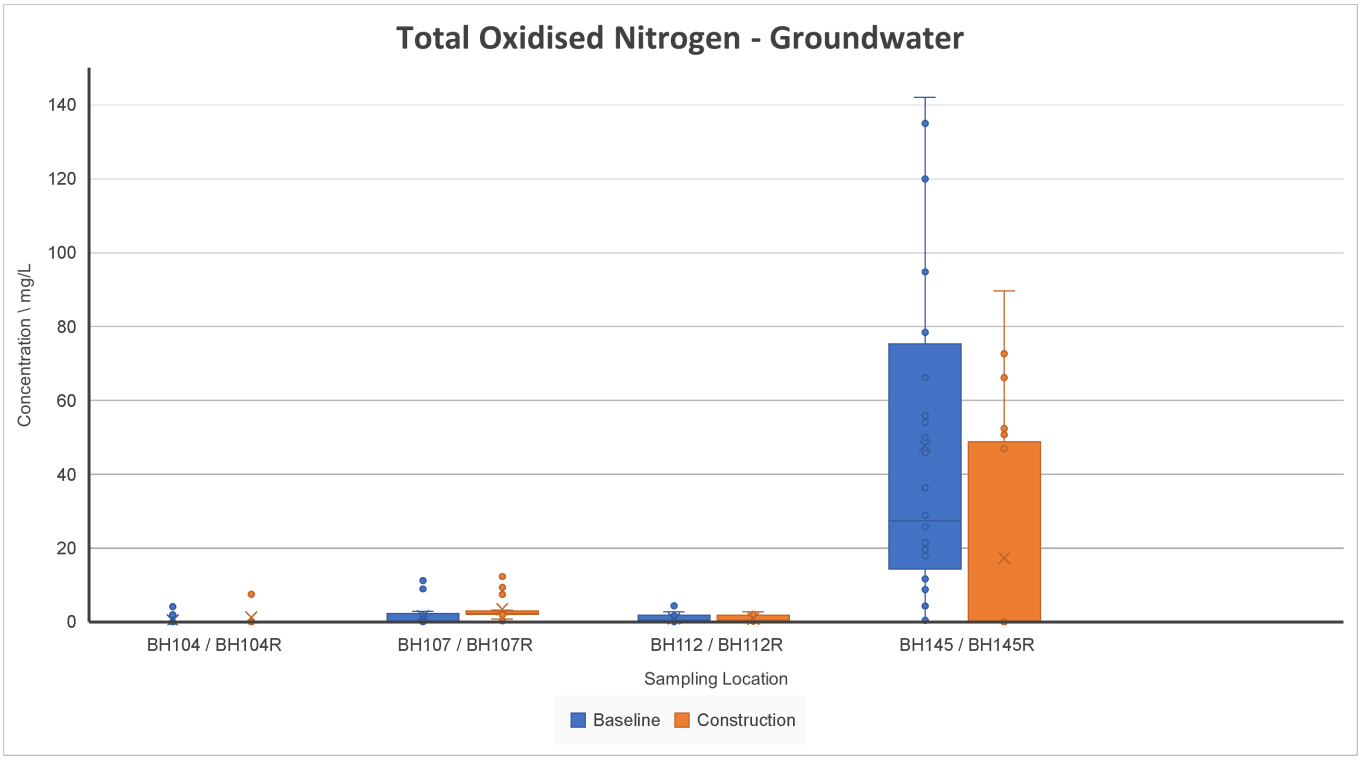


Figure 8 *Summary of total oxidised nitrogen concentrations for the baseline and construction phases to September 2024*

Total Nitrogen

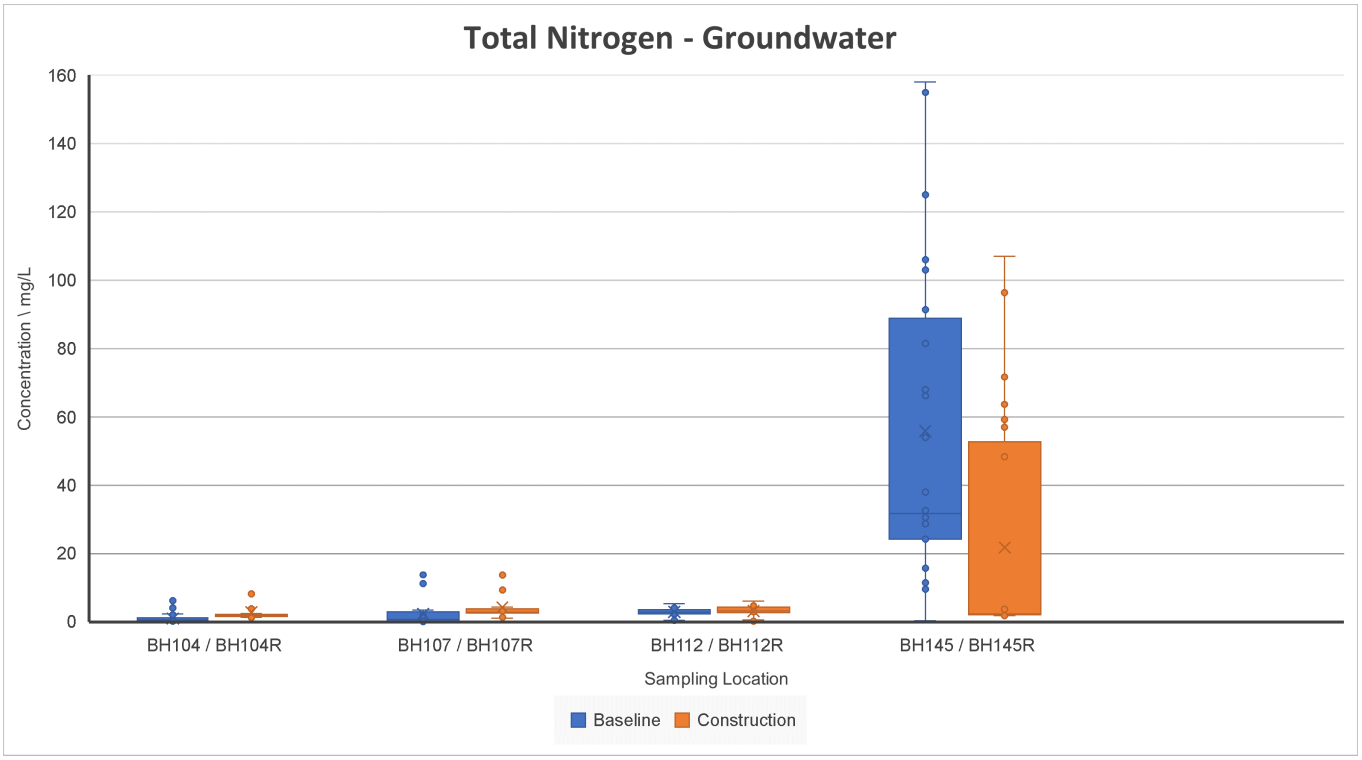
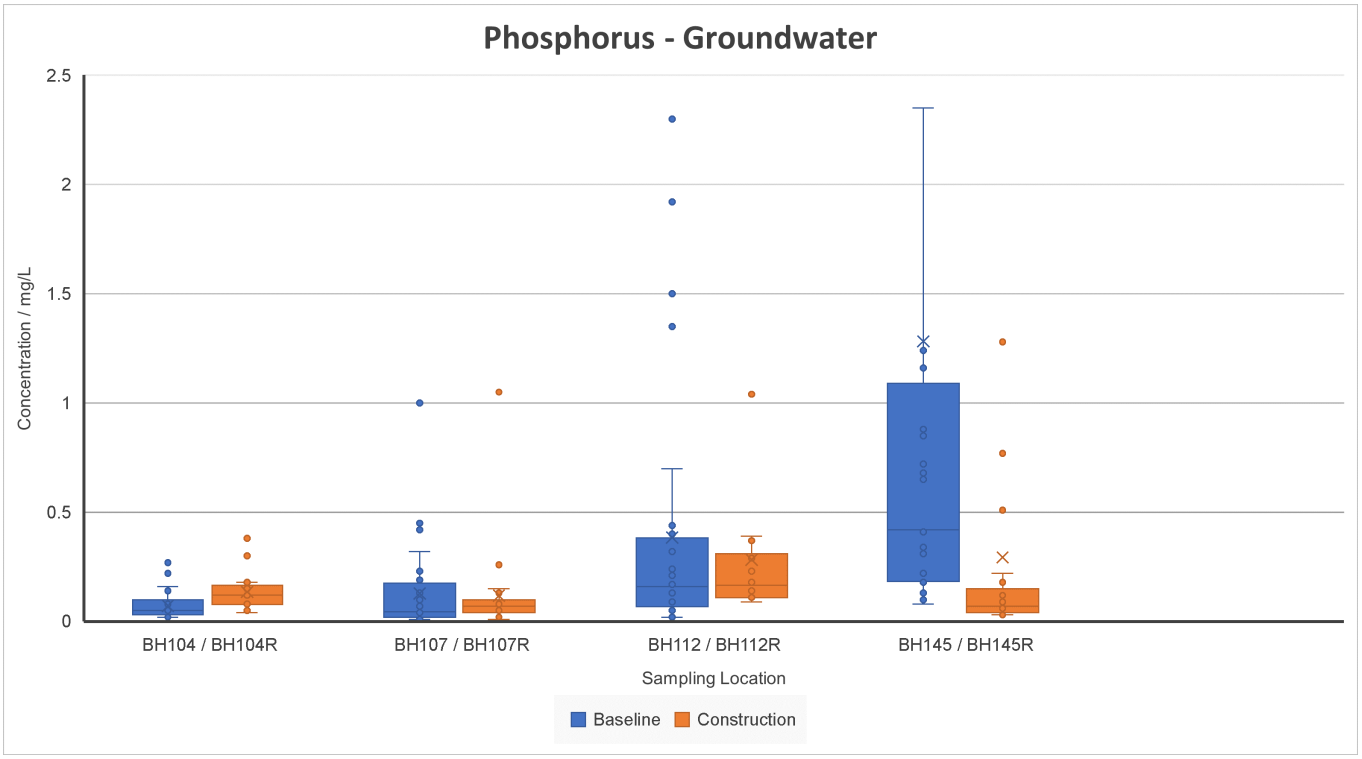


Figure 9 *Summary of total nitrogen concentrations for the baseline and construction phases to September 2024*

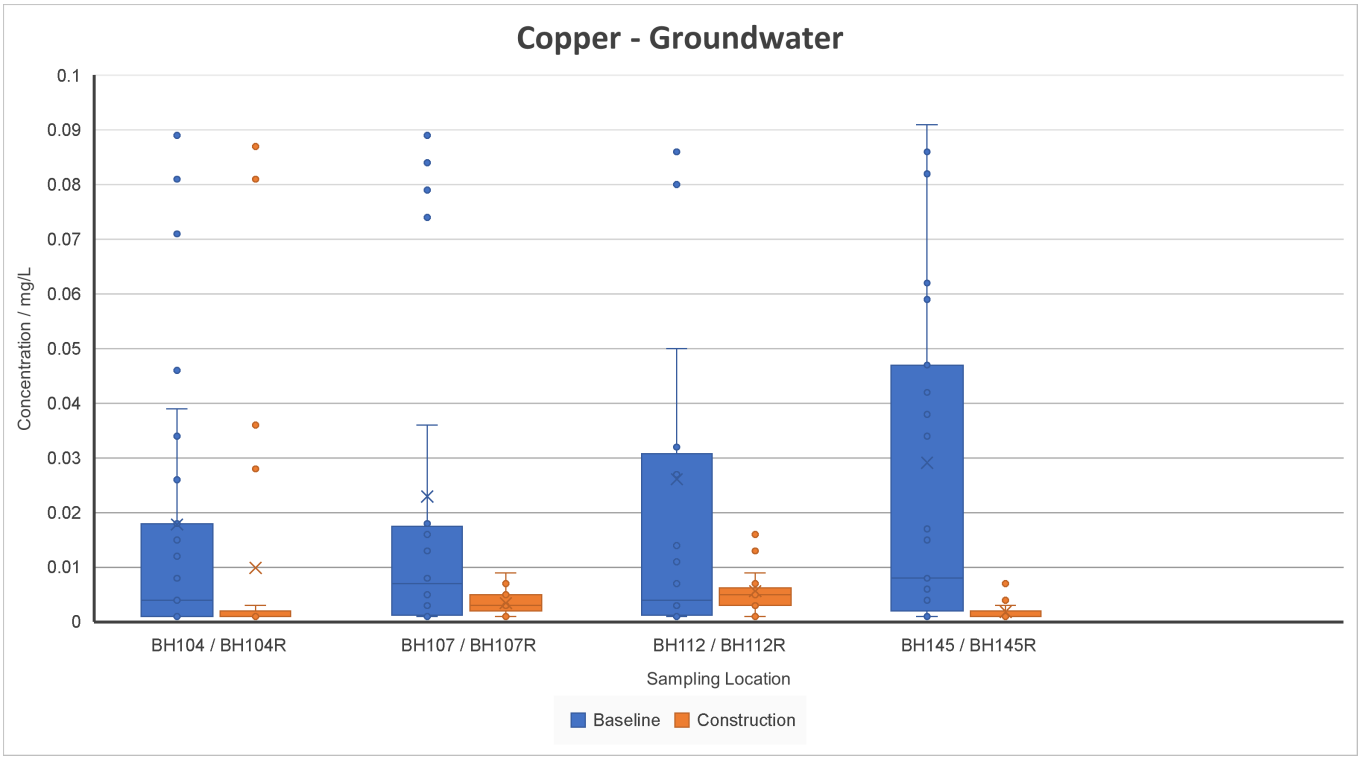
Phosphorus



Note: Some outliers have been hidden

Figure 10 *Summary of phosphorus concentrations for the baseline and construction phases to September 2024*

Copper



Note: Some outliers have been hidden

Figure 11 Summary of copper concentrations for the baseline and construction phases to September 2024

Manganese

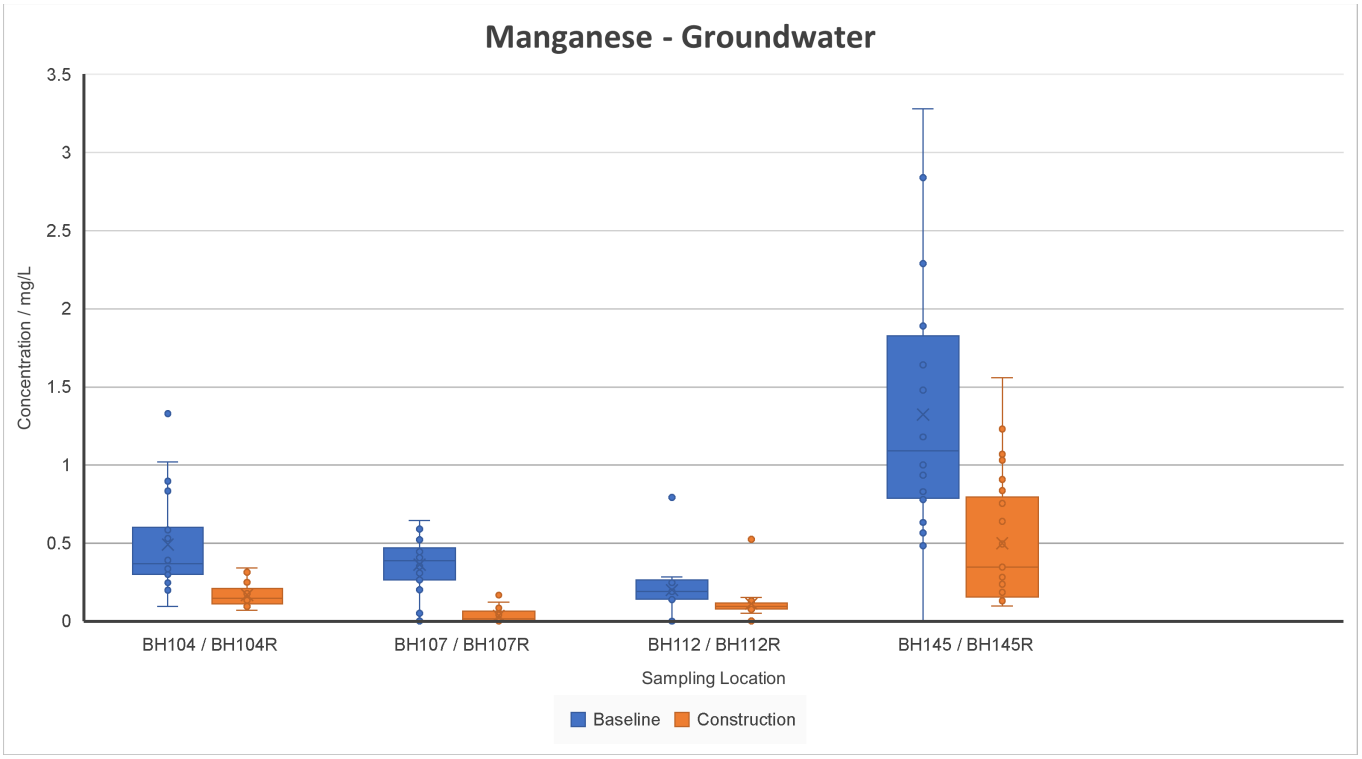


Figure 12 Summary of manganese concentrations for the baseline and construction phases to September 2024

Appendix E

Calibration certificates

Oil / Water Interface Meter

Instrument Geotech Interface Meter (30M)
Serial No. 4019

airmet
Air-Met Scientific Pty Ltd
1300 137 067

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

Certificate of Calibration

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

Calibrated by: Hugh Scullin

Calibration date: 2/04/2024

Next calibration due: 2/05/2024

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		419529	pH 6.85
2. pH 4.00		pH 4.00		414104	pH 3.99
3. ORP		236.48 mV		A420151/B402268	236.9mV
4. EC		2760 uS/cm		414103	2761uS/cm
5. D.O		0.0%		407802	-0.2%
6. Temp (°C)		21.6		MultiTherm	21.4
7. Turbidity		100NTU		420991	100.76NTU

Calibrated by: Samuel Tanner

Calibration date: 03/04/2024

Next calibration due: 03/05/2024

Oil / Water Interface Meter

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Instrument Geotech Interface Meter (30M)
Serial No. 4254

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.

Samuel Tanner

Calibration date: 8/05/2024

Next calibration due: 7/07/2024

Multi Parameter Water Meter

Instrument YSI Pro DSS
Serial No. 21B104421

airmet
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. Conductivity	✓	
	3. D.O	✓	
	4. 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		pH7		419529	6.89
2. pH 4.00		pH4		414104	4
3.ORP (mV)		241.76		A420151/B420152	241.7
4. Conductivity		2760		424499	2760
5. D.O		0.0%		407802	-0.1%
6. Temp (°C)		19.1		MultiTherm	19.2
7. Turbidity (NTU)		200		387323	198.6

Calibrated by: Eliza Anwar

Calibration date: 13/05/2024

Next calibration due: 12/06/2024

Multi Parameter Water Meter

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. pH 7.00 (pH)		pH 7.00	NIST	419529	6.88
2. pH 4.00 (pH)		pH 4.00	NIST	414104	3.88
3. ORP (mV)		247.9	NIST	420151/420152	252.1
4. EC (µS/cm)		2760	NIST	424499	2754
5. D.O		0.0%	NIST	407802	0.2%
6. Temp (°C)		16.6	NIST	MultiTherm	16.4
8.Turbidity		100NTU	NIST	426952	100.02

Calibrated by: Alex Buist

Calibration date: 04/06/2024

Next calibration due: 04/07/2024

Oil / Water Interface Meter

Instrument Geotech Interface Meter (30M)
Serial No. 3908

Air-Met Scientific Pty Ltd
1300 137 067

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

Certificate of Calibration

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

Calibrated by: Eliza Anwar

Calibration date: 5/06/2024

Next calibration due: 5/07/2024

Oil / Water Interface Meter

Instrument Interface Meter (30M)
Serial No. 312530

airmet
Air-Met Scientific Pty Ltd
1300 137 067

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: Amanda Neale

Calibration date: 7/06/2024

Next calibration due: 7/07/2024

Multi Parameter Water Meter

Instrument YSI Pro DSS
Serial No. 21K104033

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	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00	pH 7.00		419529	6.99
2. pH 4.00	pH 4.00		414104	3.97
3. mV	247.04		A420151/B420152	247.1
4. EC	2760 µS/cm		424499	2763
6. D.O	0%		407802	0.4%
7. Temp	16.8		MultiTherm	16.6
8.Tubidity	100 NTU		426952	99.86

Calibrated by: **Christopher Nicdao**

Calibration date: **6/06/2024**

Next calibration due: **6/07/2024**

Oil / Water Interface Meter

Instrument Geotech Interface Meter (30M)
Serial No. 3908

airmet
Air-Met Scientific Pty Ltd
1300 137 067

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

Certificate of Calibration

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

Calibrated by: Christopher Nicdao

Calibration date: 3/07/2024

Next calibration due: 2/08/2024

Multi Parameter Water Meter

Instrument YSI Pro DSS
Serial No. 20F162072

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	
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 No.	Instrument Reading
pH 4.00 (pH)		pH 4.00		414104	3.99
pH 7.00 (pH)		pH 7.00		419529	6.91
ORP (mV)		245.28		A420151/B420152	245.2
EC (uS/cm)		2760		424499	2762
D.O. (%)		100%		NA	101.5%
D.O. (%)		0%		407802	-0.4%
Temp (°C)		17.6		MultiTherm	17.5
Turbidity (NTU)		100 NTU		426952	99.82

Calibrated by: Christopher Nicdao

Calibration date: 5/07/2024

Next calibration due: 5/08/2024

19/07/2024

Oil / Water Interface Meter

Instrument Geotech Interface Meter (30M)
Serial No. 4063

Air-Met Scientific Pty Ltd
1300 137 067

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

Certificate of Calibration

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

Calibrated by: **Christopher Nicdao**

Calibration date: **19/07/2024**

Next calibration due: **18/08/2024**

Multi Parameter Water Meter

Instrument **YSI ProDSS**
Serial No. **20F162173**

Air-Met Scientific Pty Ltd
1300 137 067

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	✓	
	6. Turbidity	✓	
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. D.O		100%		399985	99.90%
2. Conductivity		2760uS		406852	2759
3. pH7		pH 7.00		413975	7.01
4. pH4		pH 4.00		414101	4.03
5. ORP mV		241.76		405006/398193	242.3
6. Temp °C		19.2		33938728	19.3
7. Turbidity		100NTU		412418	100.69

Calibrated by: **Christopher Nicdao**

Calibration date: **26-Jul-24**

Next calibration due: **25-Aug-24**

Multi Parameter Water Meter

Instrument YSI ProDSS
Serial No. 20F162173

airmet
Air-Met Scientific Pty Ltd
1300 137 067

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	✓	
	6. Turbidity	✓	
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. D.O		100%		412773	100.5%
2. Conductivity		2760		42449	2767
3. pH7		7.00		419529	7.05
4. pH4		4.00		422643	3.99
5. ORP mV		241.32		420151/420152	241.4
6. Temp °C		19.4		Testo	19.3
7. Turbidity		100.00		426945	99.64

Calibrated by: Samuel Tanner

Calibration date: 4-Sep-24

Next calibration due: 4-Oct-24

Oil / Water Interface Meter

Instrument Geotech Interface Meter (30M)
Serial No. 4441

airmet
Air-Met Scientific Pty Ltd
1300 137 067

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

Certificate of Calibration

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

Calibrated by: Amanda Neale

Calibration date: 5/09/2024

Next calibration due: 4/11/2024

Appendix F

Quality assurance / Quality control program and assessment

Data Quality Objectives (DQOs)

The Data Quality Objectives (DQOs) 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 DQO process will be applied to the on-going monitoring to ensure that data collection activities are appropriate and achieve the project objectives. The DQO process involves seven steps as follows:

– Step 1: State the Problem
– Step 2: Identify the decision/goal of the study
– Step 3: Identify the information inputs
– Step 4: Define the boundaries of the Study
– Step 5: Develop the analytical approach
– Step 6: Specify performance or acceptance criteria
– Step 7: Develop the plan for obtaining data

An overview of the DQOs for the works are presented in the following steps.

Step 1: State the problem

The M12 Motorway (the project) is located between the M7 Motorway at Cecil Hills, and The Northern Road at Luddenham in Western Sydney, covering approximately 16 km. The intention of the project is to provide direct access between the Western Sydney International Airport at Badgerys Creek and Sydney's motorway network.

As part of the project approval conditions, TfNSW are required to prepare and implement a groundwater monitoring program for the M12 Motorway development to be undertaken during baseline, construction and post construction.

Step 2: Identify the decision/goal of the study

The key goal of the baseline monitoring program is to collect background monitoring data to identify baseline conditions in at least the first 12 months "pre-construction", prior to commencement of construction of the M12 Motorway.

The baseline data would support the development of a groundwater monitoring program and management plans for construction and operation of the project. The baseline data may also inform the design of construction and operational groundwater quality controls.

Step 3: Identify the information inputs

The following inputs are required for the decision:

Existing data obtained from previous Jacobs reports: Surface water and hydrology assessment report (JAJV, 2018a), Contamination factual report (JAJV, 2018b) and groundwater assessment report (2018c).

– Sampling and gauging of four groundwater well locations (BH104/BH104R, BH107/BH107R, BH112/BH112R and BH145/BH145R) along the proposed project alignment.
– Analysis of groundwater samples for the following analytes:
    - Dissolved heavy metals (arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel and zinc)
    - Total recoverable hydrocarbons (TRH)
    - Benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN)
    - Nutrients (including ammonia, nitrate, nitrite, total nitrogen, total phosphorus)
    - Total dissolved solids (TDS)
    - Total suspended solids (TSS)
    - Major anions and cations (chloride, sulfate, sodium, potassium, magnesium, calcium, carbonate and bicarbonate)

- Total hardness as CaCO3.

– Comparison of data with relevant public health and environmental water quality criteria to identify baseline conditions prior to commencement of the construction of the project.
– Confirmation that data generated by sampling and analysis are of a suitable quality to allow reliable comparison to baseline data as per the assessment of the data quality indicators (DQIs) (further discussed below).
– Baseline 20th and/or 80th percentiles to be calculated and compared to the construction monitoring period to ensure that the construction of the motorway is not impacted on the groundwater.

Step 4: Define the boundaries of the study

The spatial and temporal boundaries of the study area are as follows:

– The lateral boundary of the project is defined as the extent of the groundwater monitoring locations as shown in Figure 1, Appendix A.
– The vertical boundary of the project is defined as the depth of the maximum groundwater well, approximately 72.15m AHD (BH112)
– The temporal boundary of the project is defined as the previous baseline monitoring periods (April 2019 to July 2022) and the construction monitoring period (August 2022 to September 2024).

Step 5: Develop the analytical approach

The degree of impact by contaminants and the associated decisions will be assessed with reference to assessment criteria, as discussed in Section 4.2. Acceptable relative percentage difference (RPD) limits for chemicals of potential concern (CoPC) detected in Quality Assurance and Quality Control (QA/QC) samples such as field duplicates, rinsate blanks, trip blanks and trip spikes and matrix spikes and matrix spike duplicates are identified in the following sections. The decision rules to be applied are as follows:

– Monitoring data will be compared against relevant public health and environmental water quality guidelines to make this assessment.
– If the data has been collected in a manner from which it is possible to establish completeness, comparability, representativeness, precision and accuracy, the data will be considered suitable for the purposes of this assessment.
– If baseline data, either within or exceeding adopted assessment criteria, is considered suitable for interpretation, baseline conditions are able to be determined and support the development of a groundwater monitoring program during the construction and future operation of the project.
– If changes in groundwater conditions are observed between monitoring events during the construction and/or operational phases and previous baseline periods that cannot be plausibly explained by natural environmental fluctuations, and the concentrations of contaminants of potential concern have become elevated to levels in exceedance of the adopted public health and environmental water quality criteria, then further assessment may be required to evaluate the need for additional investigation and / or remediation / management activities.

Step 6: Specify performance or acceptance criteria

Data generated during this groundwater monitoring program must be appropriate to allow decisions to be made with confidence. Specific limits have been adopted in accordance with the appropriate guidance from the AS4482.1, which includes appropriate indicators of data quality (DQIs used to assess QA/QC, and GHD's Standard Field Operating Procedures). The pre-determined DQIs established for the project are discussed below.

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: Develop the plan for obtaining data

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 is provided in Section 3.

Data quality indicators

Data generated during this investigation must be appropriate to allow decisions to be made with confidence. Specific limits for this investigation have been adopted in accordance with guidance from the AS4482.1 which includes appropriate indicators of data quality ((DQIs) used to assess QA/QC, and GHD's Standard Field Operating Procedures).

To assess the usability of the data prior to making decisions, the data was assessed against pre-determined DQIs. The DQIs including precision, accuracy, representativeness, comparability and completeness, were reviewed at the completion of the investigation works to assess for the presence of decision errors.

The pre-determined DQIs established for the investigation are discussed below and shown in Table F1.

– Precision - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the RPD of duplicate samples.
– Accuracy - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this investigation is a measure of the closeness of the analytical results obtained by a method to the 'true' (or standard) value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
– Representativeness - expresses the degree to which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
– Comparability - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
– Completeness - is defined as the percentage of measurements made which are judged to be valid measurements.

Table F1 – Summary of quality assurance / quality control criteria – all media

Data quality indicator	Frequency	Data quality acceptance criteria
Precision		
Blind and split duplicates	1 / 10 samples (combined)	<30-50% RPD
Transport spike	1 per batch	70-130% recovery
Transport blank	1 per batch	<LOR
Accuracy		
Surrogate spikes Laboratory control samples Matrix spikes	All organic samples 1 per lab batch 1 per lab batch	70-130% <LOR 70-130%
Rinsate blanks (for non-dedicated equipment)	1 per lab event	<LOR
Representativeness		
Sampling appropriate for media and analytes	All samples	-
Samples extracted and analysed within holding times	All samples	Organics (14 days) Inorganics (6 months)
Comparability		
Consistent field conditions, sampling staff and laboratory analysis	All samples	All samples
Standard operating procedures for sample collection & handling	All samples	All samples
Standard analytical methods used for all analyses	All samples	All samples

Data quality indicator	Frequency	Data quality acceptance criteria
Completeness		
Sample description and COCs completed and appropriate	All Samples	All Samples
Appropriate documentation	All Samples	All Samples
Satisfactory frequency and result for QA/QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid

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.

Field QA/QC

An evaluation of the field and laboratory data quality was undertaken in accordance with the NEPM – Schedule B2, Assessment of data quality.

Each monitoring round, one blind duplicate and one split duplicate was collected from two different sampling locations where possible and analysed as part of the project quality control program. Blind duplicate samples were analysed as an intra-laboratory duplicate at the primary laboratory (ALS Environmental). Split duplicates were analysed as inter-laboratory duplicates at the secondary laboratory (Eurofins). The duplicate samples and trip blanks are used by GHD to assess reliability of analytical results, with one of each generally collected during each monitoring event.

Six intra-laboratory duplicate samples were collected during the current monitoring period and include the following:

– GWDUP1/BH112R – 11 April 2024
– GWDUP1/BH104R – 15 May 2024
– GWDUP1/BH145R – 6 June 2024
– GWDUP1/BH104R – 11 July 2024
– GWDUP1/BH107R – 6 August 2024
– GWDUP1/BH145R – 11 September 2024

Six inter-laboratory duplicate samples were collected during the current monitoring period and include the following:

– GWDUP2/BH107R – 11 April 2024
– GWDUP2/BH107R – 16 May 2024
– GWDUP2/BH112R – 12 June 2024
– GWDUP2/BH107R – 11 July 2024
– GWDUP2/BH104R – 6 August 2024
– GWDUP2/BH104R – 12 September 2024

Twenty-four primary samples were collected during the April 2024 to September 2024 monitoring period. It was considered that the number of duplicates collected was adequate (12/24 samples = 50%). Trip blank and trip spike samples were collected during all monitoring rounds.

Relative percentage difference calculations

Relative percentage difference (RPD) calculations are used to assess how closely primary and inter/intra duplicate sample results match. RPDs are a quantitative measure of the accuracy of the analytical results and are calculated in accordance with the procedure described in *AS 4482.1 – 2005 (Standards Australia 2005). According to AS 4482.1 – 2005.* typical RPDs are expected to range between 30% and 50%; however, this may be higher for organics and for low concentrations of analytes. GHD has adopted the following:

- 200% for concentrations within 1 to 10 times the analyte LOR
- 50% for concentrations within 10 to 30 times the analyte LOR
- 30% for concentrations greater than 30 times the analyte LOR

Where a result is below the laboratory LOR for one of the paired samples, the concentration assigned to that sample is the LOR. Where both results are reported below laboratory LOR the RPD is not calculated.

There were no RPD exceedances reported for M12 groundwater sampling during the current monitoring period:

RPD results are presented in Table F2, Appendix F.

Trip blanks

Trip blank samples provide an indication of cross contamination from volatile substances during field sampling and / or during transport. Trip blanks were collected and analysed at a rate of one per sample batch submitted to the laboratory.

The six trip blank samples were free of contaminants, reporting concentrations below the laboratory detection limits.

Trip blank results are provided in Table F3, Appendix F.

Rinsate blank

Rinsate blank samples were free of contaminants, reporting concentrations below laboratory detection limits.

Rinsate results are provided in Table F3, Appendix F.

Trip spike samples

Trip spike samples are samples prepared by the primary laboratory and “spiked” with a known concentration of volatile compound (BTEXN) to provide an indication of variation in volatile parameters concentrations during transport and handling. Trip spikes were collected and analysed at a rate of one per sample batch submitted to the laboratory. Acceptance criteria for trip spike recovery is between 70 – 130%.

Trip spike samples were prepared, transported with samples, and analysed for BTEX for the six monitoring events. The trip spike recovery results are provided in Table F3, Appendix F.

The recovery of BTEXN were within the acceptable range of 70 to 130%.

Laboratory QA/QC

The NATA certified laboratories utilised for this assessment (ALS Environmental and Eurofins) undertook their own quality assurance and quality control procedures for sample analysis. GHD has reviewed the internal laboratory control data provided within the laboratory reports (refer to Appendix H). It is noted comments have been provided by the laboratory where a failure result was reported in laboratory QA/QC procedures.

Laboratory holding time

Samples were extracted and analysed within the required holding time for chemical analysis as presented on laboratory reports in Appendix H. Concentrations of analytes reporting holding time were generally consistent across the current monitoring period.

Matrix spikes

Most matrix spike recovery results were reported within the laboratory limits (70% - 130%), except for the June 2024 event for mercury, where the recovery was less than the lower data quality objective.

It should be noted there were additional outliers as some matrix spike recoveries were unable to be determined. This was because the background level was greater than or equal to four times the spike level. This occurred in the following events:

– April, May and September 2024 events for sulfate and chloride.
– July 2024 event for sulfate.

As the majority of reported matrix spike recoveries were within laboratory limits during the monitoring period, the matrix spike outliers are not considered to have any impact on the outcome of the investigation, or interpretation of this round of data.

Laboratory control samples, surrogate spikes

All laboratory control samples (LCS) and surrogate spike recoveries were within laboratory limits (70%-130% for LCS and 50%-150% for surrogate recoveries).

Laboratory duplicate samples

All laboratory duplicate samples were reported within the laboratory limits (less than 30%).

Frequency of quality control samples

A sufficient frequency of quality control samples was reported by the laboratory during the monitoring period except for the April to June, August and September 2024 events for TRH. Laboratory duplicates and matrix spikes actual rate – 0%, expected rate – 5-10%.

As quality control samples were collected for the remainder of analytes and samples during the monitoring period, it is considered that any reduced rate of collection of laboratory duplicates and matrix spikes did not have a material impact on the outcome of the investigation, or interpretation of this round of data.

QA/QC assessment outcome

The review of the QA/QC program and data indicates that the groundwater analytical data are of an acceptable quality upon which to draw meaningful conclusions regarding impacts to groundwater at the site.

Appendix F
Table F2
Calculated Relative Percentage Difference (RPD) in Field Duplicate Samples

Location Code	BH107R			BH112R			BH104R			BH107R			BH145R			BH112R		
Date	11 Apr 2024			11 Apr 2024			15 May 2024			15 May 2024	16 May 2024		06 Jun 2024			12 Jun 2024		
Field ID	BH107R	GWDUP2		BH112R	GWDUP1		BH104R	GWDUP1		BH107R	GWDUP2		BH145R	GWDUP1		BH112R	GWDUP2	
Matrix Type	Water	Water		Water	Water		Water	Water		Water	Water		Water	Water		Water	Water	
Sample Type	Normal	Interlab_D		Normal	Field_D		Normal	Field_D		Normal	Interlab_D		Normal	Field_D		Normal	Interlab_D	
Lab Report Number	ES2411734	1087440	RPD	ES2411734	ES2411734	RPD	ES2415903	ES2415903	RPD	ES2415903	1099024	RPD	ES2418682	ES2418682	RPD	ES2419514	1109038	RPD
Chemistry Name	**Unit**	**EQL**																
Metals																		
Arsenic (filtered)	mg/L	0.001	<0.001	<0.001	0	0.003	0.004	29	0.003	0.003	0	<0.001	<0.001	0	0.002	0.002	0	0.002	0.003	40
Cadmium (filtered)	mg/L	0.0001	<0.0001	<0.0002	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0002	0	<0.0001	<0.0001	0	<0.0001	<0.0002	0
Chromium (III+VI) (filtered)	mg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0
Copper (filtered)	mg/L	0.001	0.001	0.002	67	0.007	0.008	13	<0.001	0.001	0	0.002	0.002	0	<0.001	<0.001	0	0.006	0.007	15
Lead (filtered)	mg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0
Mercury (filtered)	mg/L	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0
Nickel (filtered)	mg/L	0.001	<0.001	0.001	0	0.006	0.006	0	<0.001	0.002	67	0.001	0.001	0	<0.001	<0.001	0	0.005	0.005	0
Zinc (filtered)	mg/L	0.005	0.006	0.015	86	0.009	0.012	29	<0.005	<0.005	0	0.009	0.010	11	<0.005	0.008	46	0.034	0.042	21

Location Code	BH104R			BH107R			BH104R			BH107R			BH145R			BH104R		
Date	11 Jul 2024			11 Jul 2024			06 Aug 2024			06 Aug 2024			11 Sep 2024			12 Sep 2024		
Field ID	BH104R	GWDUP1		BH107R	GWDUP2		BH104R	GWDUP2		BH107R	GWDUP1		BH145R	GWDUP1		BH104R	GWDUP2	
Matrix Type	Water	Water		Water	Water		Water	Water		Water	Water		Water	Water		Water	Water	
Sample Type	Normal	Field_D		Normal	Interlab_D		Normal	Interlab_D		Normal	Field_D		Normal	Field_D		Normal	Interlab_D	
Lab Report Number	ES2422922	ES2422922	RPD	ES2422922	1117977	RPD	ES2425825	1127260	RPD	ES2425825	ES2425825	RPD	ES2429962	ES2429962	RPD	ES2429962	1139072	RPD
Chemistry Name	**Unit**	**EQL**																
Metals																		
Arsenic (filtered)	mg/L	0.001	0.003	0.003	0	<0.001	<0.001	0	0.003	0.003	0	<0.001	<0.001	0	0.002	0.002	0	0.003	0.003	0
Cadmium (filtered)	mg/L	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0002	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0002	0
Chromium (III+VI) (filtered)	mg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0
Copper (filtered)	mg/L	0.001	<0.001	<0.001	0	0.003	0.003	0	<0.001	<0.001	0	0.001	<0.001	0	<0.001	<0.001	0	<0.001	0.002	67
Lead (filtered)	mg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0
Mercury (filtered)	mg/L	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0	<0.0001	<0.0001	0
Nickel (filtered)	mg/L	0.001	<0.001	0.002	67	0.001	0.001	0	0.011	0.010	10	0.010	0.008	22	0.001	0.001	0	0.001	0.001	0
Zinc (filtered)	mg/L	0.005	0.008	<0.005	46	0.013	0.012	8	0.018	0.010	57	0.017	<0.005	109	0.007	0.007	0	<0.005	0.005	0

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 200 (1 - 10 x EQL); 50 (10 - 30 x EQL); 30 (> 30 x EQL))**
*****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory**

Sample Type	Trip_B						Rinsate					
Date	08 Apr 2024	06 May 2024	05 Jun 2024	08 Jul 2024	01 Aug 2024	09 Sep 2024	12 Apr 2024	16 May 2024	12 Jun 2024	11 Jul 2024	07 Aug 2024	12 Sep 2024
Field ID	Trip Blank	Trip Blank	Trip blank	Trip Blank	Trip Blank	Trip blank	GWRB1	GWRB1	GWRB1	GWRB1	GWRB1	GWRB1
Lab Report Number	ES2411734	ES2415903	ES2418682	ES2422922	ES2425825	ES2429962	ES2411734	ES2415903	ES2419514	ES2422922	ES2425825	ES2429962

Chem Name	Unit	EQL												
Metals														
Arsenic	mg/L	0.001	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.0001	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (III+VI)	mg/L	0.001	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.001	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.001	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury	mg/L	0.0001	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	mg/L	0.001	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.005	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
BTEXN														
Benzene	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-
	%													
Toluene	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-
	%													
Ethylbenzene	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-
	%													
Xylene (o)	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-
	%													
Xylene (m & p)	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-
	%													
Xylene Total	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-
	%													
Naphthalene (BTEXN suite)	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-
	%													
TRH - NEPM 2013														
F1 (C6-C10 minus BTEX)	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	-	-	-	-
C6-C10 Fraction	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	-	-	-	-
TRH - NEPM 1999														
C6-C9 Fraction	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	-	-	-	-

***Trip blank and rinsate blank concentrations greater than the LOR have been highlighted.**
**** Acceptable trip spike recoveries are in the range of 70 to 130 %**

Sample Type			Trip_S					
Date			08 Apr 2024	06 May 2024	05 Jun 2024	08 Jul 2024	01 Aug 2024	09 Sep 2024
Field ID			Trip Spike	Trip Spike	Trip Spike	Trip Spike	Trip Spike	Trip Spike
Lab Report Number			ES2411734	ES2415903	ES2418682	ES2422922	ES2425825	ES2429962
Chem Name	**Unit**	**EQL**						
Metals								
Arsenic	mg/L	0.001	-	-	-	-	-	-
Cadmium	mg/L	0.0001	-	-	-	-	-	-
Chromium (III+VI)	mg/L	0.001	-	-	-	-	-	-
Copper	mg/L	0.001	-	-	-	-	-	-
Lead	mg/L	0.001	-	-	-	-	-	-
Mercury	mg/L	0.0001	-	-	-	-	-	-
Nickel	mg/L	0.001	-	-	-	-	-	-
Zinc	mg/L	0.005	-	-	-	-	-	-
BTEXN								
	mg/L	0.001	-	-	-	-	-	-
Benzene	%		95	105	90	95	80	80
	mg/L	0.002	-	-	-	-	-	-
Toluene	%		85	85	90	90	70	85
	mg/L	0.002	-	-	-	-	-	-
Ethylbenzene	%		90	90	95	95	70	85
	mg/L	0.002	-	-	-	-	-	-
Xylene (o)	%		100	90	95	100	75	87.5
	mg/L	0.002	-	-	-	-	-	-
Xylene (m & p)	%		95	90	90	100	70	85
	mg/L	0.002	-	-	-	-	-	-
Xylene Total	%		97.5	90	92.5	100	72.5	110
Naphthalene (BTEXN	mg/L	0.005	-	-	-	-	-	-
suite)	%		105	100	105	105	95	90
TRH - NEPM 2013								
F1 (C6-C10 minus BTEX)	mg/L	0.02	-	-	-	-	-	-
C6-C10 Fraction	mg/L	0.02	-	-	-	-	-	-
TRH - NEPM 1999								
C6-C9 Fraction	mg/L	0.02	-	-	-	-	-	-

***Trip blank and rinsate blank concentrations greater than the LOR have been highlighted.**
**** Acceptable trip spike recoveries are in the range of 70 to 130 %**

Appendix G

Field sheets

Purging and Sampling Record

Bore ID: BH104R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	10.940 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	16 m	**Ref.datum:**	TOC
Date:	11/04/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	18.140 m	**Bore Diam.:**	50 mm
Round	April 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
12:39	0.5	21.8	7.15	8287	2.65	20.2	11.060	Pale yellow tinge, slighty cloudy, no odour, no sheen, no sediment
12:43	1.0	21.7	6.94	8228	0.86	2.8	11.130	
12:47	1.5	21.2	6.90	8261	0.63	-3.0	11.180	Good recharge
12:51	2.0	21.2	6.86	8137	0.46	-10.6	11.240	
12:55	2.5	21.3	6.84	8180	0.39	-16.3	11.280	
12:59	3.0	21.3	6.83	8169	0.36	-20.5	11.300	
13:03	3.5	21.1	6.83	8188	0.30	-25.2	11.340	
13:07	4.0	21.5	6.82	8190	0.26	-27.5	11.350	
13:11	4.5	21.4	6.82	8184	0.23	-28.9	11.395	
13:15	5.0	21.6	6.82	8187	0.22	-30.8	11.420	Pale yellow tinge, slighty cloudy, no odour, no sheen, no sediment
								Parameters stable and samples collected

Field QA Checks:		*Container*	*Collected*	*Container*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Green 500 mL Plastic*	***1***	*Red 60 mL Plastic*	***1***	*Duplicate collected?*	***No***
Decontamination as per GHD procedure?	Yes	*Orange 100 mL Glass*	***1***	*Purple 2x40 mL Vials*	***1***	*Metals Filtered?*	***Yes***
Was sampling equipment pre-cleaned?	Yes	*Purple 60 mL Plastic*	***1***				
COC updated?	Yes					*# Bottles collected*	***6***

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**

Purging and Sampling Record

Bore ID: BH107R

Job Information		Sampling Information		Bore Information			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	7.615 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	13.5 m	**Ref.datum:**	TOC
Date:	11/04/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	14.500 m	**Bore Diam.:**	50 mm
Round	April 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
10:35	0.5	21.0	7.47	3765	3.15	108.5	7.640	Clear, very slightly cloudy, no odour, no sheen, no sediment
10:39	1.0	20.2	7.24	3641	0.69	105.4	7.905	
10:43	1.5	20.3	7.18	3621	0.66	103.6	8.125	
10:47	2.0	20.4	7.16	3625	0.68	103.6	8.340	
10:51	2.5	20.6	7.14	3639	0.59	103.7	8.395	
10:55	3.0	20.5	7.13	3625	0.59	104.4	8.625	Pump on lowest speed
10:59	3.5	20.6	7.13	3625	0.59	104.8	8.760	Clear
11:03	3.9	20.6	7.12	3623	0.59	105.2	8.940	Poor to moderate recharge
11:07	4.3	20.3	7.12	3610	0.84	105.7	9.110	
11:11	4.7	20.5	7.11	3600	0.87	106.4	9.235	
11:15	5.1	20.6	7.11	3608	0.94	106.9	9.380	Clear, very slightly cloudy, no odour, no sheen, no sediment
								Parameters stable, samples collected

Field QA Checks:		Container	Collected	Container	Collected		
Air bubbles in vials or violent reactions?	No	*Green 500 mL Plastic*	***1***	*Red 60 mL Plastic*	***2***	*Duplicate collected?*	***No***
Decontamination as per GHD procedure?	Yes	*Orange 100 mL Glass*	***1***	*Purple 2x40 mL Vials*	***1***	*Metals Filtered?*	***Yes***
Was sampling equipment pre-cleaned?	Yes	*Purple 60 mL Plastic*	***1***				
COC updated?	Yes					*# Bottles collected*	***7***

Comment: **Duplicate samples collected, bottles used, access, condition of headworks etc**

GWDUP2 Eurofins

Purge Volumes			
Casing Int. Dia (mm)	**50**	**100**	**150**
Vol (L/m of casing)	**2.0**	**7.9**	**17.7**

Purging and Sampling Record

Bore ID: BH112R

Job Information		Sampling Information		Bore Information			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	13.070 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	19 m	**Ref.datum:**	TOC
Date:	11/04/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	21.110 m	**Bore Diam.:**	50 mm
Round	April 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
8:26	0.5	19.4	6.61	14716	1.90	178.8	13.200	Clear, no odour or sheen, no sediment load
8:30	1.0	19.4	6.60	14726	0.90	173.1	13.350	
8:34	1.5	19.5	6.61	14749	0.69	167.7	13.460	
8:38	2.0	19.6	6.61	14771	0.67	164.4	13.580	
8:42	2.5	19.4	6.62	14751	0.67	160.8	13.660	
8:46	2.9	19.6	6.62	14802	0.65	157.7	13.740	Flow rate reduced
8:50	3.3	19.6	6.62	14816	0.65	155.7	13.810	Moderate recharge
8:54	3.7	19.8	6.62	14836	0.65	153.3	13.920	
8:58	4.1	19.8	6.62	14870	0.63	151.0	14.000	
9:02	4.5	19.9	6.62	14901	0.59	148.9	14.050	
9:06	4.9	19.9	6.63	14876	0.59	119.5	14.130	YSI powered down, ORP changed when turned back on
9:10	5.3	19.9	6.62	14890	0.57	121.4	14.180	Clear, no odour or sheen, no sediment load
								Parameters stable, samples collected

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Container	Collected	Container	Collected		
Green 500 mL Plastic	***1***	*Red 60 mL Plastic*	***2***	*Duplicate collected?*	***Yes***
Orange 100 mL Glass	***1***	*Purple 2x40 mL Vials*	***1***	*Metals Filtered?*	***Yes***
Purple 60 mL Plastic	***1***				
				# Bottles collected	***7***

Comment: **Duplicate samples collected, bottles used, access, condition of headworks etc**

GWDUP1 ALS Metals

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

Purging and Sampling Record

Bore ID: BH145R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	11.215 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	17.5 m	**Ref.datum:**	TOC
Date:	12/04/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	19.942 m	**Bore Diam.:**	50 mm
Round	April 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
10:26	0.5	20.3	6.93	15430	2.61	22.9	11.245	Pale yellow grey, light sediment load, no odour or sheen
10:30	1.0	20.1	6.85	14895	1.34	17.3	11.250	Good recharge
10:34	1.5	20.0	6.78	14238	0.67	21.5	11.255	
10:38	2.0	20.3	6.75	14047	0.56	26.4	11.260	Clear, no sediment load, no odour or sheen
10:42	2.5	20.2	6.73	14063	0.54	29.3	11.270	
10:46	3.0	20.1	6.71	13883	0.59	33.3	11.275	
10:50	3.5	20.1	6.69	13834	0.70	36.9	11.270	
10:54	4.0	20.2	6.68	13865	0.52	37.4	11.270	
10.58	4.5	20.3	6.68	13643	0.46	38.9	11.285	
11:02	5.0	20.1	6.67	13412	0.41	39.3	11.285	Clear, no sediment load, no odour or sheen
								Parameters stable, samples collected

Field QA Checks:		*Container*	*Collected*	*Container*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Green 500 mL Plastic*	***1***	*Red 60 mL Plastic*	***1***	*Duplicate collected?*	***No***
Decontamination as per GHD procedure?	Yes	*Orange 100 mL Glass*	***3***	*Purple 2x40 mL Vials*	***2***	*Metals Filtered?*	***Yes***
Was sampling equipment pre-cleaned?	Yes	*Purple 60 mL Plastic*	***1***				
COC updated?	Yes					*# Bottles collected*	***6***

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**

Groundwater Gauging Record

Client: TfNSW
Project: M12 Motorway
Job No.: 12554717
Location: Western Sydney, Sydney, NSW

WL Meter Type: Int.Fce
Date: 10-12/04/2024
Sampler: A. Duval / L. Saunders

Well ID	Date	Accessible?	SWL (mbTOC)	BOC (mbTOC)	Data logger present?	Data logger brand type	Data logger downloaded?	Comment
BH104R*	11/04/2024	Yes	10.940	18.140	Yes	HOBO	No	Reader equipment issues
BH107R*	11/04/2024	Yes	7.615	14.500	Yes	Solinst	Yes	
BH112R*	11/04/2024	Yes	13.070	21.110	Yes	Solinst	Yes	
BH145R*	12/04/2024	Yes	11.215	19.942	Yes	HOBO	No	Reader equipment issues
BH170								Not located to date
BH175	10/04/2024	Yes	5.115	17.925	Yes	Solinst	Yes	12:13PM
BH219	12/04/2024	Yes	0.300	18.245	Yes	HOBO	No	Reader equipment issues, 12:58PM

* BH104, BH107 and BH112 destroyed November 2022 and replacement wells BH104R, BH107R and BH112R are now gauged
* BH145 is no longer in use as of April 2023 and replacement well BH145R is now gauged.

Purging and Sampling Record

Bore ID: BH104R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	11.050 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	**to**		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	17 m	**Ref.datum:**	TOC
Date:	15/05/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	18.140 m	**Bore Diam.:**	50 mm
Round	May 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
8:53	0.5	19.9	6.76	7644	4.64	-45.5	11.185	Slightly cloudy, yellow-grey tinge,no sediment, no odour, no sheen
8:57	1.0	19.8	6.73	7655	1.13	-80.4	11.260	
9:01	1.5	19.8	6.73	7625	0.45	-92.0	11.325	
9:05	2.0	19.4	6.73	7585	0.37	-91.0	11.390	Clear, no odour, no sheen, no sediment
9:09	2.5	19.5	6.74	7566	0.30	-92.9	11.410	Good recharge
9:13	3.0	19.4	6.74	7577	0.24	-94.5	11.410	
9:17	3.5	19.4	6.75	7567	0.22	-97.8	11.430	
9:21	4.0	19.4	6.76	7578	0.18	-109.2	11.430	
9:25	4.5	19.6	6.77	7633	0.18	-114.0	11.470	
9:29	5.0	19.9	6.77	7707	0.17	-120.2	11.470	Clear, no odour, no sheen, no sediment
								Parameters stable, samples collected

Field QA Checks:		*Container*	*Collected*	*Container*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Green 500 mL Plastic*	***1***	*Red 60 mL Plastic*	***2***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Orange 100 mL Glass*	***1***	*Purple 2x40 mL Vials*	***2***	*Metals Filtered?*	***Yes***
Was sampling equipment pre-cleaned?	Yes	*Purple 60 mL Plastic*	***1***				
COC updated?	Yes					*# Bottles collected*	***7***

Comment: **Duplicate samples collected, bottles used, access, condition of headworks etc**

GWDUP1 ALS Metals

Purge Volumes			
Casing Int. Dia (mm)	**50**	**100**	**150**
Vol (L/m of casing)	**2.0**	**7.9**	**17.7**

Purging and Sampling Record

Bore ID: BH107R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	7.770 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	**to**		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	13 m	**Ref.datum:**	TOC
Date:	15/05/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	14.505 m	**Bore Diam.:**	50 mm
Round	May 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
11:07	0.5	20.2	6.95	3538	1.77	35.1	7.930	Clear, no sediment, no odour or sheen
11:11	1.0	20.0	6.94	3512	0.61	29.7	8.100	
11:15	1.5	20.1	6.94	3492	0.49	28.6	8.300	
11:19	2.0	20.0	6.94	3454	0.37	34.0	8.540	
11:23	2.5	19.8	6.94	3422	0.34	40.4	8.775	
11:27	3.1	19.8	6.95	3413	0.35	44.3	8.960	
11:31	3.7	19.8	6.96	3400	0.39	48.1	9.170	Flow rate reduced, moderate to poor recharge
11:35	4.1	19.9	6.96	3393	0.46	51.1	9.310	
11:39	4.6	19.8	6.96	3383	0.54	53.4	9.500	
11:43	5.1	19.7	6.97	3367	0.67	56.5	9.720	Clear, no sediment, no odour or sheen
								Parameters stable and samples collected

Field QA Checks:		*Container*	*Collected*	*Container*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Green 500 mL Plastic*	***1***	*Red 60 mL Plastic*	***2***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Orange 100 mL Glass*	***1***	*Purple 2x40 mL Vials*	***2***	*Metals Filtered?*	***Yes***
Was sampling equipment pre-cleaned?	Yes	*Purple 60 mL Plastic*	***1***				
COC updated?	Yes					*# Bottles collected*	***7***

Comment: **Duplicate samples collected, bottles used, access, condition of headworks etc**

GWDUP2 eurofins metals

Purge Volumes			
Casing Int. Dia (mm)	**50**	**100**	**150**
Vol (L/m of casing)	**2.0**	**7.9**	**17.7**

Purging and Sampling Record

Bore ID: BH112R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	13.070 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	**to**		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	20 m	**Ref.datum:**	TOC
Date:	15/05/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	21.110 m	**Bore Diam.:**	50 mm
Round	May 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
13:03	0.5	21.0	6.53	14772	3.30	47.1	13.120	Slightly cloudy, pale grey tinge, light sediment load, no odour, no she
13:07	1.0	20.7	6.53	14745	1.15	45.3	13.255	
13:11	1.5	21.0	6.54	14850	0.87	46.0	13.315	
13:15	2.0	20.8	6.54	14782	1.04	49.9	13.435	
13:19	2.5	20.5	6.54	14700	0.84	53.3	13.515	
13:23	3.0	20.6	6.54	14670	0.61	63.4	13.660	Moderate recharge
13:27	3.5	20.6	6.54	14688	0.54	68.1	13.740	Clear, no odour, no sheen, no sediment
13:31	4.0	20.5	6.54	14698	0.49	73.6	13.905	
13:35	4.5	20.5	6.55	14662	0.45	77.0	13.960	
13:39	5.0	20.5	6.55	14698	0.42	81.0	14.070	Clear, no odour, no sheen, no sediment
								Parameters stable, samples collected

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Container	*Collected*	*Container*	*Collected*		
Green 500 mL Plastic	***1***	*Red 60 mL Plastic*	***1***	*Duplicate collected?*	***No***
Orange 100 mL Glass	***1***	*Purple 2x40 mL Vials*	***1***	*Metals Filtered?*	***Yes***
Purple 60 mL Plastic	***1***				
				# Bottles collected	***6***

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

Purging and Sampling Record

Bore ID: BH145R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	11.275 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	**to**		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	18 m	**Ref.datum:**	TOC
Date:	16/05/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	19.970 m	**Bore Diam.:**	50 mm
Round	May 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
11:39	0.5	19.5	6.50	16221	1.19	-87.0	11.305	Clear, no odour, no sheen, no sediment
11:43	1.0	19.3	6.51	16103	0.57	-87.5	11.310	
11:48	1.5	19.3	6.52	15918	0.42	-85.8	11.310	Excellent recharge
11:52	2.0	19.2	6.53	15849	0.36	-86.2	11.320	
11:56	2.5	19.3	6.53	15841	0.35	-83.8	11.325	
12:00	3.0	19.2	6.54	15806	0.33	-81.3	11.320	
12:04	3.5	19.1	6.54	15770	0.29	-81.6	11.330	
12:08	4.0	19.1	6.55	15764	0.28	-80.3	11.350	
12:12	4.5	19.2	6.56	15705	0.25	-73.2	11.370	
12:16	5.0	19.4	6.56	15664	0.23	-72.1	11.340	Clear, no odour, no sheen, no sediment
								Parameters stable, samples collected

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Container	*Collected*	*Container*	*Collected*		
Green 500 mL Plastic	***1***	*Red 60 mL Plastic*	***1***	*Duplicate collected?*	***No***
Orange 100 mL Glass	***1***	*Purple 2x40 mL Vials*	***1***	*Metals Filtered?*	***Yes***
Purple 60 mL Plastic	***1***				
				# Bottles collected	***6***

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**

Purging and Sampling Record

Bore ID: BH104R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	11.020 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / N. Hugo	**Flow Cell:**	Yes	**Pump Depth:**	17 m	**Ref.datum:**	TOC
Date:	12/06/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	18.140 m	**Bore Diam.:**	50 mm
Round	June 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
11:54	0.5	19.4	6.74	7141	1.34	-37.3	11.150	Clear, no odour, no sheen, no sediment
11:59	1.0	19.6	6.73	7151	0.71	-46.6	11.200	
12:04	1.5	19.9	6.73	7211	0.57	-50.5	11.250	
12:08	2.0	19.7	6.73	7204	0.42	-53.9	11.310	
12:12	2.5	19.7	6.73	7186	0.34	-55.1	11.360	
12:17	3.0	19.4	6.73	7153	0.30	-55.5	11.370	Great recharge
12:21	3.5	19.4	6.73	7143	0.23	-57.1	11.420	
12:26	4.0	19.4	6.73	7180	0.21	-57.6	11.425	
12:31	4.5	19.2	6.73	7140	0.19	-61.2	11.460	
12:35	5.0	19.2	6.74	7120	0.16	-64.8	11.470	Clear, no odour, no sheen, no sediment
								Parameters stable, sampled

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Container	*Collected*	*Container*	*Collected*
Green 500 mL Plastic	*1*	*Red 60 mL Plastic*	*1*
Orange 100 mL Glass	*1*	*Purple 2x40 mL Vials*	*1*
Purple 60 mL Plastic	*1*		

Duplicate collected? ***No***
Metals Filtered? ***Yes***
 # Bottles collected ***6***

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**

Purging and Sampling Record

Bore ID: BH107R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	7.700 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / N. Hugo	**Flow Cell:**	Yes	**Pump Depth:**	13 m	**Ref.datum:**	TOC
Date:	12/06/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	15.515 m	**Bore Diam.:**	50 mm
Round	June 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
10:06	0.5	18.6	7.01	3258	1.37	22.4	7.875	Cloudy, white/yellowish colour, no odour, no sediment, no sheen
10:10	1.0	18.8	7.00	3230	0.78	20.6	8.050	
10:14	1.5	18.5	7.00	3173	0.60	25.9	8.270	
10:18	2.0	18.7	6.99	3169	0.58	31.1	8.420	Slightly cloudy, no odour, no sediment, no sheen
10:22	2.5	18.7	6.99	3162	0.60	35.1	8.620	
10:26	3.0	18.8	6.99	3174	0.97	41.1	8.890	
10:30	3.5	18.9	6.99	3155	0.69	42.9	9.060	Clear, no odour, no sediment, no sheen
10:35	4.0	18.7	6.98	3147	0.66	44.6	9.270	Flow rate adjusted to lowest setting
10:41	4.5	18.8	6.99	3144	0.71	46.2	9.480	
10:47	5.1	18.8	6.98	3140	0.81	49.2	9.750	Clear, no odour, no sediment, no sheen
								Parameters stable, samples collected

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Container	*Collected*	*Container*	*Collected*
Green 500 mL Plastic	*1*	*Red 60 mL Plastic*	*1*
Orange 100 mL Glass	*1*	*Purple 2x40 mL Vials*	*1*
Purple 60 mL Plastic	*1*		

Duplicate collected? ***No***
Metals Filtered? ***Yes***
 # Bottles collected ***6***

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**

Purging and Sampling Record

Bore ID: BH112R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	12.960 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / N. Hugo	**Flow Cell:**	Yes	**Pump Depth:**	19 m	**Ref.datum:**	TOC
Date:	12/06/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	21.120 m	**Bore Diam.:**	50 mm
Round	June 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
8:23	0.5	18.0	6.59	13199	3.92	95.4	13.085	Sightly cloudy, no odour, no sheen, no sediment
8:27	1.0	18.6	6.56	13363	1.45	90.3	13.220	
8:31	1.5	18.6	6.56	13334	0.79	84.9	13.320	
8:35	2.0	18.7	6.56	13353	0.58	81.3	13.410	
8:39	2.5	18.7	6.56	13336	0.49	79.9	13.490	
8:43	3.0	18.9	6.56	13373	0.46	77.8	13.645	
8:47	3.5	18.9	6.55	13355	0.42	76.5	13.700	Moderate recharge
8:51	4.0	19.1	6.55	13355	0.41	75.3	13.810	Clear, no odour, no sediment, no sheen
8:55	4.5	19.0	6.55	13370	0.35	74.2	13.930	
8:59	5.0	19.1	6.55	13336	0.36	73.7	14.010	Clear, no odour, no sediment, no sheen
								Parameters stable, samples collected

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Container	*Collected*	*Container*	*Collected*		
Green 500 mL Plastic	*1*	*Red 60 mL Plastic*	*2*	*Duplicate collected?*	*Yes*
Orange 100 mL Glass	*1*	*Purple 2x40 mL Vials*	*1*	*Metals Filtered?*	*Yes*
Purple 60 mL Plastic	*1*				
				# Bottles collected	*7*

Comment: **Duplicate samples collected, bottles used, access, condition of headworks etc**

GWDUP2 Eurofins Metals

Purge Volumes			
Casing Int. Dia (mm)	**50**	**100**	**150**
Vol (L/m of casing)	**2.0**	**7.9**	**17.7**

Purging and Sampling Record

Bore ID: BH145R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	11.180 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	A. Duval / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	17 m	**Ref.datum:**	TOC
Date:	6/06/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	19.960 m	**Bore Diam.:**	50 mm
Round	June 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	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	18.1	6.44	15586	0.69	-46.9	11.205	Clear, no odour, no sheen, no sediment
13:08	1.5	18.2	6.47	15646	0.43	-56.3	11.215	
13:14	2.5	18.2	6.47	15669	0.40	-58.9	11.225	
13:19	3.0	18.2	6.48	15609	0.37	-61.7	11.200	
13:23	3.5	18.2	6.48	15562	0.29	-61.8	11.235	
13:27	4.0	18.2	6.48	15430	0.26	-61.9	11.240	Great recharge
13:31	4.5	18.1	6.49	15194	0.21	-61.8	11.250	
13:35	5.0	18.0	6.49	15145	0.19	-62.0	11.270	Clear, no odour, no sheen, no sediment
								Parameters stable, samples collected

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Container	*Collected*	*Container*	*Collected*		
Green 500 mL Plastic	*1*	*Red 60 mL Plastic*	*2*	*Duplicate collected?*	*Yes*
Orange 100 mL Glass	*1*	*Purple 2x40 mL Vials*	*1*	*Metals Filtered?*	*Yes*
Purple 60 mL Plastic	*1*				
				# Bottles collected	*7*

Comment: **Duplicate samples collected, bottles used, access, condition of headworks etc**

GWDUP1 ALS Metals

Purge Volumes			
Casing Int. Dia (mm)	**50**	**100**	**150**
Vol (L/m of casing)	**2.0**	**7.9**	**17.7**

Groundwater Gauging Record

Client: TfNSW
Project: M12 Motorway
Job No.: 12554717
Location: Western Sydney, Sydney, NSW

WL Meter Type: Int.Fce
Date: 06/06 & 12/06/2024
Sampler: **AD/LS/NH**

Well ID	Date	Time	Accessible?	SWL (mbTOC)	BOC (mbTOC)	Data logger present?	Data logger brand type	Data logger downloaded?	Comment
BH104R*	12/06/2024	11:06	Yes	11.020	11.140	Yes	HOBO	Yes	
BH107R*	12/06/2024	9:58	Yes	7.700	15.500	Yes	Solinst	Yes	
BH112R*	12/06/2024	8:02	Yes	12.960	21.200	Yes	Solinst	Yes	
BH145R*	6/06/2024	12:24	Yes	11.180	19.960	Yes	HOBO	Yes	
BH170									Not located to date
BH175	6/06/2024	11:38	Yes	4.595	18.005	Yes	Solinst	Yes	
BH219	6/06/2024	14:18	Yes	0.020	18.275	Yes	HOBO	Yes	

* BH104, BH107 and BH112 destroyed November 2022 and replacement wells BH104R, BH107R and BH112R are now gauged
* BH145 is no longer in use as of April 2023 and replacement well BH145R is now gauged.

Purging and Sampling Record

Bore ID: BH104R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	11.180 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	**to** m		
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	L. Saunders / E. Smith	**Flow Cell:** Yes	**Pump Depth:** 17 m	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	11/07/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	18.130 m	**Well Cap Secure?**	Yes
Round	July 2024	**Field Filtered?**	Yes (disposable filter)				

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
7:56	0.5	17.6	6.77	7009	0.84	-61.2	11.410	Mostly clear, slightly cloudy, no sediment, no odour or sheen.
7:59	1.0	17.9	6.76	7035	0.37	-56.5	11.500	
8:02	1.5	17.8	6.76	7050	0.21	-64.2	11.600	Slight pale grey, somewhat cloudy, no sediment, hydrogen sulphide odour, no sheen.
8:05	2.0	17.9	6.76	7044	0.18	-66.6	11.630	
8:08	2.5	18.0	6.76	7075	0.13	-69.9	11.720	
8:11	3.0	18.0	6.76	7113	0.08	-72.1	11.760	
8:14	3.5	18.1	6.76	7154	0.06	-75.7	11.800	
8:17	4.0	18.0	6.76	7163	0.03	-79.0	11.825	
8:20	4.5	18.0	6.76	7198	0.01	-82.1	11.875	Slight pale grey, somewhat cloudy, no sediment, hydrogen sulphide odour, no sheen.
8:23	5.0	18.1	6.76	7210	0.00	-84.7	11.930	Parameters stable, samples taken

Field QA Checks:		*Container*	*Collected*	*Container*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Green 500 mL Plastic*	***1***	*Red 60 mL Plastic*	***2***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Orange 100 mL Glass*	***1***	*Purple 2x40 mL Vials*	***1***	*Metals Filtered?*	***Yes***
Was sampling equipment pre-cleaned?	Yes	*Purple 60 mL Plastic*	***1***				
COC updated?	Yes					*# Bottles collected*	***7***

Comment: **Duplicate samples collected, bottles used, access, condition of headworks etc**

GWDUP1 (ALS duplicate collected)

Purge Volumes			
Casing Int. Dia (mm)	**50**	**100**	**150**
Vol (L/m of casing)	**2.0**	**7.9**	**17.7**

Purging and Sampling Record

Bore ID: BH107R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	7.745 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**		**to**	m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	L. Saunders / E. Smith	**Flow Cell:** Yes	**Pump Depth:** 13 m	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	11/07/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	14.505 m	**Well Cap Secure?**	Yes
Round	July 2024	**Field Filtered?**	Yes (disposable filter)				

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
9:18	0.5	18.1	7.40	3276	0.43	19.8	8.100	
9:20	1.0	18.1	7.20	3270	0.38	22.1	8.300	
9:23	1.5	18.2	7.00	3267	0.33	22.6	8.620	Clear, no odour or sheen
9:25	2.0	18.3	7.00	3261	0.36	25.4	8.965	
9:27	2.5	18.3	7.00	3259	0.41	27.2	9.140	
9:29	3.0	18.2	7.00	3247	0.50	29.8	9.385	
9:31	3.5	18.2	6.99	3243	0.59	32.0	9.620	
9:36	4.5	17.9	6.99	3210	0.71	34.5	9.900	
9:40	5.0	17.9	6.99	3193	0.84	37.1	10.140	Clear, no odour or sheen
								Parameters stable, samples collected

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Container	*Collected*	*Container*	*Collected*		
Green 500 mL Plastic	*1*	*Red 60 mL Plastic*	*2*	*Duplicate collected?*	*Yes*
Orange 100 mL Glass	*1*	*Purple 2x40 mL Vials*	*1*	*Metals Filtered?*	*Yes*
Purple 60 mL Plastic	*1*				
				# Bottles collected	*7*

Comment: **Duplicate samples collected, bottles used, access, condition of headworks etc**

GWDUP2, Eurofins metals

Purge Volumes			
Casing Int. Dia (mm)	**50**	**100**	**150**
Vol (L/m of casing)	**2.0**	**7.9**	**17.7**

Purging and Sampling Record

Bore ID: BH112R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	13.025 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	**to**		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	L. Saunders / E. Smith	**Flow Cell:**	Yes	**Pump Depth:**	m	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	11/07/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	21.105 m	**Well Cap Secure?**	Yes
Round	July 2024	**Field Filtered?**	Yes (disposable filter)				

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
10:43	1.0	19.1	6.51	14029	0.38	79.5	13.485	
10:46	2.0	19.1	6.51	14054	0.35	84.9	13.630	Clear, no sediment,no odour or sheen
10:49	3.0	19.1	6.52	14080	0.37	88.1	13.795	
10:52	4.0	19.0	6.52	14099	0.26	91.0	13.955	
10:55	5.0	19.1	6.51	14116	0.22	92.6	14.080	
10:58	6.0	19.2	6.51	14136	0.17	93.1	14.205	Clear, no sediment, no odour or sheen
								Parameters stable, samples collected.

Field QA Checks:		*Container*	*Collected*	*Container*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Green 500 mL Plastic*	*1*	*Red 60 mL Plastic*	*1*	*Duplicate collected?*	*No*
Decontamination as per GHD procedure?	Yes	*Orange 100 mL Glass*	*1*	*Purple 2x40 mL Vials*	*1*	*Metals Filtered?*	*Yes*
Was sampling equipment pre-cleaned?	Yes	*Purple 60 mL Plastic*	*1*				
COC updated?	Yes					*# Bottles collected*	*6*

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**

Purging and Sampling Record

Bore ID: BH145R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Bailer	**SWL(mbTOC):**	11.140 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Grab sample	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	L. Saunders / N. Hugo	**Flow Cell:**	Yes	**Pump Depth:**	m	**Ref.datum:**	TOC
Date:	10/07/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	19.975 m	**Bore Diam.:**	50 mm
Round	July 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
12:30	-	20.5	6.62	16733	2.03	-41.7	11.140	Pale yellow grey, no sediment, very slight sulfuric odour, no sheen
								Micropurge pump failure/ did not work. Bailer sampling used and parameters taken in cup.

Field QA Checks:		*Container*	*Collected*	*Container*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Green 500 mL Plastic*	*1*	*Red 60 mL Plastic*	*1*	*Duplicate collected?*	*No*
Decontamination as per GHD procedure?	Yes	*Orange 100 mL Glass*	*1*	*Purple 2x40 mL Vials*	*1*	*Metals Filtered?*	*Yes*
Was sampling equipment pre-cleaned?	Yes	*Purple 60 mL Plastic*	*1*				
COC updated?	Yes					*# Bottles collected*	*6*

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**

Purging and Sampling Record

Bore ID: BH104R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	11.260 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	N. Hugo / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	16.5 m	**Ref.datum:**	TOC
Date:	6/08/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	18.175 m	**Bore Diam.:**	50 mm
Round	August 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
8:07	1.0	18.3	6.80	6773	0.62	-63.2	11.550	Clear, no odour, no colour, no sheen, no sediment
8:09	1.5	18.4	6.80	6774	0.55	-65.3	11.660	Slight sulfuric odour, clear
8:11	2.0	18.5	6.80	6776	0.45	-69.8	11.730	Decreased pump flow
8:14	2.5	18.1	6.81	6730	0.74	-74.2	11.785	
8:17	3.0	18.2	6.81	6766	0.63	-75.6	11.820	
8:20	3.5	18.2	6.81	6793	0.42	-77.2	11.865	Good recharge
8:24	4.0	18.3	6.81	6824	0.32	-78.7	11.895	
8:27	4.5	18.3	6.81	6852	0.31	-80.0	11.915	
8:31	5.0	18.2	6.81	6863	0.35	-81.5	11.960	Clear, colourless, no sheen, no sediment, sulfuric odour
								Parameters stable, samples taken

Field QA Checks:		*Container*	*Collected*	*Container*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Green 500 mL Plastic*	*1*	*Red 60 mL Plastic*	*2*	*Duplicate collected?*	*Yes*
Decontamination as per GHD procedure?	Yes	*Orange 100 mL Glass*	*1*	*Purple 2x40 mL Vials*	*1*	*Metals Filtered?*	*Yes*
Was sampling equipment pre-cleaned?	Yes	*Purple 60 mL Plastic*	*1*				
COC updated?	Yes					*# Bottles collected*	*7*

Comment: **Duplicate samples collected, bottles used, access, condition of headworks etc**

GWDUP2, Eurofins metals

Purge Volumes			
Casing Int. Dia (mm)	**50**	**100**	**150**
Vol (L/m of casing)	**2.0**	**7.9**	**17.7**

Purging and Sampling Record

Bore ID: BH107R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	7.730 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	**to**		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	N. Hugo / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	13.5 m	**Ref.datum:**	TOC
Date:	6/08/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	14.540 m	**Bore Diam.:**	50 mm
Round	August 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
9:27	0.5	18.2	7.09	3275	2.26	-4.9	7.965	Very faint cloudiness, colourles, no odour, no sheen, no sediment
9:29	1.0	18.2	7.11	3194	3.64	-18.1	8.185	
9:33	2.0	18.3	7.14	3153	5.55	-9.9	8.500	Pump rate slowed
9:35	2.5	18.3	7.15	3142	5.80	-7.3	8.675	
9:38	3.0	18.2	7.15	3114	6.20	-0.3	8.865	
9:42	3.5	18.2	7.14	3098	6.46	4.5	9.085	Faintly cloudy, colourless, odourless, no sheen, no sediment
9:45	4.0	18.2	7.14	3086	6.65	8.9	9.285	
9:49	4.5	18.2	7.14	3080	6.89	12.5	9.520	
9:53	5.0	18.1	7.14	3060	7.14	13.2	9.845	Faintly cloudy, colourless, odourless, no sheen, no sediment
								Parameters stable, samples taken

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Container	*Collected*	*Container*	*Collected*		
Green 500 mL Plastic	***1***	*Red 60 mL Plastic*	***1***	*Duplicate collected?*	***Yes***
Orange 100 mL Glass	***1***	*Purple 2x40 mL Vials*	***1***	*Metals Filtered?*	***Yes***
Purple 60 mL Plastic	***1***				
				# Bottles collected	***7***

Comment: **Duplicate samples collected, bottles used, access, condition of headworks etc**

GWDUP1, ALS metals

Purge Volumes			
Casing Int. Dia (mm)	**50**	**100**	**150**
Vol (L/m of casing)	**2.0**	**7.9**	**17.7**

Purging and Sampling Record

Bore ID: BH112R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	13.065 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	N. Hugo / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	20.5 m	**Ref.datum:**	TOC
Date:	6/08/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	21.155 m	**Bore Diam.:**	50 mm
Round	August 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
11:09	0.5	19.0	6.58	13340	1.55	50.7	13.205	Clear, no sediment, no odour or sheen
11:13	1.0	18.9	6.57	13331	1.36	52.7	13.320	
11:16	1.5	19.0	6.57	13341	1.17	52.5	13.440	
11:19	2.0	18.9	6.57	13325	1.06	53.9	13.540	
11:22	2.5	18.9	6.56	13340	0.95	54.3	13.655	
11:25	3.0	19.0	6.56	13357	0.90	53.7	13.745	
11:28	3.5	19.0	6.56	13362	0.79	52.4	13.860	
11:31	4.0	19.0	6.56	13363	0.75	52.8	13.945	
11:34	4.5	19.0	6.56	13363	0.72	53.0	14.030	
11:37	5.0	19.0	6.56	13369	0.68	52.9	14.110	Clear, no sediment, no odour or sheen
								Parameters stable and samples collected

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Container	*Collected*	*Container*	*Collected*		
Green 500 mL Plastic	*1*	*Red 60 mL Plastic*	*1*	*Duplicate collected?*	*No*
Orange 100 mL Glass	*1*	*Purple 2x40 mL Vials*	*1*	*Metals Filtered?*	*Yes*
Purple 60 mL Plastic	*1*				
				# Bottles collected	*6*

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**

Purging and Sampling Record

Bore ID: BH145R

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	11.220 m	**Logic Check:**	
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	Absent	**Stick Up:**	m
Sampler:	N. Hugo / L. Saunders	**Flow Cell:**	Yes	**Pump Depth:**	18 m	**Ref.datum:**	TOC
Date:	7/08/2024	**WLevel Meter Type:**	Interface Probe	**Bore Depth:**	20.000 m	**Bore Diam.:**	50 mm
Round	August 2024	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
12:57	0.5	-	-	-	-	-	11.235	Very pale grey, slightly cloudy, very slight sulfuric odour, no sheen
13:00	1.0	19.3	6.80	15763	8.66	-33.1	11.255	Very pale grey, slightly cloudy, no odour, no sheen
13:03	1.5	19.0	6.86	15632	8.38	-40.6	11.275	
13:06	2.0	18.9	6.88	15332	8.34	-43.1	11.285	
13:09	2.5	18.8	6.90	15578	8.35	-43.1	11.285	
13:12	3.0	18.7	6.90	15519	8.39	-43.3	11.300	
13:14	3.5	18.6	6.90	15495	8.32	-43.1	11.305	Good recharge
13:16	4.0	18.7	6.91	15442	8.47	-43.8	11.320	
13:18	4.5	18.6	6.92	15401	8.58	-43.8	11.310	
13:20	5.0	18.6	6.93	15307	8.61	-44.9	11.325	Very pale grey, slightly cloudy, no odour, no sheen
								Parameters stable, samples collected

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Container	*Collected*	*Container*	*Collected*		
Green 500 mL Plastic	*1*	*Red 60 mL Plastic*	*1*	*Duplicate collected?*	*No*
Orange 100 mL Glass	*1*	*Purple 2x40 mL Vials*	*1*	*Metals Filtered?*	*Yes*
Purple 60 mL Plastic	*1*				
				# Bottles collected	*6*

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**

Groundwater Gauging Record

Client: TfNSW
Project: M12 Motorway
Job No.: 12554717
Location: Western Sydney, Sydney, NSW

WL Meter Type: Int.Fce
Date: 6/08/2024 & 7/08/2024
Sampler/s: Lia Saunders, Nica Hugo

Well ID	Date	Time	Accessible?	SWL (mbTOC)	BOC (mbTOC)	Data logger present?	Data logger brand type	Data logger downloaded?	Comment
BH104R*	6/08/2024	8:07	Yes	11.260	18.175	Yes	HOBO	Yes	
BH107R*	6/08/2024	9:27	Yes	7.730	14.540	Yes	Solinst	Yes	
BH112R*	6/08/2024	11:09	Yes	13.065	21.155	Yes	Solinst	Yes	
BH145R*	7/08/2024	12:57	Yes	11.220	20.000	Yes	HOBO	Yes	
BH170									Not located to date
BH175	7/08/2024	12:11	Yes	4.265	18.080	Yes	Solinst	Yes	
BH219	7/08/2024	8:07	No	-	-	-	-	-	Could not access BH219 due to construction work.

* BH104, BH107 and BH112 destroyed November 2022 and replacement wells BH104R, BH107R and BH112R are now gauged
* BH145 is no longer in use as of April 2023 and replacement well BH145R is now gauged.

Purging and Sampling Record

Well ID: BH104R

Job Information		Sampling Information		Monitoring Well Information				
Client:	TfNSW	**Purge Method:**	Micropurge	**SWL:**	11.330 m bTOC	**Time SWL Measured:**	07:35 AM	
Project:	M12Groundwater monitoring	**Sample Method:**	Micropurge	**Well Depth:**	18.130 m bTOC	**Logic Check:**		
Proj. No.:	12554717	**Sample Depth:**	17 m bTOC	**NAPL Check:**	Absent	**Well Cap Secure?**	Yes	
Site:	M12 West	**WQuality Meter Type:**	YSI	**NAPL Depth:**	m bTOC	**Gatic or Stick Up?**	Stick Up	
Sampler:	Lia Saunders & Nica Hugo	**Flow Cell Used?**	Yes	**Screened Interval From:**	to m bTOC			
Date:	12/09/2024	**WLevel Meter Type:**	Interface Probe	**Well Diameter:**	50 mm	**Stick Up:**	m	
Round:	September 2024	**Field Filtered?**	Yes					

Time (hh:mm)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		*+/- 0.2 °C*	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
07:48	0.5	18.1	6.88	7544.0	0.79	-48.4	11.480	Clear, very pale yellow tinge, no sediment, slight sulfuric odour, no sheen
07:52	1.0	18.2	6.87	6700.0	0.35	-59.0	11.530	
07:58	1.5	18.4	6.87	6721.0	0.22	-64.8	11.600	Clear, no sediment, slight sulfuric odour, no sheen
08:02	2.0	18.4	6.87	6733.0	0.18	-67.9	11.640	
08:06	2.5	18.4	6.87	6755.0	0.15	-70.5	11.655	Good recharge
08:10	3.0	18.4	6.87	6788.0	0.13	-72.7	11.685	
08:14	3.5	18.4	6.87	6806.0	0.11	-74.5	11.690	
08:18	4.0	18.3	6.87	6822.0	0.09	-76.9	11.710	
08:22	4.5	18.3	6.87	6838.0	0.09	-79.3	11.705	
08:26	5.0	18.3	6.87	6857.0	0.07	-83.7	11.705	
08:30	5.5	18.4	6.87	6867.0	0.07	-85.6	11.710	
08:34	6.0	18.5	6.87	6872.0	0.06	-87.3	11.710	
08:38	6.5	18.4	6.87	6865.0	0.05	-88.2	11.715	Clear, no sediment, slight sulfuric odour, no sheen
								Parameters stable, samples collected

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Stabilisation Readings

The current parameter has stablised based on the previous 3 readings.

The current parameter has not yet stabilished based on the previous 3 readings.

Potential data entry error, confirm the value entered is correct.

Comment: **Duplicate samples collected, bottles used, access, condition of headworks etc**

GWDUP2, Eurofins metals

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

Purging and Sampling Record

Well ID: BH107R

Job Information		Sampling Information		Monitoring Well Information				
Client:	TfNSW	**Purge Method:**	Micropurge	**SWL:**	7.660 m bTOC	**Time SWL Measured:**	09:25 AM	
Project:	M12 Groundwater monitoring	**Sample Method:**	Micropurge	**Well Depth:**	14.500 m bTOC	**Logic Check:**		
Proj. No.:	12554717	**Sample Depth:**	13.5 m bTOC	**NAPL Check:**	Absent	**Well Cap Secure?**		
Site:	M12 Groundwater monitoring	**WQuality Meter Type:**	YSI	**NAPL Depth:**	m bTOC	**Gatic or Stick Up?**	Gatic	
Sampler:	Lia Saunders & Nica Hugo	**Flow Cell Used?**	Yes	**Screened Interval From:**	to m bTOC			
Date:	12/09/2024	**WLevel Meter Type:**	Interface Probe	**Well Diameter:**	50 mm	**Stick Up:**	m	
Round:	September 2024	**Field Filtered?**	Yes					

Time (hh:mm)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		*+/- 0.2 °C*	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
09:30	1.0	18.8	7.11	3185.0	0.65	21.5	7.915	Clear, no colour, no odour, no sheen, no sediment
09:32	1.5	18.9	7.10	3179.0	0.40	18.9	8.215	
09:34	2.0	18.8	7.09	3162.0	0.30	16.5	8.385	
09:36	2.5	18.8	7.09	3158.0	0.27	15.5	8.505	
09:38	3.0	18.8	7.08	3150.0	0.23	14.8	8.675	
09:40	3.5	18.8	7.08	3144.0	0.20	14.0	8.845	
09:43	4.0	18.7	7.08	3137.0	0.19	13.1	9.065	
09:46	4.5	18.7	7.08	3132.0	0.20	12.5	9.270	
09:49	5.0	18.8	7.08	3126.0	0.24	12.0	9.470	
09:52	5.5	18.8	7.07	3123.0	0.29	11.7	9.690	Clear, no colour, no odour, no sheen, no sediment
								Parameters stable,sampled

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Stabilisation Readings

- The current parameter has stablised based on the previous 3 readings.
- The current parameter has not yet stabilished based on the previous 3 readings.
- Potential data entry error, confirm the value entered is correct.

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

Purging and Sampling Record

Well ID: BH112R

Job Information		*Sampling Information*		*Monitoring Well Information*				
Client:	TfNSW	**Purge Method:**	Micropurge	**SWL:**	13.085 m bTOC	**Time SWL Measured:**	10:50 AM	
Project:	M12 Groundwater monitoring	**Sample Method:**	Micropurge	**Well Depth:**	21.115 m bTOC	**Logic Check:**		
Proj. No.:	12554717	**Sample Depth:**	19 m bTOC	**NAPL Check:**	Absent	**Well Cap Secure?**		
Site:	M12 Groundwater monitoring	**WQuality Meter Type:**	YSI	**NAPL Depth:**	m bTOC	**Gatic or Stick Up?**	Gatic	
Sampler:	Lia Saunders & Nica Hugo	**Flow Cell Used?**	Yes	**Screened Interval From:**	to m bTOC			
Date:	12/09/2024	**WLevel Meter Type:**	Interface Probe	**Well Diameter:**	50 mm	**Stick Up:**	m	
Round:	September 2024	**Field Filtered?**	Yes					

Time (hh:mm)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		*+/- 0.2 °C*	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
11:00	0.5	19.4	6.62	13501.0	1.01	66.4	13.230	Clear, no sediment, no odour or sheen
11:03	1.0	19.4	6.62	13474.0	0.63	65.7	13.320	
11:07	1.5	19.3	6.61	13467.0	0.41	65.1	13.430	
11:10	2.0	19.3	6.61	13456.0	0.31	65.0	13.545	
11:13	2.5	19.3	6.61	13458.0	0.27	65.1	13.620	
11:16	3.0	19.4	6.61	13461.0	0.25	65.1	13.700	
11:19	3.5	19.4	6.61	13469.0	0.22	64.9	13.810	
11:22	4.0	19.4	6.61	13475.0	0.20	64.2	13.915	
11:25	4.5	19.4	6.61	13495.0	0.19	63.6	14.055	
11:28	5.0	19.5	6.61	13518.0	0.18	62.2	14.100	Clear, no sediment, no odour or sheen
								Parameters stable, samples collected

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Stabilisation Readings

- The current parameter has stablised based on the previous 3 readings.
- The current parameter has not yet stabilished based on the previous 3 readings.
- Potential data entry error, confirm the value entered is correct.

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

Purging and Sampling Record

Well ID: BH145R

Job Information		Sampling Information		Monitoring Well Information				
Client:	TfNSW	**Purge Method:**	Micropurge	**SWL:**	11.220 m bTOC	**Time SWL Measured:**	12:20 PM	
Project:		**Sample Method:**	Micropurge	**Well Depth:**	19.955 m bTOC	**Logic Check:**		
Proj. No.:	12554717	**Sample Depth:**	18 m bTOC	**NAPL Check:**	Absent	**Well Cap Secure?**		
Site:	M12 East	**WQuality Meter Type:**	YSI	**NAPL Depth:**	m bTOC	**Gatic or Stick Up?**	Gatic	
Sampler:	Lia Saunders & Nica Hugo	**Flow Cell Used?**	Yes	**Screened Interval From:**	to m bTOC			
Date:	11/09/2024	**WLevel Meter Type:**	Interface Probe	**Well Diameter:**	50 mm	**Stick Up:**	m	
Round:	September 2024	**Field Filtered?**	Yes					

Time (hh:mm)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m bTOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		*+/- 0.2 °C*	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
12:39	0.5	19.8	6.59	1605.0	2.06	-57.8	11.245	Slightly cloudy white colour, fine suspended sediment, no odour, no sheen
12:41	1.0	19.4	6.56	15860.0	0.80	-61.6	11.275	Pale grey colour, slightly cloudy, slight sulfuric odour, no sheen
12:44	1.5	19.2	6.56	15774.0	0.52	-63.4	11.280	
12:46	2.0	19.1	6.56	15724.0	0.28	-65.5	11.290	Slighty cloudy, whiteish colour, no sheen, slight sulfuric odour
12:49	2.5	19.1	6.56	15700.0	0.21	-67.2	11.285	Good recharge
12:51	3.0	19.0	6.56	15675.0	0.17	-68.5	11.295	
12:54	3.5	19.1	6.56	15711.0	0.15	-69.5	11.300	
12:56	4.0	19.2	6.57	15700.0	0.13	-70.6	11.305	Slight sulfuric odour, slightly cloudy with white colour, no sheen
12:59	4.5	19.2	6.57	15695.0	0.13	-71.3	11.310	
13:02	5.0	19.1	6.57	15577.0	0.12	-72.0	11.320	
13:05	5.5	19.1	6.58	15433.0	0.09	-72.9	11.315	Clear, colourless, slight sulfuric odour, no sheen
13:09	6.0	19.4	6.58	15511.0	0.11	-73.8	11.305	
13:12	6.5	19.2	6.58	15455.0	0.08	-74.0	11.320	
13:15	7.0	19.1	6.58	15399.0	0.07	-74.2	11.325	
13:00	7.5	19.0	6.58	15388.0	0.05	-74.3	11.330	Clear, colourless, slight sulfuric odour, no sheen

Field QA Checks:	
Air bubbles in vials or violent reactions?	No
Decontamination as per GHD procedure?	Yes
Was sampling equipment pre-cleaned?	Yes
COC updated?	Yes

Stabilisation Readings

- The current parameter has stablised based on the previous 3 readings.
- The current parameter has not yet stabilished based on the previous 3 readings.
- Potential data entry error, confirm the value entered is correct.

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

GWDUP1 ALS Metals

Purge Volumes			
Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

Appendix H

Laboratory reports

HT

Subcon / Forward Lab / Split WO

Lab / Analyst: Eurofins

Organised By / Date:

Relinquished By / Date:

Connote / Courier:

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

BRISBANE 32 Shand Road, Sunnybank QLD 4109 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: samples.mackay@alsglobal.com

NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

TOWNSVILLE 14-15 Desma Court Garbutt QLD 4814 Ph: 07 4796 0600 E: townsville@alsglobal.com

TOWNSVILLE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

ALBURY 31 Dalton Street Albury NSW 2640 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREME** ☐ Standard TAT **(List due date):**	STANDARD TAT	**FOR LABORATORY USE ONLY (Circle)** WO No: ES2411734
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g., Ultra Trace) ☐ Non Standard or urgent TAT **(List due date):**		Custody Seal Intact? Yes No N/A
PROJECT: M12 Groundwater	**ALS QUOTE NO.:** SY/322/21 V5	COC SEQUENCE NUMBER (Circle)	Attached By PO / Internal Sheet: Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: 12554717		COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Henry Luo	**CONTACT PH: Henry Luo** 0414 090 002	OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER: Andrew Duval, Lia Saunders	**SAMPLER MOBILE:** 0468 301 344	**RELINQUISHED BY:** Lia Saunders	**RECEIVED BY:**	**RELINQUISHED BY:**
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT	DATE/TIME: 12/04/2024 14:15PM	DATE/TIME:	DATE/TIME:
Email Reports to: emily.smith@ghd.com; andrew.duval@ghd.com; lia.saunders@ghd.com, henry.luo@ghd.com, ghdlabreports@ghd.com				

		RECEIVED BY:	
		DATE/TIME: 12/4/24 1430	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: PLEASE DO NOT LOG ALL SAMPLES RECEIVED IN ONE WORKORDER. LOG AS TWO SEPARATE WORKORDERS AS PER THE TWO COCs PROVIDED.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).											
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	Comments	TOTAL CONTAINERS	W-02 (dissolved 8 metals)	EG020F (dissolved Fe, Mn)	W-04 (TRH/BTEXN)	NT-08A (TN, NO2, NO3, NH3, TP, soluble Reactive P)	NT-01D & 02 (major cations & anions, Hardness)	EA015H (TDS)	EA025H (TSS)	EP075A (SIM) (Phenols – Standard level (15 analytes))	W-02T (8 total metals)	BTEXN		
1	BH104R	11/04/2024	Water		6	X	X	X	X	X	X	X					
2	BH107R	11/04/2024	Water		6	X	X	X	X	X	X	X					
3	BH112R	11/04/2024	Water		6	X	X	X	X	X	X	X					
4	BH145R	12/-04/2024	Water		6	X	X	X	X	X	X	X					
5	GWDUP1	11/04/2024	Water		1	X											
6	GWDUP2	11/04/2024	Water	PLEASE FORWARD TO EUROFINS WITH ATTACHED COC	1												
7	GWRB1	12/04/2024	Water		1									X			
8	Trip spike	8/04/2024	Water		1										X		
9	Trip blank	8/04/2024	Water		1										X		
10																	

Environmental Division
Sydney
Work Order Reference
ES2411734

Telephone : +61-2-8784 8555

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2411734**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: henry.luo@ghd.com	E-mail	: samiksha.sathish@alsglobal.com
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9239 7199	Facsimile	: +61-2-8784 8500
Project	: 12554717	Page	: 1 of 3
Order number	: ----	Quote number	: ES2021GHDSER0026 (SY/322/21_V5)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Andrew Duval, Lia Saunders		

Dates

Date Samples Received	: 12-Apr-2024 14:30	Issue Date	: 12-Apr-2024
Client Requested Due Date	: 23-Apr-2024	Scheduled Reporting Date	: **23-Apr-2024**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: 4	Temperature	: 5.5'C, 4.9'C & 4.3'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

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
- Sample ID GWDUP2 will be forwarded to Eurofins.
- **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.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EA025H Suspended Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - NT-01D & 02 Major Cations & Anions (Ca, Mg, Na, K, Cl, SO4,	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-02 8 Metals	WATER - W-04 TRH/BTEXN
ES2411734-001	11-Apr-2024 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2411734-002	11-Apr-2024 00:00	BH107R	✓	✓	✓	✓	✓	✓	✓
ES2411734-003	11-Apr-2024 00:00	BH112R	✓	✓	✓	✓	✓	✓	✓
ES2411734-004	12-Apr-2024 00:00	BH145R	✓	✓	✓	✓	✓	✓	✓
ES2411734-005	11-Apr-2024 00:00	GWDUP1						✓	

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP080 BTEXN	WATER - W-02T 8 metals (Total)	WATER - W-18 TRH(C6 - C9)/BTEXN
ES2411734-006	12-Apr-2024 00:00	GWRB1		✓	
ES2411734-007	08-Apr-2024 00:00	Trip Spike	✓		
ES2411734-008	08-Apr-2024 00:00	Trip Blank			✓

Proactive Holding Time Report

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

Requested Deliverables

Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
ANDREW DUVAL		
- *AU Certificate of Analysis - NATA (COA)	Email	andrew.duval@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	andrew.duval@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	andrew.duval@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	andrew.duval@ghd.com
- Chain of Custody (CoC) (COC)	Email	andrew.duval@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	andrew.duval@ghd.com
- EDI Format - XTab (XTAB)	Email	andrew.duval@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	andrew.duval@ghd.com
EMILY SMITH		
- *AU Certificate of Analysis - NATA (COA)	Email	emily.smith@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	emily.smith@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	emily.smith@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	emily.smith@ghd.com
- Chain of Custody (CoC) (COC)	Email	emily.smith@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	emily.smith@ghd.com
- EDI Format - XTab (XTAB)	Email	emily.smith@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	emily.smith@ghd.com
HENRY LUO		
- *AU Certificate of Analysis - NATA (COA)	Email	henry.luo@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	henry.luo@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	henry.luo@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	henry.luo@ghd.com
- Chain of Custody (CoC) (COC)	Email	henry.luo@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	henry.luo@ghd.com
- EDI Format - XTab (XTAB)	Email	henry.luo@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	henry.luo@ghd.com
Lia Saunders		
- *AU Certificate of Analysis - NATA (COA)	Email	Lia.Saunders@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lia.Saunders@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lia.Saunders@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lia.Saunders@ghd.com
- Chain of Custody (CoC) (COC)	Email	Lia.Saunders@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	Lia.Saunders@ghd.com
- EDI Format - XTab (XTAB)	Email	Lia.Saunders@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	Lia.Saunders@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2411734**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 12-Apr-2024 14:30
Order number	: ----	Date Analysis Commenced	: 12-Apr-2024
C-O-C number	: ----	Issue Date	: 23-Apr-2024 17:38
Sampler	: Andrew Duval, Lia Saunders		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	11-Apr-2024 00:00	11-Apr-2024 00:00	11-Apr-2024 00:00	12-Apr-2024 00:00	11-Apr-2024 00:00
Compound	CAS Number	LOR	Unit		ES2411734-001	ES2411734-002	ES2411734-003	ES2411734-004	ES2411734-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		4860	2330	10100	8570	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		72	28	22	34	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		787	536	2130	1900	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		1090	1600	1340	788	----
Total Alkalinity as CaCO3	----	1	mg/L		1090	1600	1340	788	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		208	200	1490	280	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		2190	308	4040	4110	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		99	38	192	141	----
Magnesium	7439-95-4	1	mg/L		131	107	401	377	----
Sodium	7440-23-5	1	mg/L		1550	739	2930	2270	----
Potassium	7440-09-7	1	mg/L		16	15	41	16	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		0.003	<0.001	0.003	0.002	0.004
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	0.001	0.007	0.001	0.008
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	0.006	0.002	0.006
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	0.006	0.009	<0.005	0.012

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	11-Apr-2024 00:00	11-Apr-2024 00:00	11-Apr-2024 00:00	12-Apr-2024 00:00	11-Apr-2024 00:00
					ES2411734-001	ES2411734-002	ES2411734-003	ES2411734-004	ES2411734-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		**0.103**	**0.004**	**0.094**	**0.238**	----
Iron	7439-89-6	0.05	mg/L		**1.03**	<0.05	<0.05	**0.70**	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**1.56**	**0.02**	**2.55**	**1.77**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	**0.10**	**0.02**	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	**2.20**	**0.24**	**0.79**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	**2.20**	**0.34**	**0.81**	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.8**	**0.4**	**2.7**	**2.2**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**1.8**	**2.6**	**3.0**	**3.0**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.10**	**0.03**	**0.15**	**0.05**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	**0.02**	**0.07**	<0.01	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**87.9**	**44.8**	**172**	**138**	----
ø **Total Cations**	----	0.01	meq/L		**83.6**	**43.2**	**171**	**137**	----
ø **Ionic Balance**	----	0.01	%		**2.53**	**1.80**	**0.20**	**0.11**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	11-Apr-2024 00:00	11-Apr-2024 00:00	11-Apr-2024 00:00	12-Apr-2024 00:00	11-Apr-2024 00:00
Compound	CAS Number	LOR	Unit		ES2411734-001	ES2411734-002	ES2411734-003	ES2411734-004	ES2411734-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**101**	**105**	**104**	**112**	----
Toluene-D8	2037-26-5	2	%		**106**	**107**	**108**	**102**	----
4-Bromofluorobenzene	460-00-4	2	%		**123**	**126**	**126**	**127**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	GWRB1	Trip Spike	Trip Blank	----	----
				Sampling date / time	12-Apr-2024 00:00	08-Apr-2024 00:00	08-Apr-2024 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2411734-006	ES2411734-007	ES2411734-008	--------	--------
					Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
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		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	----	<20	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	----	<20	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		----	----	<20	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	**19**	<1	----	----
Toluene	108-88-3	2	µg/L		----	**17**	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		----	**18**	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	**19**	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		----	**20**	<2	----	----
^ **Total Xylenes**	----	2	µg/L		----	**39**	<2	----	----
^ **Sum of BTEX**	----	1	µg/L		----	**93**	<1	----	----
Naphthalene	91-20-3	5	µg/L		----	**21**	<5	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	**107**	**111**	----	----
Toluene-D8	2037-26-5	2	%		----	**105**	**109**	----	----
4-Bromofluorobenzene	460-00-4	2	%		----	**119**	**131**	----	----

Surrogate Control Limits

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

QUALITY CONTROL REPORT

Work Order	: **ES2411734**	Page	: 1 of 12
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 12-Apr-2024
Order number	: ----	Date Analysis Commenced	: 12-Apr-2024
C-O-C number	: ----	Issue Date	: 23-Apr-2024
Sampler	: Andrew Duval, Lia Saunders		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

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 (%)
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 5732723)									
ES2411714-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	34	28	17.0	No Limit
ES2411739-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	456	474	3.8	0% - 20%
ES2411917-004	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	66	72	8.3	No Limit
ES2412080-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2090	2050	1.8	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5732724)									
ES2411714-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	9	8	0.0	No Limit
ES2411739-005	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	27	28	3.6	No Limit
ES2411917-004	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2412080-005	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	2050	2020	1.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5738717)									
ES2411734-001	BH104R	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1090	1090	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	1090	1090	0.0	0% - 20%
EW2401748-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	66	69	5.1	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	66	69	5.1	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5723244)									
EW2401748-004	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	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 (%)*
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5723244) - continued									
ES2411662-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	4	4	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5723692)									
EW2401677-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	14	19	30.8	0% - 50%
ES2411734-004	BH145R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	280	260	7.1	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5723245)									
EW2401748-004	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	14	14	0.0	0% - 50%
ES2411662-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	4	4	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 5723693)									
EW2401677-003	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	40	40	0.0	0% - 20%
ES2411734-004	BH145R	ED045G: Chloride	16887-00-6	1	mg/L	4110	4110	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5732997)									
EW2401663-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	42	40	3.7	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	19	18	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	293	252	15.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	23	23	0.0	0% - 20%
EW2401779-007	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5732995)									
EW2401663-001	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	0.016	0.017	0.0	0% - 50%
		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: Manganese	7439-96-5	0.001	mg/L	0.088	0.087	1.7	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.039	0.040	3.6	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.029	0.031	7.4	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EW2401779-007	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: Manganese	7439-96-5	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5732995) - continued									
EW2401779-007	Anonymous	EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5733007)									
ES2412156-005	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	0.341	0.341	0.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.007	0.007	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: Manganese	7439-96-5	0.001	mg/L	0.344	0.346	0.5	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.157	0.156	1.2	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.140	0.138	1.1	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	15.1	15.0	0.4	0% - 20%
ES2411714-001	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: Manganese	7439-96-5	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 5733032)									
ES2411714-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.006	0.007	0.0	No Limit
ES2411858-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.087	0.086	1.6	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.064	0.063	0.0	0% - 50%
EG035F: Dissolved Mercury by FIMS (QC Lot: 5732996)									
ES2411734-003	BH112R	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	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 (%)*
EG035F: Dissolved Mercury by FIMS (QC Lot: 5733006)									
ES2411734-005	GWDUP1	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
WN2404604-003	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5730822)									
ES2411734-006	GWRB1	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2411942-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5737989)									
ES2411734-001	BH104R	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.56	1.55	0.0	0% - 20%
ES2412453-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.31	0.31	0.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5723240)									
ES2411618-003	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EW2401736-003	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5723690)									
ES2411876-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.10	0.10	0.0	No Limit
ES2411734-004	BH145R	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.02	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5737990)									
ES2411734-001	BH104R	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2412453-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5737994)									
ES2411734-001	BH104R	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.8	1.8	0.0	0% - 50%
ES2412453-008	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.6	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5737993)									
ES2411734-001	BH104R	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.10	0.11	9.9	0% - 50%
ES2412453-008	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5723243)									
ES2411662-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5723691)									
ES2411949-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01 (0.10)*	mg/L	<0.10	<0.10	0.0	No Limit
ES2411734-004	BH145R	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5723146)									
ES2411618-008	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2411734-004	BH145R	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5723146)									
ES2411618-008	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2411734-004	BH145R	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5723146)									
ES2411618-008	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080: BTEXN (QC Lot: 5723146) - continued									
ES2411618-008	Anonymous	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
ES2411734-004	BH145R	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 Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 5732723)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	98.1	87.0	109
				<10	293 mg/L	118	75.2	126
				<10	2410 mg/L	102	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5732724)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	95.7	83.0	129
				<5	1000 mg/L	98.4	82.0	110
				<5	928 mg/L	90.9	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 5738717)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	104	81.0	115
				----	50 mg/L	107	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5723244)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	82.0	122
				<1	500 mg/L	101	82.0	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5723692)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	102	82.0	122
				<1	500 mg/L	102	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 5723245)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	108	80.9	127
				<1	1000 mg/L	101	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 5723693)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	106	80.9	127
				<1	1000 mg/L	103	80.9	127
ED093F: Dissolved Major Cations (QCLot: 5732997)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	98.1	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	98.8	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	100	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	100	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 5732995)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	101	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.6	85.0	111

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 5732995) - continued								
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.3	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.5	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	100	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	97.7	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.6	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.0	82.0	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 5733007)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.9	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.6	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.9	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.4	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.6	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	98.5	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.5	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.0	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.9	82.0	112
EG020T: Total Metals by ICP-MS (QCLot: 5733032)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.0	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.4	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.2	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	101	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.2	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.1	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	107	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 5732996)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	103	83.0	105
EG035F: Dissolved Mercury by FIMS (QCLot: 5733006)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	94.2	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5730822)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	102	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5737989)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	101	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5723240)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	99.1	82.0	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5723690)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	104	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5737990)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5737994)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	99.2	69.0	123
				<0.1	1 mg/L	96.8	70.0	123
				<0.1	5 mg/L	95.2	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5737993)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	107	71.3	126
				<0.01	0.442 mg/L	110	71.3	126
				<0.01	1 mg/L	102	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5723243)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	104	85.0	117
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5723691)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	105	85.0	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5723146)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	75.8	75.0	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5725086)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	67.5	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	83.4	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	82.8	58.3	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5723146)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	75.3	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5725086)								
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	75.9	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	73.4	50.5	115
EP080: BTEXN (QCLot: 5723146)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	95.6	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	89.7	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	97.6	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	106	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	104	76.4	123

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	LCS: Spike Recovery (%)	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080: BTEXN (QCLot: 5723146) - continued								
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	109	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**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5723244)							
ES2411662-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	103	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5723692)							
ES2411734-004	BH145R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5723245)							
ES2411662-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	85.3	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5723693)							
ES2411734-004	BH145R	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5732995)							
ES2411734-004	BH145R	EG020A-F: Arsenic	7440-38-2	1 mg/L	112	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	100.0	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	95.7	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	104	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	96.8	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	97.6	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	97.2	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5733007)							
ES2411714-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	103	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	103	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	101	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	102	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	100	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	102	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	105	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	106	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG020T: Total Metals by ICP-MS (QCLot: 5733032)							
ES2411714-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	103	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	101	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	101	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	104	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	102	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	101	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	110	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5732996)							
ES2411734-001	BH104R	EG035F: Mercury	7439-97-6	0.01 mg/L	81.5	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5733006)							
ES2411590-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	89.3	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5730822)							
ES2411739-001	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	92.4	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5737989)							
ES2411734-001	BH104R	EK055G: Ammonia as N	7664-41-7	1 mg/L	100	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5723240)							
ES2411618-003	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	104	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5723690)							
ES2411734-004	BH145R	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	103	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5737990)							
ES2411734-001	BH104R	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	95.7	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5737994)							
ES2411734-002	BH107R	EK061G: Total Kjeldahl Nitrogen as N	----	10 mg/L	106	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5737993)							
ES2411734-002	BH107R	EK067G: Total Phosphorus as P	----	1 mg/L	104	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5723243)							
ES2411662-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	99.1	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5723691)							
ES2411734-004	BH145R	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	103	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5723146)							
ES2411618-008	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	98.8	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5723146)							
ES2411618-008	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	99.4	70.0	130
EP080: BTEXN (QCLot: 5723146)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080: BTEXN (QCLot: 5723146) - continued							
ES2411618-008	Anonymous	EP080: Benzene	71-43-2	25 µg/L	107	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	102	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	110	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	116	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	116	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	112	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2411734**	Page	: 1 of 10
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 12-Apr-2024
Site	: ----	Issue Date	: 23-Apr-2024
Sampler	: Andrew Duval, Lia Saunders	No. of samples received	: 8
Order number	: ----	No. of samples analysed	: 8

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike 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
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2411734--004	BH145R	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	ES2411734--004	BH145R	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
TRH - Semivolatile Fraction	EP071	0	10	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
TRH - Semivolatile Fraction	EP071	0	10	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*
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	----	**17-Apr-2024**	18-Apr-2024	✓
Clear Plastic Bottle - Natural (EA015H) BH145R	**12-Apr-2024**	**----**	----	----	**17-Apr-2024**	19-Apr-2024	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	----	**17-Apr-2024**	18-Apr-2024	✓
Clear Plastic Bottle - Natural (EA025H) BH145R	**12-Apr-2024**	**----**	----	----	**17-Apr-2024**	19-Apr-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
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	----	**18-Apr-2024**	09-May-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH145R	**12-Apr-2024**	**----**	----	----	**18-Apr-2024**	10-May-2024	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	----	**19-Apr-2024**	25-Apr-2024	✓
Clear Plastic Bottle - Natural (ED037-P) BH145R	**12-Apr-2024**	**----**	----	----	**19-Apr-2024**	26-Apr-2024	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	----	**13-Apr-2024**	09-May-2024	✓
Clear Plastic Bottle - Natural (ED041G) BH145R	**12-Apr-2024**	**----**	----	----	**13-Apr-2024**	10-May-2024	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	----	**13-Apr-2024**	09-May-2024	✓
Clear Plastic Bottle - Natural (ED045G) BH145R	**12-Apr-2024**	**----**	----	----	**13-Apr-2024**	10-May-2024	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	----	**18-Apr-2024**	09-May-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH145R	**12-Apr-2024**	**----**	----	----	**18-Apr-2024**	10-May-2024	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) BH104R, BH107R, BH112R, GWDUP1	**11-Apr-2024**	**----**	----	----	**18-Apr-2024**	08-Oct-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) BH145R	**12-Apr-2024**	**----**	----	----	**18-Apr-2024**	09-Oct-2024	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) GWRB1	**12-Apr-2024**	**18-Apr-2024**	09-Oct-2024	✓	**18-Apr-2024**	09-Oct-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
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	**----**	**19-Apr-2024**	09-May-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) GWDUP1	**11-Apr-2024**	**----**	----	**----**	**22-Apr-2024**	09-May-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) BH145R	**12-Apr-2024**	**----**	----	**----**	**19-Apr-2024**	10-May-2024	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) GWRB1	**12-Apr-2024**	**----**	----	**----**	**19-Apr-2024**	10-May-2024	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	**----**	**19-Apr-2024**	09-May-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH145R	**12-Apr-2024**	**----**	----	**----**	**19-Apr-2024**	10-May-2024	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	**----**	**13-Apr-2024**	13-Apr-2024	✓
Clear Plastic Bottle - Natural (EK057G) BH145R	**12-Apr-2024**	**----**	----	**----**	**13-Apr-2024**	14-Apr-2024	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	**----**	**19-Apr-2024**	09-May-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH145R	**12-Apr-2024**	**----**	----	**----**	**19-Apr-2024**	10-May-2024	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH104R, BH107R, BH112R	**11-Apr-2024**	**19-Apr-2024**	09-May-2024	✓	**19-Apr-2024**	09-May-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH145R	**12-Apr-2024**	**19-Apr-2024**	10-May-2024	✓	**19-Apr-2024**	10-May-2024	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH104R, BH107R, BH112R	**11-Apr-2024**	**19-Apr-2024**	09-May-2024	✓	**19-Apr-2024**	09-May-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH145R	**12-Apr-2024**	**19-Apr-2024**	10-May-2024	✓	**19-Apr-2024**	10-May-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
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) BH104R, BH107R, BH112R	**11-Apr-2024**	**----**	----	**----**	**13-Apr-2024**	13-Apr-2024	✓
Clear Plastic Bottle - Natural (EK071G) BH145R	**12-Apr-2024**	**----**	----	**----**	**13-Apr-2024**	14-Apr-2024	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R, BH112R	**11-Apr-2024**	**16-Apr-2024**	18-Apr-2024	✓	**18-Apr-2024**	26-May-2024	✓
Amber Glass Bottle - Unpreserved (EP071) BH145R	**12-Apr-2024**	**16-Apr-2024**	19-Apr-2024	✓	**18-Apr-2024**	26-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**08-Apr-2024**	**12-Apr-2024**	22-Apr-2024	✓	**13-Apr-2024**	22-Apr-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R, BH112R	**11-Apr-2024**	**12-Apr-2024**	25-Apr-2024	✓	**12-Apr-2024**	25-Apr-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**12-Apr-2024**	**12-Apr-2024**	26-Apr-2024	✓	**12-Apr-2024**	26-Apr-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R, BH112R	**11-Apr-2024**	**16-Apr-2024**	18-Apr-2024	✓	**18-Apr-2024**	26-May-2024	✓
Amber Glass Bottle - Unpreserved (EP071) BH145R	**12-Apr-2024**	**16-Apr-2024**	19-Apr-2024	✓	**18-Apr-2024**	26-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**08-Apr-2024**	**12-Apr-2024**	22-Apr-2024	✓	**13-Apr-2024**	22-Apr-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R, BH112R	**11-Apr-2024**	**12-Apr-2024**	25-Apr-2024	✓	**12-Apr-2024**	25-Apr-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**12-Apr-2024**	**12-Apr-2024**	26-Apr-2024	✓	**12-Apr-2024**	26-Apr-2024	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) Trip Spike, Trip Blank	**08-Apr-2024**	**12-Apr-2024**	22-Apr-2024	✓	**13-Apr-2024**	22-Apr-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R, BH112R	**11-Apr-2024**	**12-Apr-2024**	25-Apr-2024	✓	**12-Apr-2024**	25-Apr-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**12-Apr-2024**	**12-Apr-2024**	26-Apr-2024	✓	**12-Apr-2024**	26-Apr-2024	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	25	**16.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	3	19	**15.79**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	3	16	**18.75**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	26	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	17	**11.76**	**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	10	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	25	**16.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	19	**10.53**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	16	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	26	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	5	40	**12.50**	**12.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	5	40	**12.50**	**12.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	14	**21.43**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	**5.88**	**5.00**	✓	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	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	25	**8.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	19	**10.53**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	16	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	**5.88**	**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	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	25	**8.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	19	**10.53**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	16	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	**5.88**	**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	10	**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
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(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 SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. 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-NO3- F. Combined oxidised Nitrogen (NO2+NO3) 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-NO3-. 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)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
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)

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

eurofins mgt

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

☐ **Brisbane**
Unit 1-21 Smallwood Place, Murrarie
Phone: +617 3902 4600
Email: enviro.bris@mgtlabmark.com.a

☐ **Melbourne**
2 Kingston Town Close, Oakleigh, VIC 3166
Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mgtlabmark.com.au

CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Company Name : GHD Pty Ltd, Sydney	**Contact Name :** Andrew Duval 0468 301 344	**Purchase Order :** 12554717	**COC Number :**
Office Address :	**Project Manager:** Henry Luo 0414 090 002	**PROJECT Number :** 12554717	**Eurofins | mgt quote ID :**
Level 15, 133 Castlereagh Street, Sydney NSW 2000	**Email for results :** emily.smith@ghd.com; andrew.duval@ghd.com; lia.saunders@ghd.com henry.luo@ghd.com; ghdlabreports@ghd.com	**PROJECT Name :** M12 Water Sampling	**Data output format:** ESDAT

Special Directions & Comments :

Sent from ALS

Eurofins | mgt DI water batch number:

	Sample ID	Date	Matrix	Dissolved metals	Total metals					
1	SWDUP2	11/04/2024	Water		X					
2	GWDUP2	11/04/2024	Water	X						
3										
4										
5										
6										
7										
8										
9										
10										

ES2411739
ES2411739A

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:

500P	250P	60P	1LA	40mL vial	200mL A	Jar	Bag
		1					
		1					

Sample comments:

Laboratory Staff

Relinquished By: Lia Saunders	**Received By:** R Carstens
Date & Time : 12/04/2024 '14:15PM	**Date & Time :** 15/04/24 11:22AM
Signature: L.S.	**Signature:**

Method Of Shipment

- ☐ Courier
- ☑ Hand Delivered
- ☐ Postal

Courier Consignment # :

Temperature on arrival: 7.0°C

Report number: 1087440

Rec: 12/4/24 1430 Relinq: 12/4/24 1430

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd

ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Sample Receipt Advice

Company name:	GHD Pty Ltd NSW
Contact name:	Henry Luo
Project name:	M12 WATER SAMPLING
Project ID:	12554717
Turnaround time:	5 Day
Date/Time received	Apr 15, 2024 11:22 AM
Eurofins reference	1087440

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 : 7 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.
X	Split sample sent to requested external lab.
X	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:

Bonnie Pu on phone : or by email: BonniePu@eurofins.com

Results will be delivered electronically via email to Henry Luo - henry.luo@ghd.com.

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

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Order No.:
Report #: 1087440
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Apr 15, 2024 11:22 AM
Due: Apr 22, 2024
Priority: 5 Day
Contact Name: Henry Luo

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	Apr 11, 2024		Water	S24-Ap0034547	X	
2	GWDUP2	Apr 11, 2024		Water	S24-Ap0034548		X
Test Counts						1	1

GHD Pty Ltd NSW
Level 15, 133 Castlereagh Street
Sydney
NSW 2000

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: **Henry Luo**

Report **1087440-W**
Project name M12 WATER SAMPLING
Project ID 12554717
Received Date Apr 15, 2024

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S24-Ap0034547**	**S24-Ap0034548**
Date Sampled			**Apr 11, 2024**	**Apr 11, 2024**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	0.001	-
Arsenic (filtered)	0.001	mg/L	-	< 0.001
Cadmium	0.0002	mg/L	< 0.0002	-
Cadmium (filtered)	0.0002	mg/L	-	< 0.0002
Chromium	0.001	mg/L	0.003	-
Chromium (filtered)	0.001	mg/L	-	< 0.001
Copper	0.001	mg/L	0.005	-
Copper (filtered)	0.001	mg/L	-	0.002
Lead	0.001	mg/L	0.002	-
Lead (filtered)	0.001	mg/L	-	< 0.001
Mercury	0.0001	mg/L	< 0.0001	-
Mercury (filtered)	0.0001	mg/L	-	< 0.0001
Nickel	0.001	mg/L	0.002	-
Nickel (filtered)	0.001	mg/L	-	0.001
Zinc	0.005	mg/L	0.020	-
Zinc (filtered)	0.005	mg/L	-	0.015

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
Metals M8	Sydney	Apr 15, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Apr 15, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Order No.:
Report #: 1087440
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Apr 15, 2024 11:22 AM
Due: Apr 22, 2024
Priority: 5 Day
Contact Name: Henry Luo

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	Apr 11, 2024		Water	S24-Ap0034547	X	
2	GWDUP2	Apr 11, 2024		Water	S24-Ap0034548		X
Test Counts						1	1

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

1. 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.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. 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 sampling date; 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 seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**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	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should 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 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	81			80-120	Pass	
Cadmium	%	85			80-120	Pass	
Chromium	%	86			80-120	Pass	
Copper	%	84			80-120	Pass	
Lead	%	84			80-120	Pass	
Mercury	%	95			80-120	Pass	
Nickel	%	83			80-120	Pass	
Zinc	%	86			80-120	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	96			80-120	Pass	
Cadmium (filtered)	%	97			80-120	Pass	
Chromium (filtered)	%	97			80-120	Pass	
Copper (filtered)	%	97			80-120	Pass	
Lead (filtered)	%	95			80-120	Pass	
Mercury (filtered)	%	98			80-120	Pass	
Nickel (filtered)	%	96			80-120	Pass	
Zinc (filtered)	%	96			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S24-Ap0029962	NCP	%	97			75-125	Pass	
Cadmium (filtered)	S24-Ap0029962	NCP	%	93			75-125	Pass	
Chromium (filtered)	S24-Ap0029962	NCP	%	91			75-125	Pass	
Copper (filtered)	S24-Ap0029962	NCP	%	89			75-125	Pass	
Lead (filtered)	S24-Ap0029962	NCP	%	89			75-125	Pass	
Mercury (filtered)	S24-Ap0029962	NCP	%	90			75-125	Pass	
Nickel (filtered)	S24-Ap0029962	NCP	%	88			75-125	Pass	
Zinc (filtered)	S24-Ap0029962	NCP	%	85			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S24-Ap0036320	NCP	mg/L	0.002	0.001	13	30%	Pass	
Cadmium	S24-Ap0036320	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S24-Ap0036320	NCP	mg/L	0.001	0.001	5.0	30%	Pass	
Copper	S24-Ap0036320	NCP	mg/L	0.004	0.004	2.0	30%	Pass	
Lead	S24-Ap0036320	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	S24-Ap0036320	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S24-Ap0036320	NCP	mg/L	0.002	0.001	12	30%	Pass	
Zinc	S24-Ap0036320	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S24-Ap0034548	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S24-Ap0034548	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S24-Ap0034548	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S24-Ap0034548	CP	mg/L	0.002	0.002	2.2	30%	Pass	
Lead (filtered)	S24-Ap0034548	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S24-Ap0034548	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S24-Ap0034548	CP	mg/L	0.001	< 0.001	13	30%	Pass	
Zinc (filtered)	S24-Ap0034548	CP	mg/L	0.015	0.016	2.1	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

Authorised by:

Nileshni Goundar	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal

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.

HT

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Garbutt QLD 4814 Ph: 07 4796 0600 E: townsville@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4942 6903 E: newcastle@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREME** ☐ Standard TAT **(List due date):**	STANDARD TAT	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g., Ultra Trace ☐ Non Standard or urgent TAT **(List due date):**		Custody Seal Intact? Yes No N/A
PROJECT: M12 Groundwater	**ALS QUOTE NO.:** SY/322/21 V5	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: 12554717		COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Henry Luo	**CONTACT PH: Henry Luo** 0414 090 002	OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER: Andrew Duval, Lia Saunders **SAMPLER MOBILE:** 0468 301 344	**RELINQUISHED BY:** Lia Saunders	**RECEIVED BY:**	**RELINQUISHED BY:**	**RECEIVED BY:**
COC emailed to ALS? (YES / NO) **EDD FORMAT (or default):** ESDAT	DATE/TIME: 16/05/2024 14:45	DATE/TIME:	DATE/TIME:	DATE/TIME: 16/5/24 1455
Email Reports to: emily.smith@ghd.com; andrew.duval@ghd.com; lia.saunders@ghd.com, henry.luo@ghd.com, ghdlabreports@ghd.com				

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: PLEASE DO NOT LOG ALL SAMPLES RECEIVED IN ONE WORKORDER. LOG AS TWO SEPARATE WORKORDERS AS PER THE TWO COCs PROVIDED.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).											
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	Comments	TOTAL CONTAINERS	W-02 (dissolved 8 metals)	EG020F (dissolved Fe, Mn)	W-04 (TRH/BTEXN)	NT-08A (TN, NO2, NO3, NH3, TP, soluble Reactive P)	NT-01D & 02 (major cations & anions, Hardness)	EA015H (TDS)	EA025H (TSS)	EP075A (SIM) (Phenols – Standard level (15 analytes))	W-02T (8 total metals)	BTEXN		
1	BH104R	15/05/2024	Water		6	X	X	X	X	X	X	X					
2	BH107R	15/05/2024	Water		6	X	X	X	X	X	X	X					
3	BH112R	15/05/2024	Water		6	X	X	X	X	X	X	X					
4	BH145R	16/05/2024	Water		6	X	X	X	X	X	X	X					
5	GWDUP1	15/05/2024	Water		1	X											
~~6~~	GWDUP2	15/05/2024	Water	PLEASE FORWARD TO EUROFINS WITH ATTACHED COC	1												
6	GWRB1	16/05/2024	Water		1									X			
7	Trip spike	6/05/2024	Water		1										X		
8	Trip blank	6/05/2024	Water		1										X		

Subcon / Forward Lab / Split WO
Lab / Analysis: Eurofins
Organised By / Date:
Relinquished By / Date:
Connote / Courier: QL FWD
WO No: ES2415903
Attach By PO / Internal Sheet:

Environmental Division
Sydney
Work Order Reference
ES2415903

Telephone : + 61-2-8784 8555

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **ES2415903**		
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: henry.luo@ghd.com	E-mail	: samiksha.sathish@alsglobal.com
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9239 7199	Facsimile	: +61-2-8784 8500
Project	: 12554717	Page	: 1 of 3
Order number	: ----	Quote number	: ES2021GHDSER0026 (SY/322/21_V5)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Andrew Duval, Lia Saunders		

Dates

Date Samples Received	: 16-May-2024 14:55	Issue Date	: 17-May-2024
Client Requested Due Date	: 23-May-2024	Scheduled Reporting Date	: **23-May-2024**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 7	Temperature	: 4.6'C, 4.9'C, 3.2'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

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).**
- **QC Forward analysis will be conducted by Eurofins.**
- 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.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EA025H Suspended Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - NT-01D & 02 Major Cations & Anions (Ca, Mg, Na, K, Cl, SO4,	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-02 8 Metals	WATER - W-04 TRH/BTEXN
ES2415903-001	15-May-2024 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2415903-002	15-May-2024 00:00	BH107R	✓	✓	✓	✓	✓	✓	✓
ES2415903-003	15-May-2024 00:00	BH112R	✓	✓	✓	✓	✓	✓	✓
ES2415903-004	16-May-2024 00:00	BH145R	✓	✓	✓	✓	✓	✓	✓
ES2415903-005	15-May-2024 00:00	GWDUP1						✓	

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP080 BTEXN	WATER - W-02T 8 metals (Total)	WATER - W-18 TRH(C6 - C9)/BTEXN
ES2415903-006	16-May-2024 00:00	GWRB1		✓	
ES2415903-007	06-May-2024 00:00	Trip Spike	✓		
ES2415903-008	06-May-2024 00:00	Trip Blank			✓

Proactive Holding Time Report

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

Requested Deliverables

Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
ANDREW DUVAL		
- *AU Certificate of Analysis - NATA (COA)	Email	andrew.duval@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	andrew.duval@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	andrew.duval@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	andrew.duval@ghd.com
- Chain of Custody (CoC) (COC)	Email	andrew.duval@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	andrew.duval@ghd.com
- EDI Format - XTab (XTAB)	Email	andrew.duval@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	andrew.duval@ghd.com
EMILY SMITH		
- *AU Certificate of Analysis - NATA (COA)	Email	emily.smith@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	emily.smith@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	emily.smith@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	emily.smith@ghd.com
- Chain of Custody (CoC) (COC)	Email	emily.smith@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	emily.smith@ghd.com
- EDI Format - XTab (XTAB)	Email	emily.smith@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	emily.smith@ghd.com
GHD LAB REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	ghdlabreports@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ghdlabreports@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ghdlabreports@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ghdlabreports@ghd.com
- Chain of Custody (CoC) (COC)	Email	ghdlabreports@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	ghdlabreports@ghd.com
- EDI Format - XTab (XTAB)	Email	ghdlabreports@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	ghdlabreports@ghd.com
HENRY LUO		
- *AU Certificate of Analysis - NATA (COA)	Email	henry.luo@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	henry.luo@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	henry.luo@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	henry.luo@ghd.com
- Chain of Custody (CoC) (COC)	Email	henry.luo@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	henry.luo@ghd.com
- EDI Format - XTab (XTAB)	Email	henry.luo@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	henry.luo@ghd.com
Lia Saunders		
- *AU Certificate of Analysis - NATA (COA)	Email	Lia.Saunders@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lia.Saunders@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lia.Saunders@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lia.Saunders@ghd.com
- Chain of Custody (CoC) (COC)	Email	Lia.Saunders@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	Lia.Saunders@ghd.com
- EDI Format - XTab (XTAB)	Email	Lia.Saunders@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	Lia.Saunders@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2415903**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 16-May-2024 14:55
Order number	: ----	Date Analysis Commenced	: 17-May-2024
C-O-C number	: ----	Issue Date	: 23-May-2024 21:11
Sampler	: Andrew Duval, Lia Saunders		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- It has been noted that Ammonia is greater than TKN, however this difference is within the limits of experimental variation.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	15-May-2024 00:00	15-May-2024 00:00	15-May-2024 00:00	16-May-2024 00:00	15-May-2024 00:00
Compound	CAS Number	LOR	Unit		ES2415903-001	ES2415903-002	ES2415903-003	ES2415903-004	ES2415903-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**4840**	**2160**	**10100**	**10500**	**----**
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**89**	**17**	**51**	**44**	**----**
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**809**	**547**	**2220**	**2590**	**----**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	**----**
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	**----**
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**993**	**1440**	**1230**	**891**	**----**
Total Alkalinity as CaCO3	----	1	mg/L		**993**	**1440**	**1230**	**891**	**----**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**220**	**210**	**2090**	**333**	**----**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**2060**	**301**	**4110**	**5230**	**----**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**108**	**41**	**202**	**200**	**----**
Magnesium	7439-95-4	1	mg/L		**131**	**108**	**416**	**508**	**----**
Sodium	7440-23-5	1	mg/L		**1620**	**735**	**2970**	**3020**	**----**
Potassium	7440-09-7	1	mg/L		**17**	**15**	**42**	**18**	**----**
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.003**	<0.001	**0.004**	**0.004**	**0.003**
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	**0.002**	**0.005**	**0.001**	**0.001**
Nickel	7440-02-0	0.001	mg/L		<0.001	**0.001**	**0.006**	<0.001	**0.002**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	**0.009**	**0.015**	**0.008**	<0.005

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	15-May-2024 00:00	15-May-2024 00:00	15-May-2024 00:00	16-May-2024 00:00	15-May-2024 00:00
Compound	CAS Number	LOR	Unit		ES2415903-001	ES2415903-002	ES2415903-003	ES2415903-004	ES2415903-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		**0.103**	**0.006**	**0.090**	**0.166**	----
Iron	7439-89-6	0.05	mg/L		**1.43**	<0.05	<0.05	**3.00**	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**1.70**	**0.19**	**2.70**	**2.24**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.01**	<0.01	**0.05**	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	**2.30**	**0.26**	**0.04**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	**2.30**	**0.31**	**0.04**	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**2.0**	**0.3**	**2.8**	**2.2**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**2.0**	**2.6**	**3.1**	**2.2**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.12**	**0.04**	**0.11**	**0.04**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	**0.06**	<0.01	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**82.5**	**41.6**	**184**	**172**	----
ø Total Cations	----	0.01	meq/L		**87.1**	**43.3**	**174**	**184**	----
ø Ionic Balance	----	0.01	%		**2.68**	**1.95**	**2.63**	**3.19**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	15-May-2024 00:00	15-May-2024 00:00	15-May-2024 00:00	16-May-2024 00:00	15-May-2024 00:00
Compound	CAS Number	LOR	Unit		ES2415903-001	ES2415903-002	ES2415903-003	ES2415903-004	ES2415903-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**97.9**	**94.4**	**97.0**	**99.0**	----
Toluene-D8	2037-26-5	2	%		**97.4**	**95.8**	**98.7**	**97.2**	----
4-Bromofluorobenzene	460-00-4	2	%		**108**	**108**	**104**	**108**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	GWRB1	Trip Spike	Trip Blank	----	----
				Sampling date / time	16-May-2024 00:00	06-May-2024 00:00	06-May-2024 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2415903-006	ES2415903-007	ES2415903-008	--------	--------
					Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
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		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	----	<20	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	----	<20	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		----	----	<20	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	**21**	<1	----	----
Toluene	108-88-3	2	µg/L		----	**17**	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		----	**18**	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	**18**	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		----	**18**	<2	----	----
^ **Total Xylenes**	----	2	µg/L		----	**36**	<2	----	----
^ **Sum of BTEX**	----	1	µg/L		----	**92**	<1	----	----
Naphthalene	91-20-3	5	µg/L		----	**20**	<5	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	**104**	**102**	----	----
Toluene-D8	2037-26-5	2	%		----	**99.6**	**99.8**	----	----
4-Bromofluorobenzene	460-00-4	2	%		----	**107**	**114**	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

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

QUALITY CONTROL REPORT

Work Order	: **ES2415903**	Page	: 1 of 11
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 16-May-2024
Order number	: ----	Date Analysis Commenced	: 17-May-2024
C-O-C number	: ----	Issue Date	: 23-May-2024
Sampler	: Andrew Duval, Lia Saunders		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

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 (%)
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 5806209)									
ES2415782-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	201	202	0.0	0% - 20%
ES2415903-003	BH112R	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	10100	10000	0.7	0% - 20%
ES2415936-009	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	428	436	2.1	0% - 20%
ES2415948-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	342	340	0.7	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5806210)									
ES2415782-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	26	22	13.6	No Limit
ES2415903-003	BH112R	EA025H: Suspended Solids (SS)	----	5	mg/L	51	52	2.9	0% - 50%
ES2415936-009	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	20	22	7.1	No Limit
ES2415948-002	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	9	8	11.8	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 5798495)									
ES2415807-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	7	5	25.3	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	7	5	25.3	No Limit
ES2415903-004	BH145R	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	891	893	0.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	891	893	0.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5797113)									
ME2400813-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	39	38	3.2	0% - 20%
ES2415903-001	BH104R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	220	218	0.7	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5797114)									

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 (%)
ED045G: Chloride by Discrete Analyser (QC Lot: 5797114) - continued									
ME2400813-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	445	452	1.4	0% - 20%
ES2415903-001	BH104R	ED045G: Chloride	16887-00-6	1	mg/L	2060	2140	3.5	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5799618)									
ES2415946-007	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	46	44	3.6	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	36	34	5.5	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	122	116	5.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
ES2415903-001	BH104R	ED093F: Calcium	7440-70-2	1	mg/L	108	108	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	131	132	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	1620	1620	0.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	17	17	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5799616)									
ES2415975-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	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: Manganese	7439-96-5	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.006	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
ES2415903-001	BH104R	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: Manganese	7439-96-5	0.001	mg/L	0.103	0.103	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	1.43	1.44	0.0	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5802363)									
ES2415819-001	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: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5802363) - continued									
ES2415819-001	Anonymous	EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
ES2415820-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.005	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.006	0.005	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 5799701)									
ES2415832-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	0.0009	0.0010	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.261	0.266	1.6	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.084	0.084	0.0	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.013	0.012	0.0	0% - 50%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.704	0.713	1.3	0% - 20%
EW2402232-002	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.013	0.015	12.4	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5799617)									
ES2415903-002	BH107R	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2415975-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5802366)									
ES2415851-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2416123-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.1 µg/L	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5801624)									
ES2415492-006	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2415834-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5803383)									

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 (%)*
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5803383) - continued									
ES2415621-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.06	130	No Limit
ES2415932-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.06	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5797116)									
ES2415932-006	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.04	0.04	0.0	No Limit
ES2415903-001	BH104R	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.01	0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5803382)									
ES2415621-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2415932-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.89	0.88	1.8	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5803386)									
ES2415585-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.4	0.0	No Limit
ES2415675-006	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.4	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5803387)									
ES2415585-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.03	0.0	No Limit
ES2415675-006	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.06	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5797117)									
ES2415932-006	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2415903-001	BH104R	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5797024)									
ES2415903-001	BH104R	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ME2400813-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5797024)									
ES2415903-001	BH104R	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ME2400813-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5797024)									
ES2415903-001	BH104R	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
ME2400813-004	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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080: BTEXN (QC Lot: 5797024) - continued									
ME2400813-004	Anonymous	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 Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 5806209)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	98.8	87.0	109
				<10	293 mg/L	112	75.2	126
				<10	2410 mg/L	105	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5806210)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	99.0	83.0	129
				<5	1000 mg/L	99.0	82.0	110
				<5	928 mg/L	99.0	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 5798495)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	87.5	81.0	115
				----	50 mg/L	82.4	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5797113)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	102	82.0	122
				<1	500 mg/L	107	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 5797114)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	101	80.9	127
				<1	1000 mg/L	95.0	80.9	127
ED093F: Dissolved Major Cations (QCLot: 5799618)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	109	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	106	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	106	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	105	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 5799616)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	94.0	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.8	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.0	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	92.8	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	91.2	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	90.9	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.3	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.0	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	102	82.0	112

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 5802363)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.5	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.0	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	87.8	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.9	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	92.7	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	89.2	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	89.9	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.0	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	87.2	82.0	112
EG020T: Total Metals by ICP-MS (QCLot: 5799701)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	101	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	104	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	102	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.1	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	102	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	100	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 5799617)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	100	83.0	105
EG035F: Dissolved Mercury by FIMS (QCLot: 5802366)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	97.3	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5801624)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	90.4	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5803383)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	98.6	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5797116)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	98.2	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5803382)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5803386)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	86.2	69.0	123
				<0.1	1 mg/L	94.4	70.0	123
				<0.1	5 mg/L	88.9	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5803387)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5803387) - continued								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	89.2	71.3	126
				<0.01	0.442 mg/L	96.0	71.3	126
				<0.01	1 mg/L	99.8	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5797117)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	106	85.0	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5796706)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	72.7	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	65.6	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	63.3	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5797024)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	101	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5796706)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	57.3	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	65.3	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	68.6	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5797024)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	98.6	75.0	127
EP080: BTEXN (QCLot: 5797024)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	116	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	102	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	108	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	114	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	99.4	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**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5797113)							
ES2415903-001	BH104R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
ED045G: Chloride by Discrete Analyser (QCLot: 5797114)							
ES2415903-001	BH104R	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5799616)							
ES2415903-002	BH107R	EG020A-F: Arsenic	7440-38-2	1 mg/L	95.8	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	92.1	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	82.5	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	87.5	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	78.6	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	88.4	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	91.6	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	93.7	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5802363)							
ES2415819-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	109	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	107	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	104	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	102	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	106	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	103	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	101	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	109	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 5799701)							
ES2415832-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	97.2	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	98.1	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	94.2	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	95.4	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	90.9	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	98.8	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	95.6	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5799617)							
ES2415903-001	BH104R	EG035F: Mercury	7439-97-6	0.01 mg/L	77.5	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5802366)							
ES2415832-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	70.0	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5801624)							
ES2415492-006	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	85.1	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5803383)							
ES2415621-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	113	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5797116)							
ES2415903-001	BH104R	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	101	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5803382)							
ES2415621-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	126	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5803386)							
ES2415621-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	97.8	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5803387)							
ES2415621-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	95.4	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5797117)							
ES2415903-001	BH104R	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	107	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5797024)							
ES2415903-001	BH104R	EP080: C6 - C9 Fraction	----	325 µg/L	97.8	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5797024)							
ES2415903-001	BH104R	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	96.8	70.0	130
EP080: BTEXN (QCLot: 5797024)							
ES2415903-001	BH104R	EP080: Benzene	71-43-2	25 µg/L	111	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	95.0	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	103	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	108	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	106	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	95.2	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2415903**	Page	: 1 of 10
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 16-May-2024
Site	: ----	Issue Date	: 23-May-2024
Sampler	: Andrew Duval, Lia Saunders	No. of samples received	: 8
Order number	: ----	No. of samples analysed	: 8

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, 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
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2415903--001	BH104R	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	ES2415903--001	BH104R	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
TRH - Semivolatile Fraction	EP071	0	8	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
TRH - Semivolatile Fraction	EP071	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 / ***Container*** / *Client Sample ID(s)*	***Sample Date***	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) BH104R, BH107R, BH112R	**15-May-2024**	**----**	----	**----**	**22-May-2024**	22-May-2024	✓
Clear Plastic Bottle - Natural (EA015H) BH145R	**16-May-2024**	**----**	----	**----**	**22-May-2024**	23-May-2024	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H) BH104R, BH107R, BH112R	**15-May-2024**	**----**	----	**----**	**22-May-2024**	22-May-2024	✓
Clear Plastic Bottle - Natural (EA025H) BH145R	**16-May-2024**	**----**	----	**----**	**22-May-2024**	23-May-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
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH104R, BH107R, BH112R	**15-May-2024**	**----**	----	**----**	**20-May-2024**	12-Jun-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH145R	**16-May-2024**	**----**	----	**----**	**20-May-2024**	13-Jun-2024	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) BH104R, BH107R, BH112R	**15-May-2024**	**----**	----	**----**	**19-May-2024**	29-May-2024	✓
Clear Plastic Bottle - Natural (ED037-P) BH145R	**16-May-2024**	**----**	----	**----**	**19-May-2024**	30-May-2024	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) BH104R, BH107R, BH112R	**15-May-2024**	**----**	----	**----**	**17-May-2024**	12-Jun-2024	✓
Clear Plastic Bottle - Natural (ED041G) BH145R	**16-May-2024**	**----**	----	**----**	**17-May-2024**	13-Jun-2024	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) BH104R, BH107R, BH112R	**15-May-2024**	**----**	----	**----**	**17-May-2024**	12-Jun-2024	✓
Clear Plastic Bottle - Natural (ED045G) BH145R	**16-May-2024**	**----**	----	**----**	**17-May-2024**	13-Jun-2024	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH104R, BH107R, BH112R	**15-May-2024**	**----**	----	**----**	**20-May-2024**	12-Jun-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH145R	**16-May-2024**	**----**	----	**----**	**20-May-2024**	13-Jun-2024	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) BH104R, BH107R, BH112R, GWDUP1	**15-May-2024**	**----**	----	**----**	**20-May-2024**	11-Nov-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) BH145R	**16-May-2024**	**----**	----	**----**	**20-May-2024**	12-Nov-2024	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) GWRB1	**16-May-2024**	**18-May-2024**	12-Nov-2024	✓	**20-May-2024**	12-Nov-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
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) BH104R, BH107R, BH112R, GWDUP1	**15-May-2024**	**----**	----	----	**22-May-2024**	12-Jun-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) BH145R	**16-May-2024**	**----**	----	----	**22-May-2024**	13-Jun-2024	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) GWRB1	**16-May-2024**	**----**	----	----	**23-May-2024**	13-Jun-2024	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH104R, BH107R, BH112R	**15-May-2024**	**----**	----	----	**21-May-2024**	12-Jun-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH145R	**16-May-2024**	**----**	----	----	**21-May-2024**	13-Jun-2024	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BH104R, BH107R, BH112R	**15-May-2024**	**----**	----	----	**17-May-2024**	17-May-2024	✓
Clear Plastic Bottle - Natural (EK057G) BH145R	**16-May-2024**	**----**	----	----	**17-May-2024**	18-May-2024	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH104R, BH107R, BH112R	**15-May-2024**	**----**	----	----	**21-May-2024**	12-Jun-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH145R	**16-May-2024**	**----**	----	----	**21-May-2024**	13-Jun-2024	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH104R, BH107R, BH112R	**15-May-2024**	**21-May-2024**	12-Jun-2024	✓	**21-May-2024**	12-Jun-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH145R	**16-May-2024**	**21-May-2024**	13-Jun-2024	✓	**21-May-2024**	13-Jun-2024	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH104R, BH107R, BH112R	**15-May-2024**	**21-May-2024**	12-Jun-2024	✓	**21-May-2024**	12-Jun-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH145R	**16-May-2024**	**21-May-2024**	13-Jun-2024	✓	**21-May-2024**	13-Jun-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
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) BH104R, BH107R, BH112R	**15-May-2024**	**----**	----	**----**	**17-May-2024**	17-May-2024	✓
Clear Plastic Bottle - Natural (EK071G) BH145R	**16-May-2024**	**----**	----	**----**	**17-May-2024**	18-May-2024	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R, BH112R	**15-May-2024**	**17-May-2024**	22-May-2024	✓	**21-May-2024**	26-Jun-2024	✓
Amber Glass Bottle - Unpreserved (EP071) BH145R	**16-May-2024**	**17-May-2024**	23-May-2024	✓	**21-May-2024**	26-Jun-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**06-May-2024**	**17-May-2024**	20-May-2024	✓	**17-May-2024**	20-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R, BH112R	**15-May-2024**	**17-May-2024**	29-May-2024	✓	**17-May-2024**	29-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**16-May-2024**	**17-May-2024**	30-May-2024	✓	**17-May-2024**	30-May-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R, BH112R	**15-May-2024**	**17-May-2024**	22-May-2024	✓	**21-May-2024**	26-Jun-2024	✓
Amber Glass Bottle - Unpreserved (EP071) BH145R	**16-May-2024**	**17-May-2024**	23-May-2024	✓	**21-May-2024**	26-Jun-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**06-May-2024**	**17-May-2024**	20-May-2024	✓	**17-May-2024**	20-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R, BH112R	**15-May-2024**	**17-May-2024**	29-May-2024	✓	**17-May-2024**	29-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**16-May-2024**	**17-May-2024**	30-May-2024	✓	**17-May-2024**	30-May-2024	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) Trip Spike, Trip Blank	**06-May-2024**	**17-May-2024**	20-May-2024	✓	**17-May-2024**	20-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R, BH112R	**15-May-2024**	**17-May-2024**	29-May-2024	✓	**17-May-2024**	29-May-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**16-May-2024**	**17-May-2024**	30-May-2024	✓	**17-May-2024**	30-May-2024	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	19	**10.53**	**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
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**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 Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	18	**11.11**	**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	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	19	**5.26**	**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
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	5	40	**12.50**	**12.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	5	40	**12.50**	**12.50**	✓	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 Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	18	**5.56**	**5.00**	✓	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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
TRH Volatiles/BTEX	EP080	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	19	**5.26**	**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
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**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 Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	18	**5.56**	**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	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	40	**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
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	**5.56**	**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 Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	18	**5.56**	**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	17	**5.88**	**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
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(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 SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. 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-NO3- F. Combined oxidised Nitrogen (NO2+NO3) 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-NO3-. 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)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
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)

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

eurofins mgt

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

☐ **Brisbane**
Unit 1-21 Smallwood Place, Murrarie
Phone: +617 3902 4600
Email: enviro.bris@mgtlabmark.com.a

☐ **Melbourne**
2 Kingston Town Close, Oakleigh, VIC 3166
Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mgtlabmark.com.au

CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Company Name : GHD Pty Ltd, Sydney	**Contact Name :** Andrew Duval 0468 301 344	**Purchase Order :** 12554717	**COC Number :**
Office Address : Level 15, 133 Castlereagh Street, Sydney NSW 2000	**Project Manager:** Henry Luo 0414 090 002	**PROJECT Number :** 12554717	**Eurofins | mgt quote ID :**
	Email for results : emily.smith@ghd.com; andrew.duval@ghd.com; lia.saunders@ghd.com henry.luo@ghd.com; ghdlabreports@ghd.com	**PROJECT Name :** M12 Water Sampling	**Data output format:** ESDAT

Special Directions & Comments :

Sent from ALS

Eurofins | mgt DI water batch number:

	Sample ID	Date	Matrix	Dissolved metals	Total metals					
1	SWDUP2	16/05/2024	Water		X					
2	GWDUP2	15/05/2024	Water	X						
3										
4										
5										
6										
7										
8										
9										
10										

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

Containers:

500P	250P	60P	1LA	40mL vial	200mL A	Jar	Bag	Sample comments:
		1						
		1						

Relinquished By: Lia Saunders
Date & Time : 16/05/2024 14:45
Signature: L.S.

Laboratory Staff
Received By: Arany
Date & Time : 2015 1-50pm
Signature:

Method Of Shipment
☑ Courier via ALS
☐ Hand Delivered
☐ Postal
Courier Consignment # :

Temperature on arrival: 10.7

Report number: 1099024

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd

ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Sample Receipt Advice

Company name:	GHD Pty Ltd NSW
Contact name:	Andrew Duval
Project name:	M12 WATER SAMPLING
Project ID:	12554717
Turnaround time:	5 Day
Date/Time received	May 20, 2024 1:50 PM
Eurofins reference	1099024

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 : 10.7 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.
X	Split sample sent to requested external lab.
X	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:

Bonnie Pu on phone : or by email: BonniePu@eurofins.com

Results will be delivered electronically via email to Andrew Duval - andrew.duval@ghd.com.

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

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Order No.:
Report #: 1099024
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: May 20, 2024 1:50 PM
Due: May 27, 2024
Priority: 5 Day
Contact Name: Andrew Duval

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	May 16, 2024		Water	S24-My0056228	X	
2	GWDUP2	May 16, 2024		Water	S24-My0056229		X
Test Counts						1	1

GHD Pty Ltd NSW
Level 15, 133 Castlereagh Street
Sydney
NSW 2000

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: **Andrew Duval**

Report **1099024-W**
Project name M12 WATER SAMPLING
Project ID 12554717
Received Date May 20, 2024

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S24-My0056228**	**S24-My0056229**
Date Sampled			**May 16, 2024**	**May 16, 2024**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	0.002	-
Arsenic (filtered)	0.001	mg/L	-	< 0.001
Cadmium	0.0002	mg/L	< 0.0002	-
Cadmium (filtered)	0.0002	mg/L	-	< 0.0002
Chromium	0.001	mg/L	0.002	-
Chromium (filtered)	0.001	mg/L	-	< 0.001
Copper	0.001	mg/L	0.007	-
Copper (filtered)	0.001	mg/L	-	0.002
Lead	0.001	mg/L	0.003	-
Lead (filtered)	0.001	mg/L	-	< 0.001
Mercury	0.0001	mg/L	< 0.0001	-
Mercury (filtered)	0.0001	mg/L	-	< 0.0001
Nickel	0.001	mg/L	0.003	-
Nickel (filtered)	0.001	mg/L	-	0.001
Zinc	0.005	mg/L	0.018	-
Zinc (filtered)	0.005	mg/L	-	0.010

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
Metals M8	Sydney	May 23, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	May 23, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Order No.:
Report #: 1099024
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: May 20, 2024 1:50 PM
Due: May 27, 2024
Priority: 5 Day
Contact Name: Andrew Duval

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	May 16, 2024		Water	S24-My0056228	X	
2	GWDUP2	May 16, 2024		Water	S24-My0056229		X
Test Counts						1	1

Internal Quality Control Review and Glossary

General

1. 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.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. 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 sampling date; 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 seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**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	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should 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 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	85			80-120	Pass	
Cadmium	%	89			80-120	Pass	
Chromium	%	92			80-120	Pass	
Copper	%	93			80-120	Pass	
Lead	%	94			80-120	Pass	
Mercury	%	96			80-120	Pass	
Nickel	%	93			80-120	Pass	
Zinc	%	93			80-120	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	89			80-120	Pass	
Cadmium (filtered)	%	92			80-120	Pass	
Chromium (filtered)	%	92			80-120	Pass	
Copper (filtered)	%	91			80-120	Pass	
Lead (filtered)	%	94			80-120	Pass	
Mercury (filtered)	%	99			80-120	Pass	
Nickel (filtered)	%	91			80-120	Pass	
Zinc (filtered)	%	93			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S24-My0056088	NCP	%	91			75-125	Pass	
Cadmium	S24-My0056088	NCP	%	95			75-125	Pass	
Chromium	S24-My0056088	NCP	%	92			75-125	Pass	
Copper	S24-My0056088	NCP	%	84			75-125	Pass	
Lead	S24-My0056088	NCP	%	95			75-125	Pass	
Mercury	S24-My0056088	NCP	%	97			75-125	Pass	
Nickel	S24-My0056088	NCP	%	91			75-125	Pass	
Zinc	S24-My0056088	NCP	%	83			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S24-My0052832	NCP	%	87			75-125	Pass	
Cadmium (filtered)	S24-My0052832	NCP	%	95			75-125	Pass	
Chromium (filtered)	S24-My0052832	NCP	%	110			75-125	Pass	
Copper (filtered)	S24-My0052832	NCP	%	88			75-125	Pass	
Lead (filtered)	S24-My0052832	NCP	%	88			75-125	Pass	
Mercury (filtered)	S24-My0052832	NCP	%	95			75-125	Pass	
Nickel (filtered)	S24-My0052832	NCP	%	87			75-125	Pass	
Zinc (filtered)	S24-My0052832	NCP	%	99			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S24-My0056086	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	S24-My0056086	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S24-My0056086	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S24-My0056086	NCP	mg/L	1.0	1.0	2.3	30%	Pass	
Lead	S24-My0056086	NCP	mg/L	0.004	0.004	<1	30%	Pass	
Mercury	S24-My0056086	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S24-My0056086	NCP	mg/L	0.006	0.005	12	30%	Pass	
Zinc	S24-My0056086	NCP	mg/L	0.33	0.32	1.7	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S24-My0052816	NCP	mg/L	0.001	0.001	1.8	30%	Pass	
Cadmium (filtered)	S24-My0052816	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S24-My0052816	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S24-My0052816	NCP	mg/L	0.005	0.005	4.3	30%	Pass	
Lead (filtered)	S24-My0052816	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S24-My0066081	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S24-My0052816	NCP	mg/L	0.008	0.008	2.1	30%	Pass	
Zinc (filtered)	S24-My0052816	NCP	mg/L	0.014	0.012	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

Authorised by:

Bonnie Pu	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal

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.

HT

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: newcastle@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREMENTS (Standard TAT may be longer for some tests e.g., Ultra Trace) ☐ Standard TAT (List due date): STANDARD TAT ☐ Non Standard or urgent TAT (List due date):		FOR LABORATORY USE ONLY (Circle)
OFFICE: Sydney			Custody Seal Intact? Yes No N/A
PROJECT: M12 Groundwater	ALS QUOTE NO.: SY/322/21 V5	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: 12554717		COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Henry Luo	CONTACT PH: Henry Luo 0414 090 002	OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER: Andrew Duval, Lia Saunders	SAMPLER MOBILE: 0468 301 344	RELINQUISHED BY: Lia Saunders	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT	DATE/TIME: 15:45	DATE/TIME: 6/6/24 1600	DATE/TIME:	DATE/TIME:
Email Reports to: emily.smith@ghd.com; andrew.duval@ghd.com; lia.saunders@ghd.com, henry.luo@ghd.com, ghdlabreports@ghd.com					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: PLEASE DO NOT LOG ALL SAMPLES RECEIVED IN ONE WORKORDER. LOG AS TWO SEPARATE WORKORDERS AS PER THE TWO COCs PROVIDED.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).											
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	Comments	TOTAL CONTAINERS	W-02 (dissolved 8 metals)	EG020F (dissolved Fe, Mn)	W-04 (TRH/BTEXN)	NT-08A (TN, NO2, NO3, NH3, TP, soluble Reactive P)	NT-01D & 02 (major cations & anions, Hardness)	EA015H (TDS)	EA025H (TSS)	EP075A (SIM) (Phenols – Standard level (15 analytes))	W-02T (8 total metals)	BTEXN		
1	BH145R	6/06/2024	Water		6	X	X	X	X	X	X	X					
2	GWDUP1	6/06/2024	Water		1	X											
3	Trip spike	5/06/2024	Water		1										X		
4	Trip blank	5/06/2024	Water		1										X		

Environmental Division
Sydney
Work Order Reference
ES2418682

Telephone : +61-2-8784 8555

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **ES2418682**		
Amendment	: **1**		
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: henry.luo@ghd.com	E-mail	: samiksha.sathish@alsglobal.com
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9239 7199	Facsimile	: +61-2-8784 8500
Project	: 12554717	Page	: 1 of 3
Order number	: 12554717	Quote number	: ES2021GHDSER0026 (SY/322/21_V5)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: ANDREW DUVAL, Lia Saunders		

Dates

Date Samples Received	: 06-Jun-2024 16:00	Issue Date	: 18-Jun-2024
Client Requested Due Date	: 14-Jun-2024	Scheduled Reporting Date	: **19-Jun-2024**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 4	Temperature	: 4.3'C 43'C 3.8'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 4 / 4

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.**
- 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.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EA025H Suspended Solids - Standard Level	WATER - EP080 BTEXN	WATER - NT-01D & 02 Major Cations & Anions (Ca, Mg, Na, K, Cl, SO4,	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-02 8 Metals	WATER - W-04 TRH/BTEXN
ES2418682-001	06-Jun-2024 00:00	BH145R	✓	✓		✓	✓	✓	✓
ES2418682-002	06-Jun-2024 00:00	GWDUP1						✓	
ES2418682-003	05-Jun-2024 00:00	Trip spike			✓				

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - W-18 TRH(C6 - C9)/BTEXN
ES2418682-004	05-Jun-2024 00:00	Trip blank	✓

Proactive Holding Time Report

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

Requested Deliverables

Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
ANDREW DUVAL		
- *AU Certificate of Analysis - NATA (COA)	Email	andrew.duval@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	andrew.duval@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	andrew.duval@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	andrew.duval@ghd.com
- Chain of Custody (CoC) (COC)	Email	andrew.duval@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	andrew.duval@ghd.com
- EDI Format - XTab (XTAB)	Email	andrew.duval@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	andrew.duval@ghd.com
EMILY SMITH		
- *AU Certificate of Analysis - NATA (COA)	Email	emily.smith@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	emily.smith@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	emily.smith@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	emily.smith@ghd.com
- Chain of Custody (CoC) (COC)	Email	emily.smith@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	emily.smith@ghd.com
- EDI Format - XTab (XTAB)	Email	emily.smith@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	emily.smith@ghd.com
GHD LAB REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	ghdlabreports@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ghdlabreports@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ghdlabreports@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ghdlabreports@ghd.com
- Chain of Custody (CoC) (COC)	Email	ghdlabreports@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	ghdlabreports@ghd.com
- EDI Format - XTab (XTAB)	Email	ghdlabreports@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	ghdlabreports@ghd.com
HENRY LUO		
- *AU Certificate of Analysis - NATA (COA)	Email	henry.luo@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	henry.luo@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	henry.luo@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	henry.luo@ghd.com
- Chain of Custody (CoC) (COC)	Email	henry.luo@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	henry.luo@ghd.com
- EDI Format - XTab (XTAB)	Email	henry.luo@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	henry.luo@ghd.com
Lia Saunders		
- *AU Certificate of Analysis - NATA (COA)	Email	Lia.Saunders@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lia.Saunders@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lia.Saunders@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lia.Saunders@ghd.com
- Chain of Custody (CoC) (COC)	Email	Lia.Saunders@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	Lia.Saunders@ghd.com
- EDI Format - XTab (XTAB)	Email	Lia.Saunders@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	Lia.Saunders@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2418682**	Page	: 1 of 6
Amendment	: **1**		
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 06-Jun-2024 16:00
Order number	: 12554717	Date Analysis Commenced	: 07-Jun-2024
C-O-C number	: ----	Issue Date	: 19-Jun-2024 11:33
Sampler	: ANDREW DUVAL, Lia Saunders		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.
- Amendment (18/06/2024): This report has been amended following the addition of W-18 TRH (C6-C9)/BTEX on sample 004, Trip Blank.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH145R	GWDUP1	Trip spike	Trip blank	----
				Sampling date / time	06-Jun-2024 00:00	06-Jun-2024 00:00	05-Jun-2024 00:00	05-Jun-2024 00:00	----
Compound	CAS Number	LOR	Unit		ES2418682-001	ES2418682-002	ES2418682-003	ES2418682-004	--------
					Result	Result	Result	Result	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**10800**	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**38**	----	----	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**2750**	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**1010**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**1010**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**341**	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**5560**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**202**	----	----	----	----
Magnesium	7439-95-4	1	mg/L		**546**	----	----	----	----
Sodium	7440-23-5	1	mg/L		**3050**	----	----	----	----
Potassium	7440-09-7	1	mg/L		**17**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.002**	**0.002**	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	**0.008**	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH145R	GWDUP1	Trip spike	Trip blank	----
			Sampling date / time	06-Jun-2024 00:00	06-Jun-2024 00:00	05-Jun-2024 00:00	05-Jun-2024 00:00	----
Compound	CAS Number	LOR	Unit	ES2418682-001	ES2418682-002	ES2418682-003	ES2418682-004	--------
				Result	Result	Result	Result	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**2.10**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.02**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.02**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**2.0**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**2.0**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.03**	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	----	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**184**	----	----	----	----
ø Total Cations	----	0.01	meq/L	**188**	----	----	----	----
ø Ionic Balance	----	0.01	%	**1.07**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	<20	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH145R	GWDUP1	Trip spike	Trip blank	----
				Sampling date / time	06-Jun-2024 00:00	06-Jun-2024 00:00	05-Jun-2024 00:00	05-Jun-2024 00:00	----
Compound	CAS Number	LOR	Unit		ES2418682-001	ES2418682-002	ES2418682-003	ES2418682-004	--------
					Result	Result	Result	Result	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	----	----	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	18	<1	----
Toluene	108-88-3	2	µg/L		<2	----	18	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	19	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	18	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	19	<2	----
^ Total Xylenes	----	2	µg/L		<2	----	37	<2	----
^ Sum of BTEX	----	1	µg/L		<1	----	92	<1	----
Naphthalene	91-20-3	5	µg/L		<5	----	21	<5	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		98.6	----	101	90.1	----
Toluene-D8	2037-26-5	2	%		93.4	----	101	87.9	----
4-Bromofluorobenzene	460-00-4	2	%		99.5	----	104	92.6	----

Surrogate Control Limits

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

QUALITY CONTROL REPORT

Work Order	: **ES2418682**	Page	: 1 of 10
Amendment	: **1**		
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 06-Jun-2024
Order number	: 12554717	Date Analysis Commenced	: 07-Jun-2024
C-O-C number	: ----	Issue Date	: 19-Jun-2024
Sampler	: ANDREW DUVAL, Lia Saunders		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

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 (%)*
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 5854561)									
ES2418678-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	238	240	0.6	0% - 20%
ES2418937-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	65	59	9.3	No Limit
ES2418937-016	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	6090	6130	0.7	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5854562)									
ES2418678-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	14	18	25.4	No Limit
ES2418937-002	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2418937-016	Anonymous	EA025H: Suspended Solids (SS)	----	5 (10)*	mg/L	<10	<10	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 5852540)									
ES2418463-011	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	560	566	1.1	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	560	566	1.1	0% - 20%
ES2418463-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	220	221	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	220	221	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5845103)									
ES2418522-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	45	47	5.7	0% - 20%
ES2418741-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1300	1520	15.4	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5845107)									

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 (%)*
ED045G: Chloride by Discrete Analyser (QC Lot: 5845107) - continued									
ES2418667-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	35	35	0.0	0% - 20%
ES2418741-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	227	217	4.6	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5845255)									
ES2418667-008	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	84	80	5.5	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	14	13	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	28	26	8.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1	1	0.0	No Limit
ES2418687-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	56	55	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	26	26	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	127	126	0.8	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	6	6	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5845256)									
ES2418667-008	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
ES2418687-001	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	0.002	0.002	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.016	0.016	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5850152)									
ES2418463-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0001	0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.010	0.011	0.0	0% - 50%
		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	0.003	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.077	0.073	4.7	0% - 50%
ES2418563-001	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	0.064	0.065	0.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	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 (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5850152) - continued									
ES2418563-001	Anonymous	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	0.006	0.006	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5845257)									
ES2418685-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2418667-009	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5850151)									
ES2418463-003	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2418890-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5853835)									
ES2418678-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.04	0.0	No Limit
WN2407121-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.63	0.69	8.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5845104)									
ES2418522-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.12	0.12	0.0	0% - 50%
ES2418667-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5853834)									
ES2418678-003	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	2.04	2.06	1.3	0% - 20%
WN2407121-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	3.45	3.54	2.5	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5853840)									
ES2418669-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1 (5.0)*	mg/L	33.6	32.0	4.8	No Limit
ES2418682-001	BH145R	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.0	2.0	0.0	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5853839)									
ES2418669-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.23	0.22	0.0	0% - 20%
ES2418682-001	BH145R	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.02	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5845108)									
ES2418875-003	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.99	0.96	3.6	0% - 20%
ES2418667-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.03	0.03	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5843242)									
ES2418593-009	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2418648-008	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5866015)									
ES2419937-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5843242)									
ES2418593-009	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2418648-008	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5866015)									
ES2419937-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5843242)									
ES2418593-009	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
ES2418648-008	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	12	12	0.0	No Limit
EP080: BTEXN (QC Lot: 5866015)									
ES2419937-002	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 Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 5854561)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	98.0	87.0	109
				<10	293 mg/L	99.6	75.2	126
				<10	2410 mg/L	103	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5854562)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	96.3	83.0	129
				<5	1000 mg/L	98.4	82.0	110
				<5	928 mg/L	92.8	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 5852540)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	98.9	81.0	115
				----	50 mg/L	101	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5845103)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	82.0	122
				<1	500 mg/L	100.0	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 5845107)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	97.8	80.9	127
				<1	1000 mg/L	99.8	80.9	127
ED093F: Dissolved Major Cations (QCLot: 5845255)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	101	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	100	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	98.6	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 5845256)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.4	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.7	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.9	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.8	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.0	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.6	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.5	81.0	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 5850152)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.6	85.0	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 5850152) - continued								
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	102	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.4	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.0	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.9	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	93.4	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.2	81.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 5845257)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	90.2	83.0	105
EG035F: Dissolved Mercury by FIMS (QCLot: 5850151)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	94.4	83.0	105
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5853835)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	112	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5845104)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	99.8	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5853834)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	105	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5853840)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	83.1	69.0	123
				<0.1	1 mg/L	102	70.0	123
				<0.1	5 mg/L	93.4	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5853839)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	96.0	71.3	126
				<0.01	0.442 mg/L	100	71.3	126
				<0.01	1 mg/L	109	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5845108)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	102	85.0	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5843242)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	86.7	75.0	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5843475)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	70.8	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	88.2	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	65.7	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5866015)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	82.6	75.0	127

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5843242)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	90.3	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5843475)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	54.9	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	75.7	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	66.5	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5866015)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	86.0	75.0	127
EP080: BTEXN (QCLot: 5843242)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	94.7	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	104	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	109	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	108	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	110	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	114	75.5	124
EP080: BTEXN (QCLot: 5866015)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	90.2	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	95.2	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	100.0	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	98.1	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	102	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	104	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**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5845103)							
ES2418522-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5845107)							
ES2418667-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	97.7	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG020F: Dissolved Metals by ICP-MS (QCLot: 5845256)							
ES2418667-009	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	94.9	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	90.8	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	93.2	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	89.9	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	92.2	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	86.4	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	93.2	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5850152)							
ES2418463-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	106	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	85.1	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	93.1	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	81.9	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	94.1	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	98.6	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	88.1	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5845257)							
ES2418667-008	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	89.5	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5850151)							
ES2418461-010	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	94.2	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5853835)							
ES2418678-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.5 mg/L	109	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5845104)							
ES2418522-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	112	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5853834)							
ES2418678-003	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5853840)							
ES2418669-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	100 mg/L	90.4	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5853839)							
ES2418669-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	107	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5845108)							
ES2418667-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	102	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5843242)							
ES2418593-009	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	83.4	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5866015)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5866015) - continued							
ES2419937-002	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	79.5	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5843242)							
ES2418593-009	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	80.0	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5866015)							
ES2419937-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	81.1	70.0	130
EP080: BTEXN (QCLot: 5843242)							
ES2418593-009	Anonymous	EP080: Benzene	71-43-2	25 µg/L	86.0	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	83.1	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	84.5	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	91.4	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	88.9	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	74.1	70.0	130
EP080: BTEXN (QCLot: 5866015)							
ES2419937-002	Anonymous	EP080: Benzene	71-43-2	25 µg/L	78.4	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	90.5	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	99.6	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	97.2	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	103	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	98.1	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2418682**	Page	: 1 of 8
Amendment	: **1**		
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 06-Jun-2024
Site	: ----	Issue Date	: 19-Jun-2024
Sampler	: ANDREW DUVAL, Lia Saunders	No. of samples received	: 4
Order number	: 12554717	No. of samples analysed	: 4

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.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, 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
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2418522--001	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	ES2418678--003	Anonymous	**Nitrite + Nitrate as N**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
TRH - Semivolatile Fraction	EP071	0	3	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
TRH - Semivolatile Fraction	EP071	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*
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) BH145R	**06-Jun-2024**	**----**	----	**----**	**13-Jun-2024**	13-Jun-2024	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H) BH145R	**06-Jun-2024**	**----**	----	**----**	**13-Jun-2024**	13-Jun-2024	✓
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH145R	**06-Jun-2024**	**----**	----	**----**	**11-Jun-2024**	04-Jul-2024	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) BH145R	**06-Jun-2024**	**----**	----	**----**	**12-Jun-2024**	20-Jun-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
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
BH145R	**06-Jun-2024**	**----**	----	**----**	**08-Jun-2024**	04-Jul-2024	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
BH145R	**06-Jun-2024**	**----**	----	**----**	**08-Jun-2024**	04-Jul-2024	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH145R	**06-Jun-2024**	**----**	----	**----**	**11-Jun-2024**	04-Jul-2024	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH145R	**06-Jun-2024**	**----**	----	**----**	**11-Jun-2024**	03-Dec-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
GWDUP1	**06-Jun-2024**	**----**	----	**----**	**12-Jun-2024**	03-Dec-2024	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH145R	**06-Jun-2024**	**----**	----	**----**	**12-Jun-2024**	04-Jul-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
GWDUP1	**06-Jun-2024**	**----**	----	**----**	**13-Jun-2024**	04-Jul-2024	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH145R	**06-Jun-2024**	**----**	----	**----**	**13-Jun-2024**	04-Jul-2024	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
BH145R	**06-Jun-2024**	**----**	----	**----**	**08-Jun-2024**	08-Jun-2024	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH145R	**06-Jun-2024**	**----**	----	**----**	**13-Jun-2024**	04-Jul-2024	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
BH145R	**06-Jun-2024**	**13-Jun-2024**	04-Jul-2024	✓	**14-Jun-2024**	04-Jul-2024	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
BH145R	**06-Jun-2024**	**13-Jun-2024**	04-Jul-2024	✓	**14-Jun-2024**	04-Jul-2024	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
BH145R	**06-Jun-2024**	**----**	----	**----**	**08-Jun-2024**	08-Jun-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
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
BH145R	**06-Jun-2024**	**07-Jun-2024**	13-Jun-2024	✓	**12-Jun-2024**	17-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip blank	**05-Jun-2024**	**18-Jun-2024**	19-Jun-2024	✓	**19-Jun-2024**	19-Jun-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH145R	**06-Jun-2024**	**07-Jun-2024**	20-Jun-2024	✓	**07-Jun-2024**	20-Jun-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
BH145R	**06-Jun-2024**	**07-Jun-2024**	13-Jun-2024	✓	**12-Jun-2024**	17-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip blank	**05-Jun-2024**	**18-Jun-2024**	19-Jun-2024	✓	**19-Jun-2024**	19-Jun-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH145R	**06-Jun-2024**	**07-Jun-2024**	20-Jun-2024	✓	**07-Jun-2024**	20-Jun-2024	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip spike	**05-Jun-2024**	**07-Jun-2024**	19-Jun-2024	✓	**07-Jun-2024**	19-Jun-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip blank	**05-Jun-2024**	**18-Jun-2024**	19-Jun-2024	✓	**19-Jun-2024**	19-Jun-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH145R	**06-Jun-2024**	**07-Jun-2024**	20-Jun-2024	✓	**07-Jun-2024**	20-Jun-2024	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	3	30	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	30	**10.00**	**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	3	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	24	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	5	30	**16.67**	**12.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	5	30	**16.67**	**12.50**	✓	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	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Dissolved Mercury by FIMS	EG035F	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	30	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	30	**6.67**	**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	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**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	3	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	24	**8.33**	**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
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
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 (SnCl2)(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 SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. 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-NO3- F. Combined oxidised Nitrogen (NO2+NO3) 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-NO3-. 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)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
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)
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.

HT

Environmental Division
Sydney
Work Order Reference
ES2419514

Telephone : + 61-2-8784 8555

CHAIN OF CUSTODY

ALS Laboratory: please tick →

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 08 8359 0890 E: mackay@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee mail@alsglobal.com
NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREME** ☐ Standard TAT **(List due date):** STANDARD TAT	**FOR LABORATORY USE ON**	
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g.. Ultra Trace ☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact?	Yes / No / N/A
PROJECT: M12 Groundwater	**ALS QUOTE NO.:** SY/322/21 V5	Free ice / frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER: 12554717	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt:	°C
PROJECT MANAGER: Henry Luo	**CONTACT PH: Henry Luo** 0414 090 002 OF: 1 2 3 4 5 6 7	Other comment:	

SAMPLER: Andrew Duval, Nica Hugo	**SAMPLER MOBILE:** 0468 301 344	**RELINQUISHED BY:** Andrew Duval	**RECEIVED BY:**
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT	DATE/TIME: 12/06/2024 17:15	DATE/TIME:
Email Reports to: emily.smith@ghd.com; andrew.duval@ghd.com; lia.saunders@ghd.com, henry.luo@ghd.com, ghdlabreports@ghd.com		**RELINQUISHED BY:** DATE/TIME:	**RECEIVED BY:** DATE/TIME: 12/6/24 1748

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: PLEASE DO NOT LOG ALL SAMPLES RECEIVED IN ONE WORKORDER. LOG AS TWO SEPARATE WORKORDERS AS PER THE TWO COCs PROVIDED.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).											
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	Comments	TOTAL CONTAINERS	W-02 (dissolved 8 metals)	EG020F (dissolved Fe, Mn)	W-04 (TRH/BTEXN)	NT-08A (TN, NO2, NO3, NH3, TP, soluble Reactive P)	NT-01D & 02 (major cations & anions, Hardness)	EA015H (TDS)	EA025H (TSS)	EP075A (SIM) (Phenols – Standard level (15 analytes))	W-02T (8 total metals)	BTEXN		
1	BH104R	12/06/2024	Water		6	X	X	X	X	X	X	X					
2	BH107R	12/06/2024	Water		6	X	X	X	X	X	X	X					
3	BH112R	12/06/2024	Water		6	X	X	X	X	X	X	X					
—	GWDUP2	12/06/2024	Water	PLEASE FORWARD TO EUROFINS WITH ATTACHED COC	1												
4	GWRB1	12/06/2024	Water		1									X			

Analysis: Eurofins GWDUP2
Organised By / Date:
Relinquished By / Date:
Mode / Courier:
ES2419514

ES2419514

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2419514**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: henry.luo@ghd.com	E-mail	: samiksha.sathish@alsglobal.com
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9239 7199	Facsimile	: +61-2-8784 8500
Project	: 12554717	Page	: 1 of 3
Order number	: 12554717	Quote number	: ES2021GHDSER0026 (SY/322/21_V5)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: ANDREW DUVAL, NICA HUGO		

Dates

Date Samples Received	: 12-Jun-2024 17:48	Issue Date	: 14-Jun-2024
Client Requested Due Date	: 20-Jun-2024	Scheduled Reporting Date	: **20-Jun-2024**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 3	Temperature	: 3.9'C, 2.7'C, 4.3'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 4 / 4

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
- This is an updated SRN which indicates the sample GWDUP2 forwarded to Eurofins for analysis.
- **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.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EA025H Suspended Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - NT-01D & 02 Major Cations & Anions (Ca, Mg, Na, K, Cl, SO4,	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-02 8 Metals	WATER - W-04 TRH/BTEXN
ES2419514-001	12-Jun-2024 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2419514-002	12-Jun-2024 00:00	BH107R	✓	✓	✓	✓	✓	✓	✓
ES2419514-003	12-Jun-2024 00:00	BH112R	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - W-02T 8 metals (Total)
ES2419514-004	12-Jun-2024 00:00	GWRB1	✓

Proactive Holding Time Report

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

Requested Deliverables

Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
ANDREW DUVAL		
- *AU Certificate of Analysis - NATA (COA)	Email	andrew.duval@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	andrew.duval@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	andrew.duval@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	andrew.duval@ghd.com
- Chain of Custody (CoC) (COC)	Email	andrew.duval@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	andrew.duval@ghd.com
- EDI Format - XTab (XTAB)	Email	andrew.duval@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	andrew.duval@ghd.com
EMILY SMITH		
- *AU Certificate of Analysis - NATA (COA)	Email	emily.smith@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	emily.smith@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	emily.smith@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	emily.smith@ghd.com
- Chain of Custody (CoC) (COC)	Email	emily.smith@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	emily.smith@ghd.com
- EDI Format - XTab (XTAB)	Email	emily.smith@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	emily.smith@ghd.com
GHD LAB REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	ghdlabreports@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ghdlabreports@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ghdlabreports@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ghdlabreports@ghd.com
- Chain of Custody (CoC) (COC)	Email	ghdlabreports@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	ghdlabreports@ghd.com
- EDI Format - XTab (XTAB)	Email	ghdlabreports@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	ghdlabreports@ghd.com
HENRY LUO		
- *AU Certificate of Analysis - NATA (COA)	Email	henry.luo@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	henry.luo@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	henry.luo@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	henry.luo@ghd.com
- Chain of Custody (CoC) (COC)	Email	henry.luo@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	henry.luo@ghd.com
- EDI Format - XTab (XTAB)	Email	henry.luo@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	henry.luo@ghd.com
Lia Saunders		
- *AU Certificate of Analysis - NATA (COA)	Email	Lia.Saunders@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lia.Saunders@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lia.Saunders@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lia.Saunders@ghd.com
- Chain of Custody (CoC) (COC)	Email	Lia.Saunders@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	Lia.Saunders@ghd.com
- EDI Format - XTab (XTAB)	Email	Lia.Saunders@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	Lia.Saunders@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2419514**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 12-Jun-2024 17:48
Order number	: 12554717	Date Analysis Commenced	: 14-Jun-2024
C-O-C number	: ----	Issue Date	: 20-Jun-2024 16:58
Sampler	: ANDREW DUVAL, NICA HUGO		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EG035: Poor matrix spike recovery was obtained for Mercury on sample ES2419130 # 1. Confirmed by re-analysis.
- It has been noted that Ammonia is greater than TKN, however this difference is within the limits of experimental variation.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	GWRB1	----
				Sampling date / time	12-Jun-2024 00:00	12-Jun-2024 00:00	12-Jun-2024 00:00	12-Jun-2024 00:00	----
Compound	CAS Number	LOR	Unit		ES2419514-001	ES2419514-002	ES2419514-003	ES2419514-004	--------
					Result	Result	Result	Result	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**4840**	**2260**	**10000**	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**64**	**27**	**115**	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**798**	**526**	**2110**	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**1010**	**1370**	**1150**	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**1010**	**1370**	**1150**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**216**	**207**	**1600**	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**2300**	**315**	**4130**	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**102**	**39**	**193**	----	----
Magnesium	7439-95-4	1	mg/L		**132**	**104**	**395**	----	----
Sodium	7440-23-5	1	mg/L		**1610**	**708**	**2880**	----	----
Potassium	7440-09-7	1	mg/L		**17**	**14**	**40**	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.003**	<0.001	**0.002**	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		**0.003**	**0.002**	**0.006**	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	**0.001**	**0.005**	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	**0.008**	**0.034**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	GWRB1	----
				Sampling date / time	12-Jun-2024 00:00	12-Jun-2024 00:00	12-Jun-2024 00:00	12-Jun-2024 00:00	----
Compound	CAS Number	LOR	Unit		ES2419514-001	ES2419514-002	ES2419514-003	ES2419514-004	--------
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		**0.099**	**0.003**	**0.087**	----	----
Iron	7439-89-6	0.05	mg/L		**1.38**	<0.05	<0.05	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		----	----	----	<0.001	----
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		----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L		----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L		----	----	----	<0.005	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	----	<0.0001	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**1.72**	**0.02**	**2.57**	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	**0.05**	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	**2.24**	**0.40**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	**2.24**	**0.45**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.7**	**0.4**	**2.7**	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**1.7**	**2.6**	**3.2**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.07**	<0.01	**0.14**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	GWRB1	----
				Sampling date / time	12-Jun-2024 00:00	12-Jun-2024 00:00	12-Jun-2024 00:00	12-Jun-2024 00:00	----
Compound	CAS Number	LOR	Unit		ES2419514-001	ES2419514-002	ES2419514-003	ES2419514-004	--------
					Result	Result	Result	Result	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	**0.05**	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**89.6**	**40.6**	**173**	----	----
ø Total Cations	----	0.01	meq/L		**86.4**	**41.6**	**168**	----	----
ø Ionic Balance	----	0.01	%		**1.78**	**1.33**	**1.28**	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	----	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	----	----
^ Total Xylenes	----	2	µg/L		<2	<2	<2	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	GWRB1	----
				Sampling date / time	12-Jun-2024 00:00	12-Jun-2024 00:00	12-Jun-2024 00:00	12-Jun-2024 00:00	----
Compound	CAS Number	LOR	Unit		ES2419514-001	ES2419514-002	ES2419514-003	ES2419514-004	--------
					Result	Result	Result	Result	----
EP080: BTEXN - Continued									
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**94.4**	**94.3**	**95.3**	----	----
Toluene-D8	2037-26-5	2	%		**99.3**	**99.0**	**101**	----	----
4-Bromofluorobenzene	460-00-4	2	%		**100**	**100.0**	**101**	----	----

Surrogate Control Limits

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

QUALITY CONTROL REPORT

Work Order	: **ES2419514**	Page	: 1 of 9
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 12-Jun-2024
Order number	: 12554717	Date Analysis Commenced	: 14-Jun-2024
C-O-C number	: ----	Issue Date	: 20-Jun-2024
Sampler	: ANDREW DUVAL, NICA HUGO		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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 (%)
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 5865069)									
ES2419310-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1010	1000	0.2	0% - 20%
ES2419479-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2190	2040	6.7	0% - 20%
ES2419486-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2310	2390	3.3	0% - 20%
ES2419521-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	548	546	0.4	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5865070)									
ES2419310-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	67	64	4.6	0% - 50%
ES2419479-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	3750	3840	2.4	0% - 20%
ES2419486-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	128	137	7.0	0% - 20%
ES2419521-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	47	35	29.3	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 5868542)									
ES2419206-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.0	No Limit
ES2419566-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	834	850	1.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	834	850	1.9	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5859246)									
ES2419514-001	BH104R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	216	216	0.0	0% - 20%
ES2419511-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2	2	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 5859247)									

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 (%)*
ED045G: Chloride by Discrete Analyser (QC Lot: 5859247) - continued									
ES2419511-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	11	11	0.0	0% - 50%
ED093F: Dissolved Major Cations (QC Lot: 5860761)									
ES2419363-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	33	34	3.2	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	11	11	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	5	9	62.2	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	2	3	0.0	No Limit
ES2419485-008	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	6	6	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	4	4	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	17	17	0.0	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	4	4	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5860759)									
ES2419363-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.146	0.146	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.018	0.018	0.0	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.024	0.025	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
ES2419485-008	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: Manganese	7439-96-5	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.24	0.24	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 5861084)									
ES2419485-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit

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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 5861084) - continued									
ES2419485-011	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5860758)									
ES2419474-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ME2400977-004	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5860733)									
ES2419153-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2419478-006	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5863754)									
ES2419033-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.03	0.0	No Limit
ES2419514-001	BH104R	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.72	1.71	0.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5859248)									
ES2419579-004	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2419511-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5863755)									
ES2419033-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.01	0.0	No Limit
ES2419514-001	BH104R	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5863759)									
ES2419033-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.2	0.0	No Limit
ES2419514-002	BH107R	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.4	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5863758)									
ES2419033-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.08	0.0	No Limit
ES2419514-002	BH107R	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.02	66.7	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5859249)									
ES2419511-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.72	0.73	0.0	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5862485)									
ES2419482-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
WN2407345-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5862485)									
ES2419482-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
WN2407345-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080: BTEXN (QC Lot: 5862485)									
ES2419482-001	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
WN2407345-004	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 Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 5865069)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	97.7	87.0	109
				<10	293 mg/L	115	75.2	126
				<10	2410 mg/L	101	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5865070)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	103	83.0	129
				<5	1000 mg/L	99.4	82.0	110
				<5	928 mg/L	93.2	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 5868542)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	106	81.0	115
				----	50 mg/L	113	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5859246)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	104	82.0	122
				<1	500 mg/L	104	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 5859247)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	109	80.9	127
				<1	1000 mg/L	104	80.9	127
ED093F: Dissolved Major Cations (QCLot: 5860761)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	108	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	104	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.7	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 5860759)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.9	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.8	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.9	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.7	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	91.2	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	88.2	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.7	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	91.7	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	87.5	82.0	112

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020T: Total Metals by ICP-MS (QCLot: 5861084)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.6	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	101	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.6	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	101	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.5	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	105	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 5860758)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	95.2	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5860733)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	97.1	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5863754)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	102	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5859248)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	104	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5863755)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5863759)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	93.2	69.0	123
				<0.1	1 mg/L	99.8	70.0	123
				<0.1	5 mg/L	97.5	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5863758)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	99.4	71.3	126
				<0.01	0.442 mg/L	102	71.3	126
				<0.01	1 mg/L	105	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5859249)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	99.4	85.0	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5861183)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	63.2	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	70.0	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	60.4	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5862485)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	99.7	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5861183)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5861183) - continued								
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	67.9	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	66.6	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5862485)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	87.2	75.0	127
EP080: BTEXN (QCLot: 5862485)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	86.7	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	95.2	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	94.4	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	95.2	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	92.4	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	102	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**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5859246)							
ES2419511-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	117	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5859247)							
ES2419511-002	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	103	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5860759)							
ES2419363-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	109	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	111	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	108	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	111	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	106	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	92.7	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	110	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	113	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 5861084)							
ES2419485-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	107	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 5861084) - continued							
ES2419485-002	Anonymous	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	106	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	110	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	107	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	111	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	103	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	108	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5860758)							
ES2419130-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	# 25.4	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5860733)							
ES2419153-002	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	86.0	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5863754)							
ES2419033-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.5 mg/L	91.3	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5859248)							
ES2419511-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	114	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5863755)							
ES2419033-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	95.9	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5863759)							
ES2419033-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	92.7	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5863758)							
ES2419033-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	105	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5859249)							
ES2419511-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	80.1	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5862485)							
ES2419482-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	90.0	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5862485)							
ES2419482-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	76.4	70.0	130
EP080: BTEXN (QCLot: 5862485)							
ES2419482-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	84.5	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	84.5	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	86.7	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	87.4	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	86.6	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	92.7	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2419514**	Page	: 1 of 9
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 12-Jun-2024
Site	: ----	Issue Date	: 20-Jun-2024
Sampler	: ANDREW DUVAL, NICA HUGO	No. of samples received	: 4
Order number	: 12554717	No. of samples analysed	: 4

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.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, 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
Matrix Spike (MS) Recoveries							
EG035F: Dissolved Mercury by FIMS	ES2419130--001	Anonymous	**Mercury**	7439-97-6	25.4 %	70.0-130%	**Recovery less than lower data quality objective**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
TRH - Semivolatile Fraction	EP071	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
TRH - Semivolatile Fraction	EP071	0	20	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*
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H)								
BH104R, BH112R	BH107R,	**12-Jun-2024**	**----**	----	----	**18-Jun-2024**	19-Jun-2024	✓
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025H)								
BH104R, BH112R	BH107R,	**12-Jun-2024**	**----**	----	----	**18-Jun-2024**	19-Jun-2024	✓
EA065: Total Hardness as CaCO3								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)								
BH104R, BH112R	BH107R,	**12-Jun-2024**	**----**	----	----	**17-Jun-2024**	10-Jul-2024	✓
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
BH104R, BH112R	BH107R,	**12-Jun-2024**	**----**	----	----	**19-Jun-2024**	26-Jun-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
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**----**	----	**----**	**14-Jun-2024**	10-Jul-2024	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**----**	----	**----**	**14-Jun-2024**	10-Jul-2024	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**----**	----	**----**	**17-Jun-2024**	10-Jul-2024	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**----**	----	**----**	**17-Jun-2024**	09-Dec-2024	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
GWRB1	**12-Jun-2024**	**17-Jun-2024**	09-Dec-2024	✓	**17-Jun-2024**	09-Dec-2024	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**----**	----	**----**	**19-Jun-2024**	10-Jul-2024	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
GWRB1	**12-Jun-2024**	**----**	----	**----**	**19-Jun-2024**	10-Jul-2024	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**----**	----	**----**	**18-Jun-2024**	10-Jul-2024	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**----**	----	**----**	**14-Jun-2024**	14-Jun-2024	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**----**	----	**----**	**18-Jun-2024**	10-Jul-2024	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**18-Jun-2024**	10-Jul-2024	✓	**18-Jun-2024**	10-Jul-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
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**18-Jun-2024**	10-Jul-2024	✓	**18-Jun-2024**	10-Jul-2024	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**----**	----	----	**14-Jun-2024**	14-Jun-2024	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**17-Jun-2024**	19-Jun-2024	✓	**19-Jun-2024**	27-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**17-Jun-2024**	26-Jun-2024	✓	**17-Jun-2024**	26-Jun-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**17-Jun-2024**	19-Jun-2024	✓	**19-Jun-2024**	27-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**17-Jun-2024**	26-Jun-2024	✓	**17-Jun-2024**	26-Jun-2024	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH112R	**12-Jun-2024**	**17-Jun-2024**	26-Jun-2024	✓	**17-Jun-2024**	26-Jun-2024	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	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
Nitrite as N by Discrete Analyser	EK057G	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**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 Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
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	20	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	8	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	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
Nitrite as N by Discrete Analyser	EK057G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	5	40	**12.50**	**12.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	5	40	**12.50**	**12.50**	✓	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 Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
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	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	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
Nitrite as N by Discrete Analyser	EK057G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**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 Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
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	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	**7.69**	**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 Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
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	20	**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
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(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 SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. 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-NO3- F. Combined oxidised Nitrogen (NO2+NO3) 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-NO3-. 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)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
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)

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

eurofins mgt

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

☐ **Brisbane**
Unit 1-21 Smallwood Place, Murrarie
Phone: +617 3902 4600
Email: enviro.bris@mgtlabmark.com.a

☐ **Melbourne**
2 Kingston Town Close, Oakleigh, VIC 3166
Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mgtlabmark.com.au

CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Company Name : GHD Pty Ltd, Sydney	**Contact Name :** Andrew Duval 0468 301 344	**Purchase Order :** 12554717	**COC Number :**
Office Address :	**Project Manager: Henry** Luo 0414 090 002	**PROJECT Number :** 12554717	**Eurofins | mgt quote ID :**
Level 15, 133 Castlereagh Street, Sydney NSW 2000	**Email for results :** emily.smith@ghd.com; andrew.duval@ghd.com; lia.saunders@ghd.com henry.luo@ghd.com; ghdlabreports@ghd.com	**PROJECT Name :** M12 Water Sampling	**Data output format:** ESDAT

Special Directions & Comments :

Sent from ALS

Eurofins | mgt DI water batch number:

	Sample ID	Date	Matrix	Dissolved metals	Total metals					
1	SWDUP2	12/06/2024	Water		X					
2	GWDUP2	12/06/2024	Water	X						
3										
4										
5										
6										
7										
8										
9										
10										

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

Containers:

	500P	250P	60P	1LA	40mL vial	200mL A	Jar	Bag	Sample comments:
1			1						
2			1						
3									
4									
5									
6									
7									
8									
9									
10									

Laboratory Staff

Relinquished By: Andrew Duval	**Received By:**
Date & Time : 12/06/2024 17:15	**Date & Time :**
Signature: A. Duval	**Signature:**

Method Of Shipment

☐ Courier
☐ Hand Delivered
☐ Postal
Courier Consignment # :

Temperature on arrival:

Report number:
110038

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079 & 25289

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd

ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Sample Receipt Advice

Company name: GHD Pty Ltd NSW
Contact name: Henry Luo
Project name: M12 WATER SAMPLING
Project ID: 12554717
Turnaround time: 5 Day
Date/Time received Jun 17, 2024 1:38 PM
Eurofins reference 1109038

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 : 3.5 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:

Adam Bateup on phone : or by email: AdamBateup@eurofins.com

Results will be delivered electronically via email to Henry Luo - henry.luo@ghd.com.

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

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079 & 25289

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Order No.:
Report #: 1109038
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Jun 17, 2024 1:38 PM
Due: Jun 24, 2024
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Adam Bateup

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	Jun 12, 2024		Water	S24-Jn0044898		X
2	GWDUP2	Jun 12, 2024		Water	S24-Jn0044899	X	
Test Counts						1	1

GHD Pty Ltd NSW
Level 15, 133 Castlereagh Street
Sydney
NSW 2000

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: **Henry Luo**

Report **1109038-W**
Project name M12 WATER SAMPLING
Project ID 12554717
Received Date Jun 17, 2024

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S24-Jn0044898**	**S24-Jn0044899**
Date Sampled			**Jun 12, 2024**	**Jun 12, 2024**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	0.001	-
Arsenic (filtered)	0.001	mg/L	-	0.003
Cadmium	0.0002	mg/L	< 0.0002	-
Cadmium (filtered)	0.0002	mg/L	-	< 0.0002
Chromium	0.001	mg/L	< 0.001	-
Chromium (filtered)	0.001	mg/L	-	< 0.001
Copper	0.001	mg/L	0.005	-
Copper (filtered)	0.001	mg/L	-	0.007
Lead	0.001	mg/L	0.001	-
Lead (filtered)	0.001	mg/L	-	< 0.001
Mercury	0.0001	mg/L	< 0.0001	-
Mercury (filtered)	0.0001	mg/L	-	< 0.0001
Nickel	0.001	mg/L	0.002	-
Nickel (filtered)	0.001	mg/L	-	0.005
Zinc	0.005	mg/L	0.016	-
Zinc (filtered)	0.005	mg/L	-	0.042

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
Metals M8	Sydney	Jun 24, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Jun 24, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079 & 25289

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Order No.:
Report #: 1109038
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Jun 17, 2024 1:38 PM
Due: Jun 24, 2024
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Adam Bateup

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	Jun 12, 2024		Water	S24-Jn0044898		X
2	GWDUP2	Jun 12, 2024		Water	S24-Jn0044899	X	
Test Counts						1	1

Internal Quality Control Review and Glossary

General

1. 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.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. 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 sampling date; 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 seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**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	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should 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 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	93			80-120	Pass	
Cadmium	%	93			80-120	Pass	
Chromium	%	99			80-120	Pass	
Copper	%	97			80-120	Pass	
Lead	%	97			80-120	Pass	
Mercury	%	109			80-120	Pass	
Nickel	%	98			80-120	Pass	
Zinc	%	93			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S24-Jn0046095	NCP	%	94			75-125	Pass	
Cadmium	S24-Jn0046095	NCP	%	91			75-125	Pass	
Chromium	S24-Jn0046095	NCP	%	97			75-125	Pass	
Copper	S24-Jn0046095	NCP	%	94			75-125	Pass	
Lead	S24-Jn0046095	NCP	%	94			75-125	Pass	
Mercury	S24-Jn0046095	NCP	%	105			75-125	Pass	
Nickel	S24-Jn0046095	NCP	%	93			75-125	Pass	
Zinc	S24-Jn0046095	NCP	%	114			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S24-Jn0047775	NCP	%	99			75-125	Pass	
Cadmium (filtered)	S24-Jn0047775	NCP	%	92			75-125	Pass	
Chromium (filtered)	S24-Jn0047775	NCP	%	95			75-125	Pass	
Copper (filtered)	S24-Jn0047775	NCP	%	94			75-125	Pass	
Lead (filtered)	S24-Jn0047775	NCP	%	93			75-125	Pass	
Mercury (filtered)	S24-Jn0047775	NCP	%	102			75-125	Pass	
Nickel (filtered)	S24-Jn0047775	NCP	%	93			75-125	Pass	
Zinc (filtered)	S24-Jn0047775	NCP	%	93			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S24-Jn0039195	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	S24-Jn0039195	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S24-Jn0039195	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S24-Jn0039195	NCP	mg/L	0.005	0.005	5.2	30%	Pass	
Lead	S24-Jn0039195	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	S24-Jn0039195	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S24-Jn0039195	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	S24-Jn0039195	NCP	mg/L	< 0.005	0.006	34	30%	Fail	Q15

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S24-Jn0046095	NCP	mg/L	0.009	0.010	6.8	30%	Pass	
Cadmium (filtered)	S24-Jn0046095	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S24-Jn0046095	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S24-Jn0046095	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead (filtered)	S24-Jn0046095	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S24-Jn0046095	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S24-Jn0046095	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc (filtered)	S24-Jn0046095	NCP	mg/L	0.011	0.011	5.9	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
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:

Nileshni Goundar	Analytical Services Manager
Mickael Ros	Senior Analyst-Metal

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.

Subcon / Forward Lab / Split WO: _____

Lab / Analysis: Eurofins - GWDUP2

Organised By / Date: _____

Relinquished By / Date: _____

Connote / Courier: _____

WO No: _____

Attached By PO / Internal Sheet: _____

Environmental Division Sydney
Work Order Reference
ES2422922

Telephone : + 61-2-8784 8555

CHAIN OF CUSTODY

ALS Laboratory: please tick →

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREMEI ☐ Standard TAT (List due date):	STANDARD TAT	FOR LABORATORY USE ONLY
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g., Ultra Trace ☐ Non Standard or urgent TAT (List due date):		Custody Seal Intact?
PROJECT: M12 Groundwater	ALS QUOTE NO.: SY/322/21 V5	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present up
ORDER NUMBER: 12554717		COC: 1 2 3 4 5 6 7	Random Sample Temperature on Re
PROJECT MANAGER: Henry Luo	CONTACT PH: Henry Luo 0414 090 002	OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER: Lia Saunders, Nica Hugo, Emily Smith	SAMPLER MOBILE: 0411 213 724	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT	Emily Smith	Thank u	
Email Reports to: emily.smith@ghd.com; andrew.duval@ghd.com; lia.saunders@ghd.com, henry.luo@ghd.com, ghdlabreports@ghd.com		DATE/TIME: 11/07/2024	DATE/TIME: 11/7/24 1739	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: PLEASE DO NOT LOG ALL SAMPLES RECEIVED IN ONE WORKORDER. LOG AS TWO SEPARATE WORKORDERS AS PER THE TWO COCs PROVIDED.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).											
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	Comments	TOTAL CONTAINERS	W-02 (dissolved 8 metals)	EG020F (dissolved Fe, Mn)	W-04 (TRH/BTEXN)	NT-08A (TN, NO2, NO3, NH3, TP, soluble Reactive P)	NT-01D & 02 (major cations & anions, Hardness)	EA015H (TDS)	EA025H (TSS)	EP075A (SIM) (Phenols – Standard level (15 analytes))	W-02T (8 total metals)	BTEXN		
1	BH104R	11/07/2024	Water		6	X	X	X	X	X	X	X					
2	BH107R	11/07/2024	Water		6	X	X	X	X	X	X	X					
3	BH112R	11/07/2024	Water		6	X	X	X	X	X	X	X					
4	BH145R	10/07/2024	Water		6	X	X	X	X	X	X	X					
5	GWDUP1	11/07/2024	Water		1	X											
Forp	GWDUP2	11/07/2024	Water	PLEASE FORWARD TO EUROFINS WITH ATTACHED COC	1												
6	GWRB1	11/07/2024	Water		1									X			
7	Trip spike	8/07/2024	Water		1										X		
8	Trip blank	8/07/2024	Water		1										X		

HT

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2422922**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: henry.luo@ghd.com	E-mail	: samiksha.sathish@alsglobal.com
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9239 7199	Facsimile	: +61-2-8784 8500
Project	: 12554717	Page	: 1 of 3
Order number	: ----	Quote number	: ES2021GHDSER0026 (SY/322/21_V5)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Emily Smith, Lia Saunders, Nica Hugo		

Dates

Date Samples Received	: 11-Jul-2024 17:34	Issue Date	: 12-Jul-2024
Client Requested Due Date	: 19-Jul-2024	Scheduled Reporting Date	: **19-Jul-2024**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 8	Temperature	: 0.0, 0.2, 0.1'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

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
- This is an updated SRN which indicates the addition of W-04 (TRH/BTEX) for samples 01-04
- Sample GWDUP2 has been forwarded to Eurofins for analysis
- **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.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Unless otherwise stated, 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.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EA025H Suspended Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - NT-01D & 02 Major Cations & Anions (Ca, Mg, Na, K, Cl, SO4,	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-02 8 Metals	WATER - W-04 TRH/BTEXN
ES2422922-001	11-Jul-2024 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2422922-002	11-Jul-2024 00:00	BH107R	✓	✓	✓	✓	✓	✓	✓
ES2422922-003	11-Jul-2024 00:00	BH112R	✓	✓	✓	✓	✓	✓	✓
ES2422922-004	10-Jul-2024 00:00	BH145R	✓	✓	✓	✓	✓	✓	✓
ES2422922-005	11-Jul-2024 00:00	GWDUP1						✓	

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP080 BTEXN	WATER - W-02T 8 metals (Total)	WATER - W-18 TRH(C6 - C9)/BTEXN
ES2422922-006	11-Jul-2024 00:00	GWRB1		✓	
ES2422922-007	08-Jul-2024 00:00	Trip Spike	✓		
ES2422922-008	08-Jul-2024 00:00	Trip Blank			✓

Proactive Holding Time Report

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

Requested Deliverables

Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
ANDREW DUVAL		
- *AU Certificate of Analysis - NATA (COA)	Email	andrew.duval@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	andrew.duval@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	andrew.duval@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	andrew.duval@ghd.com
- Chain of Custody (CoC) (COC)	Email	andrew.duval@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	andrew.duval@ghd.com
- EDI Format - XTab (XTAB)	Email	andrew.duval@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	andrew.duval@ghd.com
EMILY SMITH		
- *AU Certificate of Analysis - NATA (COA)	Email	emily.smith@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	emily.smith@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	emily.smith@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	emily.smith@ghd.com
- Chain of Custody (CoC) (COC)	Email	emily.smith@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	emily.smith@ghd.com
- EDI Format - XTab (XTAB)	Email	emily.smith@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	emily.smith@ghd.com
GHD LAB REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	ghdlabreports@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ghdlabreports@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ghdlabreports@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ghdlabreports@ghd.com
- Chain of Custody (CoC) (COC)	Email	ghdlabreports@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	ghdlabreports@ghd.com
- EDI Format - XTab (XTAB)	Email	ghdlabreports@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	ghdlabreports@ghd.com
HENRY LUO		
- *AU Certificate of Analysis - NATA (COA)	Email	henry.luo@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	henry.luo@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	henry.luo@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	henry.luo@ghd.com
- Chain of Custody (CoC) (COC)	Email	henry.luo@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	henry.luo@ghd.com
- EDI Format - XTab (XTAB)	Email	henry.luo@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	henry.luo@ghd.com
Lia Saunders		
- *AU Certificate of Analysis - NATA (COA)	Email	Lia.Saunders@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lia.Saunders@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lia.Saunders@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lia.Saunders@ghd.com
- Chain of Custody (CoC) (COC)	Email	Lia.Saunders@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	Lia.Saunders@ghd.com
- EDI Format - XTab (XTAB)	Email	Lia.Saunders@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	Lia.Saunders@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2422922**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 11-Jul-2024 17:34
Order number	: ----	Date Analysis Commenced	: 12-Jul-2024
C-O-C number	: ----	Issue Date	: 19-Jul-2024 13:54
Sampler	: Emily Smith, Lia Saunders, Nica Hugo		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EP080: Positive result for ES2422922#4 has been confirmed by re-analysis.
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	11-Jul-2024 00:00	11-Jul-2024 00:00	11-Jul-2024 00:00	10-Jul-2024 00:00	11-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		ES2422922-001	ES2422922-002	ES2422922-003	ES2422922-004	ES2422922-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**4910**	**2270**	**10400**	**6030**	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**72**	**12**	**46**	**464**	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**742**	**507**	**2130**	**1400**	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**1070**	**1530**	**1310**	**896**	----
Total Alkalinity as CaCO3	----	1	mg/L		**1070**	**1530**	**1310**	**896**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**214**	**175**	**1600**	**208**	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**1810**	**351**	**4670**	**3650**	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**96**	**35**	**191**	**112**	----
Magnesium	7439-95-4	1	mg/L		**122**	**102**	**401**	**271**	----
Sodium	7440-23-5	1	mg/L		**1340**	**593**	**2600**	**1840**	----
Potassium	7440-09-7	1	mg/L		**14**	**12**	**35**	**11**	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.003**	<0.001	**0.002**	**0.007**	**0.003**
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	**0.003**	**0.005**	**0.001**	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	**0.001**	**0.005**	**0.001**	**0.002**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		**0.008**	**0.013**	**0.013**	**0.008**	<0.005

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	11-Jul-2024 00:00	11-Jul-2024 00:00	11-Jul-2024 00:00	10-Jul-2024 00:00	11-Jul-2024 00:00
					ES2422922-001	ES2422922-002	ES2422922-003	ES2422922-004	ES2422922-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		**0.095**	**0.002**	**0.079**	**0.131**	----
Iron	7439-89-6	0.05	mg/L		**1.38**	<0.05	<0.05	**1.75**	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**1.92**	<0.01	**2.14**	**3.14**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	**0.05**	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.03**	**2.22**	**0.88**	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.03**	**2.22**	**0.93**	<0.01	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**2.1**	**0.4**	**2.6**	**3.7**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**2.1**	**2.6**	**3.5**	**3.7**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.08**	**0.02**	**0.09**	**0.12**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	**0.01**	**0.05**	<0.01	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**76.9**	**44.1**	**191**	**125**	----
ø Total Cations	----	0.01	meq/L		**73.5**	**36.2**	**156**	**108**	----
ø Ionic Balance	----	0.01	%		**2.27**	**9.80**	**9.98**	**7.28**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	11-Jul-2024 00:00	11-Jul-2024 00:00	11-Jul-2024 00:00	10-Jul-2024 00:00	11-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		ES2422922-001	ES2422922-002	ES2422922-003	ES2422922-004	ES2422922-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	3	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	3	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		106	106	114	111	----
Toluene-D8	2037-26-5	2	%		116	111	114	113	----
4-Bromofluorobenzene	460-00-4	2	%		122	117	118	116	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	GWRB1	Trip Spike	Trip Blank	----	----
				Sampling date / time	11-Jul-2024 00:00	08-Jul-2024 00:00	08-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2422922-006	ES2422922-007	ES2422922-008	--------	--------
					Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
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		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	----	<20	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	----	<20	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		----	----	<20	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	**19**	<1	----	----
Toluene	108-88-3	2	µg/L		----	**18**	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		----	**19**	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	**20**	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		----	**20**	<2	----	----
^ **Total Xylenes**	----	2	µg/L		----	**40**	<2	----	----
^ **Sum of BTEX**	----	1	µg/L		----	**96**	<1	----	----
Naphthalene	91-20-3	5	µg/L		----	**21**	<5	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	**100**	----	----	----
Toluene-D8	2037-26-5	2	%		----	**109**	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		----	**112**	----	----	----

Surrogate Control Limits

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

QUALITY CONTROL REPORT

Work Order	: **ES2422922**	Page	: 1 of 14
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 11-Jul-2024
Order number	: ----	Date Analysis Commenced	: 12-Jul-2024
C-O-C number	: ----	Issue Date	: 19-Jul-2024
Sampler	: Emily Smith, Lia Saunders, Nica Hugo		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

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 (%)*
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 5928046)									
ES2422571-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	46	36	23.6	No Limit
ES2422571-019	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	110	110	0.0	0% - 50%
ES2422776-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	37100	37700	1.6	0% - 20%
ES2422919-012	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	526	516	1.8	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 5932313)									
EN2406988-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	4520	4530	0.3	0% - 20%
ES2422922-002	BH107R	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2270	2300	1.4	0% - 20%
ES2422942-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1600	1580	1.1	0% - 20%
EW2403262-003	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	139	137	1.3	0% - 50%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5928047)									
ES2422571-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2422571-019	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2422776-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2422919-012	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	18	20	10.4	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5932314)									
EN2406988-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	142	140	1.1	0% - 20%
ES2422922-002	BH107R	EA025H: Suspended Solids (SS)	----	5	mg/L	12	11	8.5	No Limit
ES2422942-005	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	29	25	14.0	No Limit
EW2403262-003	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 5927989)									

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 (%)*
ED037P: Alkalinity by PC Titrator (QC Lot: 5927989) - continued									
EW2403300-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	18	15	23.1	0% - 50%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	18	15	23.1	0% - 50%
EW2403311-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	9	<1	160	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	9	<1	160	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5921792)									
ES2422787-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	4410	5020	13.0	0% - 20%
ES2422922-001	BH104R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	214	211	1.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5921796)									
ES2422922-002	BH107R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	175	193	10.0	0% - 20%
ES2422995-007	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	224	240	6.9	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5921793)									
ES2422787-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	730	756	3.4	0% - 20%
ES2422922-001	BH104R	ED045G: Chloride	16887-00-6	1	mg/L	1810	1760	2.9	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5921797)									
ES2422922-002	BH107R	ED045G: Chloride	16887-00-6	1	mg/L	351	354	0.7	0% - 20%
ES2422995-007	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	48	48	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5925387)									
ES2422868-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	27	27	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	67	69	2.7	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	2	3	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	1	1	0.0	No Limit
EN2406627-021	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	5	4	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	2	2	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	634	555	13.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	4	4	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 5925392)									
ES2422922-003	BH112R	ED093F: Calcium	7440-70-2	1	mg/L	191	191	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	401	404	0.7	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	2600	2580	0.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	35	35	0.0	0% - 20%
ES2422944-006	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	5	5	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	4	4	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	20	21	0.0	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED093F: Dissolved Major Cations (QC Lot: 5925392) - continued									
ES2422944-006	Anonymous	ED093F: Potassium	7440-09-7	1	mg/L	2	3	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5925391)									
ES2422922-003	BH112R	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.079	0.079	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.013	0.019	33.7	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
ES2422944-006	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: Manganese	7439-96-5	0.001	mg/L	0.044	0.041	6.6	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.006	0.012	69.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.47	0.44	5.8	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5927127)									
ES2422998-001	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: Manganese	7439-96-5	0.001	mg/L	0.070	0.074	5.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	1.41	1.40	0.0	0% - 20%
ES2422796-001	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	0.011	0.013	14.4	0% - 50%
		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: Manganese	7439-96-5	0.001	mg/L	0.076	0.076	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	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 (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5927127) - continued									
ES2422796-001	Anonymous	EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	6.92	6.93	0.1	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 5924516)									
ES2422918-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
ES2422919-010	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.005	0.004	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.004	0.006	27.5	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.011	0.011	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5925390)									
ES2422922-001	BH104R	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5927128)									
ES2422776-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.1 µg/L	<0.0001	0.0	No Limit
ES2422998-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5924522)									
ES2422919-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2422919-010	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5922745)									
ES2422919-009	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.03	0.0	No Limit
ES2422928-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5921794)									
ES2422922-002	BH107R	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2422922-001	BH104R	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5922744)									
ES2422919-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.72	0.66	8.3	0% - 20%
ES2422928-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5922741)									
ES2422919-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	1.1	0.0	0% - 50%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5922741) - continued									
ES2422919-011	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1 (1.0)*	mg/L	2.3	1.8	23.6	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5922740)									
ES2422919-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.14	0.13	11.8	0% - 50%
ES2422919-011	Anonymous	EK067G: Total Phosphorus as P	----	0.01 (0.10)*	mg/L	0.13	<0.10	25.3	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5921795)									
ES2422995-007	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2422922-001	BH104R	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5921275)									
ES2422800-022	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2422843-003	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5921420)									
ES2422939-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
ES2422939-007	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	230	210	6.9	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	140	140	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5922789)									
ES2422785-007	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2422922-003	BH112R	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5921275)									
ES2422800-022	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2422843-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5921420)									
ES2422939-001	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
ES2422939-007	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	170	170	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	180	180	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5922789)									
ES2422785-007	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2422922-003	BH112R	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5921275)									
ES2422800-022	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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080: BTEXN (QC Lot: 5921275) - continued									
ES2422800-022	Anonymous	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
ES2422843-003	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
EP080: BTEXN (QC Lot: 5922789)									
ES2422785-007	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
ES2422922-003	BH112R	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 Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 5928046)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	105	87.0	109
				<10	293 mg/L	117	75.2	126
				<10	2410 mg/L	114	83.0	124
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 5932313)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	103	87.0	109
				<10	293 mg/L	122	75.2	126
				<10	2410 mg/L	109	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5928047)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	101	83.0	129
				<5	1000 mg/L	98.8	82.0	110
				<5	928 mg/L	107	83.0	118
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5932314)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	97.7	83.0	129
				<5	1000 mg/L	96.8	82.0	110
				<5	928 mg/L	106	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 5927989)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	99.2	81.0	115
				----	50 mg/L	110	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5921792)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	102	82.0	122
				<1	500 mg/L	104	82.0	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5921796)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	82.0	122
				<1	500 mg/L	103	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 5921793)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	90.4	80.9	127
				<1	1000 mg/L	105	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 5921797)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	90.4	80.9	127
				<1	1000 mg/L	110	80.9	127
ED093F: Dissolved Major Cations (QCLot: 5925387)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED093F: Dissolved Major Cations (QCLot: 5925387) - continued								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	97.4	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	99.9	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	97.8	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	92.9	85.0	113
ED093F: Dissolved Major Cations (QCLot: 5925392)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	91.6	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	92.5	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	92.0	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	87.9	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 5925391)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	85.4	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	84.4	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.5	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	87.5	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.6	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	87.7	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	84.3	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	87.0	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	89.6	82.0	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 5927127)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.6	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.8	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.6	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.6	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.8	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	101	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.1	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.3	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.9	82.0	112
EG020T: Total Metals by ICP-MS (QCLot: 5924516)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	105	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	108	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	101	83.0	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020T: Total Metals by ICP-MS (QCLot: 5924516) - continued								
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.7	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 5925390)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	92.8	83.0	105
EG035F: Dissolved Mercury by FIMS (QCLot: 5927128)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	91.0	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5924522)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	89.4	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5922745)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	105	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5921794)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	99.8	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5922744)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5922741)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	105	69.0	123
				<0.1	1 mg/L	120	70.0	123
				<0.1	5 mg/L	113	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5922740)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	98.9	71.3	126
				<0.01	0.442 mg/L	99.9	71.3	126
				<0.01	1 mg/L	106	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5921795)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	102	85.0	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5921275)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	90.2	75.0	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5921420)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	87.0	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	79.4	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	83.6	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5922789)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	86.9	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5921275)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5921275) - continued								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	92.0	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5921420)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	67.5	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	90.1	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	80.3	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5922789)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	85.8	75.0	127
EP080: BTEXN (QCLot: 5921275)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	99.4	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	104	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	111	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	111	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	110	75.5	124
EP080: BTEXN (QCLot: 5922789)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	99.2	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	101	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	114	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	115	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	116	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**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5921792)							
ES2422787-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5921796)							
ES2422922-002	BH107R						

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5921796) - continued							
ES2422922-002	BH107R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5921793)							
ES2422787-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	97.3	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5921797)							
ES2422922-002	BH107R	ED045G: Chloride	16887-00-6	250 mg/L	103	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5925391)							
ES2422922-002	BH107R	EG020A-F: Arsenic	7440-38-2	1 mg/L	101	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	90.8	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	99.2	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	99.5	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	99.6	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	90.5	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	93.3	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	94.7	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5927127)							
EP2409462-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	124	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	93.5	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	82.8	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	94.3	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	82.9	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	90.1	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	91.2	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	87.6	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 5924516)							
ES2422919-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	112	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	109	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	116	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	111	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	110	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	105	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	108	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5925390)							
EN2406627-038	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	88.4	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5927128)							
ES2422675-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	83.5	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5924522)							
ES2422918-001	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	91.4	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5922745)							
ES2422919-009	Anonymous	EK055G: Ammonia as N	7664-41-7	0.5 mg/L	123	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5921794)							
ES2422922-001	BH104R	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	120	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5922744)							
ES2422919-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	100.0	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5922741)							
ES2422919-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	110	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5922740)							
ES2422919-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	98.9	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5921795)							
ES2422922-001	BH104R	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	116	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5921275)							
ES2422843-003	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	79.9	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5921420)							
ES2422939-002	Anonymous	EP071: C10 - C14 Fraction	----	200 µg/L	94.2	70.0	130
		EP071: C15 - C28 Fraction	----	250 µg/L	99.2	71.0	130
		EP071: C29 - C36 Fraction	----	200 µg/L	103	67.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5922789)							
ES2422785-007	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	87.2	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5921275)							
ES2422843-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	75.8	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5921420)							
ES2422939-002	Anonymous	EP071: >C10 - C16 Fraction	----	250 µg/L	95.1	70.0	130
		EP071: >C16 - C34 Fraction	----	350 µg/L	94.6	75.0	130
		EP071: >C34 - C40 Fraction	----	150 µg/L	110	67.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5922789)							
ES2422785-007	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	89.8	70.0	130
EP080: BTEXN (QCLot: 5921275)							
ES2422843-003	Anonymous	EP080: Benzene	71-43-2	25 µg/L	91.6	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	91.2	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	86.7	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080: BTEXN (QCLot: 5921275) - continued							
ES2422843-003	Anonymous	EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	94.9	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	98.4	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	91.1	70.0	130
EP080: BTEXN (QCLot: 5922789)							
ES2422785-007	Anonymous	EP080: Benzene	71-43-2	25 µg/L	99.9	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	91.2	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	101	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	101	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	106	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	111	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2422922**	Page	: 1 of 10
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 11-Jul-2024
Site	: ----	Issue Date	: 19-Jul-2024
Sampler	: Emily Smith, Lia Saunders, Nica Hugo	No. of samples received	: 8
Order number	: ----	No. of samples analysed	: 8

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

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
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2422787--001	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2422922--002	BH107R	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

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
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) BH145R	**10-Jul-2024**	**----**	----	**----**	**16-Jul-2024**	17-Jul-2024	✓
Clear Plastic Bottle - Natural (EA015H) BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	**----**	**18-Jul-2024**	18-Jul-2024	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H) BH145R	**10-Jul-2024**	**----**	----	**----**	**16-Jul-2024**	17-Jul-2024	✓
Clear Plastic Bottle - Natural (EA025H) BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	**----**	**18-Jul-2024**	18-Jul-2024	✓
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH145R	**10-Jul-2024**	**----**	----	**----**	**16-Jul-2024**	07-Aug-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	**----**	**16-Jul-2024**	08-Aug-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
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
BH145R	**10-Jul-2024**	**----**	----	----	**16-Jul-2024**	24-Jul-2024	✓
Clear Plastic Bottle - Natural (ED037-P)							
BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	----	**16-Jul-2024**	25-Jul-2024	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
BH145R	**10-Jul-2024**	**----**	----	----	**12-Jul-2024**	07-Aug-2024	✓
Clear Plastic Bottle - Natural (ED041G)							
BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	----	**12-Jul-2024**	08-Aug-2024	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
BH145R	**10-Jul-2024**	**----**	----	----	**12-Jul-2024**	07-Aug-2024	✓
Clear Plastic Bottle - Natural (ED045G)							
BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	----	**12-Jul-2024**	08-Aug-2024	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH145R	**10-Jul-2024**	**----**	----	----	**16-Jul-2024**	07-Aug-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	----	**16-Jul-2024**	08-Aug-2024	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH145R	**10-Jul-2024**	**----**	----	----	**16-Jul-2024**	06-Jan-2025	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH104R, BH107R, BH112R, GWDUP1	**11-Jul-2024**	**----**	----	----	**16-Jul-2024**	07-Jan-2025	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
GWRB1	**11-Jul-2024**	**15-Jul-2024**	07-Jan-2025	✓	**15-Jul-2024**	07-Jan-2025	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH145R	**10-Jul-2024**	**----**	----	----	**17-Jul-2024**	07-Aug-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	----	**17-Jul-2024**	08-Aug-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
GWDUP1	**11-Jul-2024**	**----**	----	----	**18-Jul-2024**	08-Aug-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
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
GWRB1	**11-Jul-2024**	**----**	----	----	**17-Jul-2024**	08-Aug-2024	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH145R	**10-Jul-2024**	**----**	----	----	**16-Jul-2024**	07-Aug-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	----	**16-Jul-2024**	08-Aug-2024	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
BH145R	**10-Jul-2024**	**----**	----	----	**12-Jul-2024**	12-Jul-2024	✓
Clear Plastic Bottle - Natural (EK057G)							
BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	----	**12-Jul-2024**	13-Jul-2024	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH145R	**10-Jul-2024**	**----**	----	----	**16-Jul-2024**	07-Aug-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	----	**16-Jul-2024**	08-Aug-2024	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
BH145R	**10-Jul-2024**	**15-Jul-2024**	07-Aug-2024	✓	**15-Jul-2024**	07-Aug-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
BH104R, BH107R, BH112R	**11-Jul-2024**	**15-Jul-2024**	08-Aug-2024	✓	**15-Jul-2024**	08-Aug-2024	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
BH145R	**10-Jul-2024**	**15-Jul-2024**	07-Aug-2024	✓	**15-Jul-2024**	07-Aug-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
BH104R, BH107R, BH112R	**11-Jul-2024**	**15-Jul-2024**	08-Aug-2024	✓	**15-Jul-2024**	08-Aug-2024	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
BH145R	**10-Jul-2024**	**----**	----	----	**12-Jul-2024**	12-Jul-2024	✓
Clear Plastic Bottle - Natural (EK071G)							
BH104R, BH107R, BH112R	**11-Jul-2024**	**----**	----	----	**12-Jul-2024**	13-Jul-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
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BH145R	**10-Jul-2024**	**15-Jul-2024**	17-Jul-2024	✓	**18-Jul-2024**	24-Aug-2024	✓
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R, BH112R	**11-Jul-2024**	**15-Jul-2024**	18-Jul-2024	✓	**18-Jul-2024**	24-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**08-Jul-2024**	**12-Jul-2024**	22-Jul-2024	✓	**13-Jul-2024**	22-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**10-Jul-2024**	**15-Jul-2024**	24-Jul-2024	✓	**15-Jul-2024**	24-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R	**11-Jul-2024**	**15-Jul-2024**	25-Jul-2024	✓	**15-Jul-2024**	25-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH112R	**11-Jul-2024**	**15-Jul-2024**	25-Jul-2024	✓	**16-Jul-2024**	25-Jul-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BH145R	**10-Jul-2024**	**15-Jul-2024**	17-Jul-2024	✓	**18-Jul-2024**	24-Aug-2024	✓
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R, BH112R	**11-Jul-2024**	**15-Jul-2024**	18-Jul-2024	✓	**18-Jul-2024**	24-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**08-Jul-2024**	**12-Jul-2024**	22-Jul-2024	✓	**13-Jul-2024**	22-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**10-Jul-2024**	**15-Jul-2024**	24-Jul-2024	✓	**15-Jul-2024**	24-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R	**11-Jul-2024**	**15-Jul-2024**	25-Jul-2024	✓	**15-Jul-2024**	25-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH112R	**11-Jul-2024**	**15-Jul-2024**	25-Jul-2024	✓	**16-Jul-2024**	25-Jul-2024	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) Trip Spike, Trip Blank	**08-Jul-2024**	**12-Jul-2024**	22-Jul-2024	✓	**13-Jul-2024**	22-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**10-Jul-2024**	**15-Jul-2024**	24-Jul-2024	✓	**15-Jul-2024**	24-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R	**11-Jul-2024**	**15-Jul-2024**	25-Jul-2024	✓	**15-Jul-2024**	25-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH112R	**11-Jul-2024**	**15-Jul-2024**	25-Jul-2024	✓	**16-Jul-2024**	25-Jul-2024	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	3	23	**13.04**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	32	**12.50**	**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
Nitrite as N by Discrete Analyser	EK057G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	8	74	**10.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	8	74	**10.81**	**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 Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	19	**10.53**	**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	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	32	**6.25**	**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
Nitrite as N by Discrete Analyser	EK057G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	10	74	**13.51**	**12.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	10	74	**13.51**	**12.50**	✓	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 Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	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	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
TRH Volatiles/BTEX	EP080	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	32	**6.25**	**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
Nitrite as N by Discrete Analyser	EK057G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	74	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	74	**5.41**	**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 Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**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	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	39	**5.13**	**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
Nitrite as N by Discrete Analyser	EK057G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	33	**6.06**	**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 Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**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	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**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
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(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 SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. 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-NO3- F. Combined oxidised Nitrogen (NO2+NO3) 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-NO3-. 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)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
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)

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

eurofins | mgt

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

☐ **Brisbane**
Unit 1-21 Smallwood Place, Murrarie
Phone: +617 3902 4600
Email: enviro.bris@mgtlabmark.com.a

☐ **Melbourne**
2 Kingston Town Close, Oakleigh, VIC 3166
Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mgtlabmark.com.au

CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Company Name : GHD Pty Ltd, Sydney	**Contact Name :** Lia Saunders 0411 213 724	**Purchase Order :** 12554717	**COC Number :**
Office Address :	**Project Manager:** Henry Luo 0414 090 002	**PROJECT Number :** 12554717	**Eurofins | mgt quote ID :**
Level 15, 133 Castlereagh Street, Sydney NSW 2000	**Email for results :** emily.smith@ghd.com; andrew.duval@ghd.com; lia.saunders@ghd.com; henry.luo@ghd.com; ghdlabreports@ghd.com	**PROJECT Name :** M12 Water Sampling	Data output format: ESDAT

Special Directions & Comments :

Sent from ALS

Eurofins | mgt DI water batch number:

	Sample ID	Date	Matrix	Dissolved metals	Total metals					
1	SWDUP2	10/07/2024	Water		X					
2	GWDUP2	11/07/2024	Water	X						
3										
4										
5										
6										
7										
8										
9										
10										

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

Containers:

	500P	250P	60P	1LA	40mL vial	200mL A	Jar	Bag	Sample comments:
1			1						
2			1						
3									
4									
5									
6									
7									
8									
9									
10									

Laboratory Staff

Relinquished By: Emily Smith	**Received By:**
Date & Time : 17:15 on 11/07/24	**Date & Time :**
Signature: E Smith	**Signature:**

Method Of Shipment

- ☐ Courier
- ☐ Hand Delivered
- ☑ Postal
- ☐

Courier Consignment # :

Temperature on arrival:

Report number:

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd

ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Sample Receipt Advice

Company name: GHD Pty Ltd NSW
Contact name: Henry Luo
Project name: M12 WATER SAMPLING
Project ID: 12554717
Turnaround time: 5 Day
Date/Time received Jul 15, 2024 2:30 PM
Eurofins reference 1117977

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 : 10.7 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

Samples logged in according to COC.

Contact

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

Adam Bateup on phone : or by email: AdamBateup@eurofins.com

Results will be delivered electronically via email to Henry Luo - henry.luo@ghd.com.

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

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Order No.: 12554717
Report #: 1117977
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Jul 15, 2024 2:30 PM
Due: Jul 22, 2024
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Adam Bateup

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	Jul 10, 2024		Water	S24-Jl0037376	X	
2	GWDUP2	Jul 11, 2024		Water	S24-Jl0037377		X
Test Counts						1	1

GHD Pty Ltd NSW
Level 15, 133 Castlereagh Street
Sydney
NSW 2000

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: **Henry Luo**

Report **1117977-W**
Project name M12 WATER SAMPLING
Project ID 12554717
Received Date Jul 15, 2024

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S24-Jl0037376**	**S24-Jl0037377**
Date Sampled			**Jul 10, 2024**	**Jul 11, 2024**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	0.001	-
Arsenic (filtered)	0.001	mg/L	-	< 0.001
Cadmium	0.0002	mg/L	< 0.0002	-
Cadmium (filtered)	0.0002	mg/L	-	< 0.0002
Chromium	0.001	mg/L	0.002	-
Chromium (filtered)	0.001	mg/L	-	< 0.001
Copper	0.001	mg/L	0.004	-
Copper (filtered)	0.001	mg/L	-	0.003
Lead	0.001	mg/L	0.001	-
Lead (filtered)	0.001	mg/L	-	< 0.001
Mercury	0.0001	mg/L	< 0.0001	-
Mercury (filtered)	0.0001	mg/L	-	< 0.0001
Nickel	0.001	mg/L	0.003	-
Nickel (filtered)	0.001	mg/L	-	0.001
Zinc	0.005	mg/L	0.014	-
Zinc (filtered)	0.005	mg/L	-	0.012

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
Metals M8	Sydney	Jul 18, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Jul 16, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Order No.: 12554717
Report #: 1117977
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Jul 15, 2024 2:30 PM
Due: Jul 22, 2024
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Adam Bateup

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	Jul 10, 2024		Water	S24-Jl0037376	X	
2	GWDUP2	Jul 11, 2024		Water	S24-Jl0037377		X
Test Counts						1	1

Internal Quality Control Review and Glossary

General

1. 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.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. 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 sampling date; 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 seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**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	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should 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 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	96			80-120	Pass	
Cadmium	%	98			80-120	Pass	
Chromium	%	94			80-120	Pass	
Copper	%	93			80-120	Pass	
Lead	%	89			80-120	Pass	
Mercury	%	100			80-120	Pass	
Nickel	%	93			80-120	Pass	
Zinc	%	95			80-120	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	93			80-120	Pass	
Cadmium (filtered)	%	99			80-120	Pass	
Chromium (filtered)	%	94			80-120	Pass	
Copper (filtered)	%	93			80-120	Pass	
Lead (filtered)	%	88			80-120	Pass	
Mercury (filtered)	%	97			80-120	Pass	
Nickel (filtered)	%	95			80-120	Pass	
Zinc (filtered)	%	91			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S24-Jl0041726	NCP	%	98			75-125	Pass	
Cadmium	S24-Jl0041726	NCP	%	94			75-125	Pass	
Chromium	S24-Jl0041726	NCP	%	91			75-125	Pass	
Copper	S24-Jl0041726	NCP	%	89			75-125	Pass	
Lead	S24-Jl0041726	NCP	%	85			75-125	Pass	
Mercury	S24-Jl0041726	NCP	%	95			75-125	Pass	
Nickel	S24-Jl0041726	NCP	%	90			75-125	Pass	
Zinc	S24-Jl0044944	NCP	%	95			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S24-Jl0038648	NCP	%	92			75-125	Pass	
Cadmium (filtered)	S24-Jl0038648	NCP	%	94			75-125	Pass	
Chromium (filtered)	S24-Jl0038648	NCP	%	95			75-125	Pass	
Copper (filtered)	S24-Jl0038648	NCP	%	94			75-125	Pass	
Lead (filtered)	S24-Jl0038648	NCP	%	88			75-125	Pass	
Mercury (filtered)	S24-Jl0038648	NCP	%	91			75-125	Pass	
Nickel (filtered)	S24-Jl0038648	NCP	%	94			75-125	Pass	
Zinc (filtered)	S24-Jl0038648	NCP	%	95			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	R24-Jl0028078	NCP	mg/L	0.002	0.002	2.4	30%	Pass	
Cadmium	R24-Jl0028078	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	R24-Jl0028078	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	R24-Jl0028078	NCP	mg/L	0.003	0.003	6.4	30%	Pass	
Lead	R24-Jl0028078	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	R24-Jl0028078	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	R24-Jl0028078	NCP	mg/L	0.007	0.007	4.0	30%	Pass	
Zinc	R24-Jl0028078	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S24-Jl0039389	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S24-Jl0036386	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S24-Jl0039389	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S24-Jl0036386	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead (filtered)	S24-Jl0036386	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S24-Jl0036386	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S24-Jl0036386	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc (filtered)	S24-Jl0039389	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	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

Authorised by:

Adam Bateup	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Mickael Ros	Senior Analyst-Metal

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.

HT

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay.environmental@alsglobal.com
TOWNSVILLE Unit 1, 14 Dominion Road Bohle QLD 4818 Ph: 07 4796 0600 E: townsville@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: newcastle@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREME** ☐ Standard TAT **(List due date):**	STANDARD TAT	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g., Ultra Trace) ☐ Non Standard or urgent TAT **(List due date):**		Custody Seal Intact? Yes No N/A
PROJECT: M12 Groundwater	**ALS QUOTE NO.:** SY/322/21 V5	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: 12554717		COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Henry Luo	**CONTACT PH:** Henry Luo 0414 090 002	OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER: Lia Saunders, Nica Hugo **SAMPLER MOBILE:** 0411 213 724	**RELINQUISHED BY:** Lia Saunders	**RECEIVED BY:**	**RELINQUISHED BY:**
COC emailed to ALS? (YES / NO) **EDD FORMAT (or default):** ESDAT	DATE/TIME: 07/08/2024 15:15PM	DATE/TIME:	DATE/TIME:
Email Reports to: emily.smith@ghd.com; nica.hugo@ghd.com; lia.saunders@ghd.com, henry.luo@ghd.com, ghdlabreports@ghd.com			**RECEIVED BY:** DATE/TIME: 7/8/24 1550

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: PLEASE DO NOT LOG ALL SAMPLES RECEIVED IN ONE WORKORDER. LOG AS TWO SEPARATE WORKORDERS AS PER THE TWO COCs PROVIDED.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).											
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	Comments	TOTAL CONTAINERS	W-02 (dissolved 8 metals)	EG020F (dissolved Fe, Mn)	W-04 (TRH/BTEXN)	NT-08A (TN, NO2, NO3, NH3, TP, soluble Reactive P)	NT-01D & I12 (major cations & anions, Hardness)	EA015H (TDS)	EA025H (TSS)	EP075A (SIM) (Phenols – Standard level (15 analytes))	W-02T (8 total metals)	BTEXN		
1	BH104R	6/08/2024	Water		6	X	X	X	X	X	X	X					
2	BH107R	6/08/2024	Water		6	X	X	X	X	X	X	X					
3	BH112R	6/08/2024	Water		6	X	X	X	X	X	X	X					
4	BH145R	7/08/2024	Water		6	X	X	X	X	X	X	X					
5	GWDUP1	6/08/2024	Water		1	X											
	GWDUP2	6/08/2024	Water	PLEASE FORWARD TO EUROFINS WITH ATTACHED COC	1												
6	GWRB1	7/08/2024	Water		1									X			
7	Trip spike	6/08/2024	Water		1										X		
8	Trip blank	6/08/2024	Water		1										X		

Subcon / Forward Lab / Split WO: Eurofins

Lab / Analysis: Metals

Organised By / Date:

Relinquished By / Date:

Connote / Courier:

WO No: ES2425825

Attached Pg. NO / Additional Sheet:

Environmental Division
Sydney
Work Order Reference
ES2425825

Telephone : +61-2-8784 8555

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2425825**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: henry.luo@ghd.com	E-mail	: samiksha.sathish@alsglobal.com
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9239 7199	Facsimile	: +61-2-8784 8500
Project	: 12554717	Page	: 1 of 3
Order number	: ----	Quote number	: EB2020GHDSER0038 (EN/000)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	:		
Sampler	: Lia Saunders, NICA HUGO		

Dates

Date Samples Received	: 07-Aug-2024 15:50	Issue Date	: 08-Aug-2024
Client Requested Due Date	: 13-Aug-2024	Scheduled Reporting Date	: **13-Aug-2024**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 7	Temperature	: 3.1'C, 1.8'C, 2.4'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

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).**
- **Sample 'GWDUP2' forwarded to Eurofins.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney, NATA accreditation no. 825, site no. 10911.
- 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.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EA025H Suspended Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - NT-01D & 02 Major Cations & Anions (Ca, Mg, Na, K, Cl, SO4,	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-02 8 Metals	WATER - W-04 TRH/BTEXN
ES2425825-001	06-Aug-2024 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2425825-002	06-Aug-2024 00:00	BH107R	✓	✓	✓	✓	✓	✓	✓
ES2425825-003	06-Aug-2024 00:00	BH112R	✓	✓	✓	✓	✓	✓	✓
ES2425825-004	07-Aug-2024 00:00	BH145R	✓	✓	✓	✓	✓	✓	✓
ES2425825-005	06-Aug-2024 00:00	GWDUP1						✓	

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP080 BTEXN	WATER - W-02T 8 metals (Total)	WATER - W-18 TRH(C6 - C9)/BTEXN
ES2425825-006	07-Aug-2024 00:00	GWRB1		✓	
ES2425825-007	01-Aug-2024 00:00	Trip Spike	✓		
ES2425825-008	01-Aug-2024 00:00	Trip Blank			✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com

Accounts Payable Australia

- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com

EMILY SMITH

- *AU Certificate of Analysis - NATA (COA)	Email	emily.smith@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	emily.smith@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	emily.smith@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	emily.smith@ghd.com
- Chain of Custody (CoC) (COC)	Email	emily.smith@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	emily.smith@ghd.com
- EDI Format - XTab (XTAB)	Email	emily.smith@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	emily.smith@ghd.com

GHD LAB REPORTS

- *AU Certificate of Analysis - NATA (COA)	Email	ghdlabreports@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ghdlabreports@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ghdlabreports@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ghdlabreports@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	ghdlabreports@ghd.com
- EDI Format - XTab (XTAB)	Email	ghdlabreports@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	ghdlabreports@ghd.com

HENRY LUO

- *AU Certificate of Analysis - NATA (COA)	Email	henry.luo@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	henry.luo@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	henry.luo@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	henry.luo@ghd.com
- A4 - AU Tax Invoice (INV)	Email	henry.luo@ghd.com
- Chain of Custody (CoC) (COC)	Email	henry.luo@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	henry.luo@ghd.com
- EDI Format - XTab (XTAB)	Email	henry.luo@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	henry.luo@ghd.com

Lia Saunders

- *AU Certificate of Analysis - NATA (COA)	Email	Lia.Saunders@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lia.Saunders@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lia.Saunders@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lia.Saunders@ghd.com
- Chain of Custody (CoC) (COC)	Email	Lia.Saunders@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	Lia.Saunders@ghd.com
- EDI Format - XTab (XTAB)	Email	Lia.Saunders@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	Lia.Saunders@ghd.com

NICA HUGO

- *AU Certificate of Analysis - NATA (COA)	Email	nica.hugo@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	nica.hugo@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	nica.hugo@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	nica.hugo@ghd.com
- Chain of Custody (CoC) (COC)	Email	nica.hugo@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	nica.hugo@ghd.com
- EDI Format - XTab (XTAB)	Email	nica.hugo@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	nica.hugo@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2425825**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 07-Aug-2024 15:50
Order number	: ----	Date Analysis Commenced	: 08-Aug-2024
C-O-C number	: ----	Issue Date	: 13-Aug-2024 18:10
Sampler	: Lia Saunders, NICA HUGO		
Site	:		
Quote number	: EN/000		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	06-Aug-2024 00:00	06-Aug-2024 00:00	06-Aug-2024 00:00	07-Aug-2024 00:00	06-Aug-2024 00:00
Compound	CAS Number	LOR	Unit		ES2425825-001	ES2425825-002	ES2425825-003	ES2425825-004	ES2425825-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**4100**	**2120**	**9370**	**10000**	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**52**	**24**	**49**	**53**	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**779**	**531**	**2300**	**2830**	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**1100**	**1570**	**1340**	**1050**	----
Total Alkalinity as CaCO3	----	1	mg/L		**1100**	**1570**	**1340**	**1050**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**218**	**205**	**1850**	**332**	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**1800**	**325**	**4420**	**6070**	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**106**	**41**	**222**	**217**	----
Magnesium	7439-95-4	1	mg/L		**125**	**104**	**425**	**556**	----
Sodium	7440-23-5	1	mg/L		**1610**	**754**	**3050**	**3240**	----
Potassium	7440-09-7	1	mg/L		**17**	**15**	**42**	**18**	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.003**	<0.001	**0.002**	**0.003**	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	**0.001**	**0.005**	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.011**	**0.010**	**0.048**	**0.024**	**0.008**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	**0.001**	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		**0.018**	**0.017**	**0.033**	**0.015**	<0.005

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	06-Aug-2024 00:00	06-Aug-2024 00:00	06-Aug-2024 00:00	07-Aug-2024 00:00	06-Aug-2024 00:00
Compound	CAS Number	LOR	Unit		ES2425825-001	ES2425825-002	ES2425825-003	ES2425825-004	ES2425825-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		**0.096**	**0.007**	**0.094**	**0.136**	----
Iron	7439-89-6	0.05	mg/L		**1.58**	<0.05	**0.30**	**3.13**	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**1.78**	**0.04**	**2.50**	**2.30**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	**0.03**	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	**1.99**	**0.29**	**0.01**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	**1.99**	**0.32**	**0.01**	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**2.2**	**0.4**	**3.1**	**2.8**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**2.2**	**2.4**	**3.4**	**2.8**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.08**	**0.04**	**0.11**	**0.07**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	**0.04**	<0.01	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**77.3**	**44.8**	**190**	**199**	----
ø Total Cations	----	0.01	meq/L		**86.0**	**43.8**	**180**	**198**	----
ø Ionic Balance	----	0.01	%		**5.36**	**1.15**	**2.75**	**0.29**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	06-Aug-2024 00:00	06-Aug-2024 00:00	06-Aug-2024 00:00	07-Aug-2024 00:00	06-Aug-2024 00:00
Compound	CAS Number	LOR	Unit		ES2425825-001	ES2425825-002	ES2425825-003	ES2425825-004	ES2425825-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**95.2**	**108**	**110**	**112**	----
Toluene-D8	2037-26-5	2	%		**98.9**	**118**	**117**	**115**	----
4-Bromofluorobenzene	460-00-4	2	%		**86.8**	**103**	**102**	**103**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	GWRB1	Trip Spike	Trip Blank	----	----
				Sampling date / time	07-Aug-2024 00:00	01-Aug-2024 00:00	01-Aug-2024 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2425825-006	ES2425825-007	ES2425825-008	--------	--------
					Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
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		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	----	<20	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	----	<20	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		----	----	<20	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	**16**	<1	----	----
Toluene	108-88-3	2	µg/L		----	**14**	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		----	**14**	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	**14**	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		----	**15**	<2	----	----
^ **Total Xylenes**	----	2	µg/L		----	**29**	<2	----	----
^ **Sum of BTEX**	----	1	µg/L		----	**73**	<1	----	----
Naphthalene	91-20-3	5	µg/L		----	**19**	<5	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	**102**	**93.2**	----	----
Toluene-D8	2037-26-5	2	%		----	**117**	**107**	----	----
4-Bromofluorobenzene	460-00-4	2	%		----	**103**	**97.2**	----	----

Surrogate Control Limits

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

QUALITY CONTROL REPORT

Work Order	: **ES2425825**	Page	: 1 of 12
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 07-Aug-2024
Order number	: ----	Date Analysis Commenced	: 08-Aug-2024
C-O-C number	: ----	Issue Date	: 13-Aug-2024
Sampler	: Lia Saunders, NICA HUGO		
Site	:		
Quote number	: EN/000		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

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 (%)*
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 5982313)									
EN2408460-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	406	404	0.5	0% - 20%
ES2425825-001	BH104R	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	4100	4090	0.2	0% - 20%
ES2425838-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	220	212	3.5	0% - 20%
ES2425856-003	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	94	90	4.6	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5982314)									
EN2408460-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2425825-001	BH104R	EA025H: Suspended Solids (SS)	----	5	mg/L	52	49	5.5	0% - 50%
ES2425838-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	11	10	0.0	No Limit
ES2425856-003	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 5977156)									
ES2425738-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	20	17	20.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	20	17	20.0	0% - 20%
ES2425738-010	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	17	18	0.0	0% - 50%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	17	18	0.0	0% - 50%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5977365)									
ES2425661-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1860	1860	0.1	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 (%)*
ED045G: Chloride by Discrete Analyser (QC Lot: 5977364)									
ES2425661-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	94	94	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5977540)									
ES2425722-003	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	6	6	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	2	2	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	20	19	0.0	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EW2403623-003	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	1	<1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	11	10	0.0	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5977538)									
ES2425471-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.021	0.021	0.0	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.049	0.048	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.004	0.003	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.281	0.282	0.0	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	1.12	1.13	0.9	0% - 20%
ES2425536-001	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	0.003	0.002	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	3.01	2.94	2.1	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.059	0.059	0.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.115	0.112	3.4	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.10	0.09	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5977542)									
EW2403623-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.016	0.016	0.0	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	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 (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5977542) - continued									
EW2403623-003	Anonymous	EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.037	0.035	5.8	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.59	0.59	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5980317)									
ES2425630-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001 (0.0010)*	mg/L	<0.0010	<0.0010	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	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	<0.010	<0.010	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005 (0.050) *	mg/L	<0.050	<0.050	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05 (0.10)*	mg/L	<0.10	<0.10	0.0	No Limit
ES2425630-012	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001 (0.0010)*	mg/L	<0.0010	<0.0010	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001 (0.010) *	mg/L	0.062	0.060	2.1	No Limit
		EG020A-F: Nickel	7440-02-0	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005 (0.050) *	mg/L	<0.050	<0.050	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05 (0.10)*	mg/L	0.30	0.29	5.8	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 5978014)									
ES2425738-006	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit

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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 5978014) - continued									
ES2425738-006	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
ES2425838-005	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.008	39.2	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5977541)									
ES2425742-006	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EW2403624-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5980318)									
ES2425630-004	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2425630-011	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5978107)									
ES2425825-006	GWRB1	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2425838-010	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5979908)									
ES2425825-003	BH112R	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	2.50	2.45	1.8	0% - 20%
ES2425825-001	BH104R	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.78	1.83	2.7	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5977363)									
ES2425805-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.05	0.05	0.0	No Limit
ES2425661-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5979907)									
ES2425825-003	BH112R	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.32	0.33	3.8	0% - 20%
ES2425825-001	BH104R	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5979898)									
ES2425807-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.8	0.0	No Limit
ES2425825-004	BH145R	EK061G: Total Kjeldahl Nitrogen as N	----	0.1 (0.2)*	mg/L	2.8	2.9	0.0	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5979899)									
ES2425807-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.04	0.04	0.0	No Limit
ES2425825-004	BH145R	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.07	0.07	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 (%)*
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5977366)									
ES2425805-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2425838-013	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.05	0.07	36.6	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5977064)									
ES2425691-007	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<0.02 mg/L	<20	0.0	No Limit
ES2425825-004	BH145R	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5977064)									
ES2425691-007	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<0.02 mg/L	<20	0.0	No Limit
ES2425825-004	BH145R	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5977064)									
ES2425691-007	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<0.001 mg/L	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<0.002 mg/L	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002 mg/L	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<0.002 mg/L	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<0.002 mg/L	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<0.005 mg/L	<5	0.0	No Limit
ES2425825-004	BH145R	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 Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 5982313)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	97.6	87.0	109
				<10	293 mg/L	103	75.2	126
				<10	2410 mg/L	101	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5982314)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	102	83.0	129
				<5	1000 mg/L	92.4	82.0	110
				<5	928 mg/L	103	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 5977156)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	102	81.0	115
				----	50 mg/L	108	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5977365)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	99.5	82.0	122
				<1	500 mg/L	98.6	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 5977364)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	105	80.9	127
				<1	1000 mg/L	95.1	80.9	127
ED093F: Dissolved Major Cations (QCLot: 5977540)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	111	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	105	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	104	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	105	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 5977538)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	101	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.4	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	100	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	97.2	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	100	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	103	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.9	82.0	112

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 5977542)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	101	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.3	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	101	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	98.1	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.3	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	112	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	106	82.0	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 5980317)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.9	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.2	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	93.4	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.8	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	93.3	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	93.8	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.1	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	94.2	82.0	112
EG020T: Total Metals by ICP-MS (QCLot: 5978014)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	106	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.5	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	101	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	99.0	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	101	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	102	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	101	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 5977541)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	95.2	83.0	105
EG035F: Dissolved Mercury by FIMS (QCLot: 5980318)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	98.0	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5978107)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	102	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5979908)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5979908) - continued								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	98.7	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5977363)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	90.5	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5979907)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	100	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5979898)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	85.8	69.0	123
				<0.1	1 mg/L	101	70.0	123
				<0.1	5 mg/L	109	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5979899)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	90.8	71.3	126
				<0.01	0.442 mg/L	99.7	71.3	126
				<0.01	1 mg/L	111	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5977366)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	93.9	85.0	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5977064)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	95.2	75.0	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5977082)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	74.5	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	104	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	100	58.3	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5977064)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	86.1	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5977082)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	81.7	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	77.4	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	58.2	50.5	115
EP080: BTEXN (QCLot: 5977064)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	102	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	96.6	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	99.6	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	96.7	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	101	76.4	123

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080: BTEXN (QCLot: 5977064) - continued								
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	106	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**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5977365)							
ES2425661-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5977364)							
ES2425661-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	86.7	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5977538)							
ES2425514-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	111	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	107	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	104	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	107	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	102	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	103	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	105	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	110	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5977542)							
ES2425825-003	BH112R	EG020A-F: Arsenic	7440-38-2	1 mg/L	117	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	107	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	106	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	108	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	75.8	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	104	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	108	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	110	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5980317)							
ES2425630-002	Anonymous	EG020A-F: Arsenic	7440-38-2	10 mg/L	95.6	70.0	130
		EG020A-F: Cadmium	7440-43-9	2.5 mg/L	88.4	70.0	130
		EG020A-F: Chromium	7440-47-3	10 mg/L	104	70.0	130
		EG020A-F: Copper	7440-50-8	10 mg/L	98.3	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 5980317) - continued							
ES2425630-002	Anonymous	EG020A-F: Lead	7439-92-1	10 mg/L	96.9	70.0	130
		EG020A-F: Manganese	7439-96-5	10 mg/L	104	70.0	130
		EG020A-F: Nickel	7440-02-0	10 mg/L	112	70.0	130
		EG020A-F: Zinc	7440-66-6	10 mg/L	113	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 5978014)							
ES2425738-007	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	116	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	110	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	113	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	114	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	119	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	115	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	114	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5977541)							
ES2425742-005	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	80.3	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5980318)							
ES2425630-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	103	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5978107)							
ES2425838-001	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	72.0	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5979908)							
ES2425825-001	BH104R	EK055G: Ammonia as N	7664-41-7	0.5 mg/L	92.7	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5977363)							
ES2425661-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	93.8	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5979907)							
ES2425825-001	BH104R	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	98.6	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5979898)							
ES2425807-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	104	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5979899)							
ES2425807-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	106	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5977366)							
ES2425805-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	91.1	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5977064)							
ES2425691-007	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	93.8	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5977064)							
ES2425691-007	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	82.4	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080: BTEXN (QCLot: 5977064)							
ES2425691-007	Anonymous	EP080: Benzene	71-43-2	25 µg/L	97.2	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	90.6	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	93.6	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	91.6	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	94.4	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	95.3	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2425825**	Page	: 1 of 10
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 07-Aug-2024
Site	:	Issue Date	: 13-Aug-2024
Sampler	: Lia Saunders, NICA HUGO	No. of samples received	: 8
Order number	: ----	No. of samples analysed	: 8

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, 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
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2425661--001	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
TRH - Semivolatile Fraction	EP071	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
TRH - Semivolatile Fraction	EP071	0	4	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*
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H)							
BH104R, BH107R, BH112R	**06-Aug-2024**	**----**	----	**----**	**12-Aug-2024**	13-Aug-2024	✓
Clear Plastic Bottle - Natural (EA015H)							
BH145R	**07-Aug-2024**	**----**	----	**----**	**12-Aug-2024**	14-Aug-2024	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
BH104R, BH107R, BH112R	**06-Aug-2024**	**----**	----	**----**	**12-Aug-2024**	13-Aug-2024	✓
Clear Plastic Bottle - Natural (EA025H)							
BH145R	**07-Aug-2024**	**----**	----	**----**	**12-Aug-2024**	14-Aug-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
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH104R, BH107R, BH112R	**06-Aug-2024**	**----**	----	**----**	**09-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH145R	**07-Aug-2024**	**----**	----	**----**	**09-Aug-2024**	04-Sep-2024	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) BH104R, BH107R, BH112R	**06-Aug-2024**	**----**	----	**----**	**08-Aug-2024**	20-Aug-2024	✓
Clear Plastic Bottle - Natural (ED037-P) BH145R	**07-Aug-2024**	**----**	----	**----**	**08-Aug-2024**	21-Aug-2024	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) BH104R, BH107R, BH112R	**06-Aug-2024**	**----**	----	**----**	**08-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Natural (ED041G) BH145R	**07-Aug-2024**	**----**	----	**----**	**08-Aug-2024**	04-Sep-2024	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) BH104R, BH107R, BH112R	**06-Aug-2024**	**----**	----	**----**	**08-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Natural (ED045G) BH145R	**07-Aug-2024**	**----**	----	**----**	**08-Aug-2024**	04-Sep-2024	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH104R, BH107R, BH112R	**06-Aug-2024**	**----**	----	**----**	**09-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH145R	**07-Aug-2024**	**----**	----	**----**	**09-Aug-2024**	04-Sep-2024	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) BH104R, BH107R, BH112R	**06-Aug-2024**	**----**	----	**----**	**09-Aug-2024**	02-Feb-2025	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) GWDUP1	**06-Aug-2024**	**----**	----	**----**	**10-Aug-2024**	02-Feb-2025	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) BH145R	**07-Aug-2024**	**----**	----	**----**	**09-Aug-2024**	03-Feb-2025	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) GWRB1	**07-Aug-2024**	**09-Aug-2024**	03-Feb-2025	✓	**09-Aug-2024**	03-Feb-2025	✓

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
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) BH104R, BH107R, BH112R	**06-Aug-2024**	----	----	----	**12-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) GWDUP1	**06-Aug-2024**	----	----	----	**13-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) BH145R	**07-Aug-2024**	----	----	----	**12-Aug-2024**	04-Sep-2024	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) GWRB1	**07-Aug-2024**	----	----	----	**12-Aug-2024**	04-Sep-2024	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH112R	**06-Aug-2024**	----	----	----	**09-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH104R, BH107R	**06-Aug-2024**	----	----	----	**10-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH145R	**07-Aug-2024**	----	----	----	**09-Aug-2024**	04-Sep-2024	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BH104R, BH107R, BH112R	**06-Aug-2024**	----	----	----	**08-Aug-2024**	08-Aug-2024	✓
Clear Plastic Bottle - Natural (EK057G) BH145R	**07-Aug-2024**	----	----	----	**08-Aug-2024**	09-Aug-2024	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH107R	**06-Aug-2024**	----	----	----	**09-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH104R, BH112R	**06-Aug-2024**	----	----	----	**10-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH145R	**07-Aug-2024**	----	----	----	**10-Aug-2024**	04-Sep-2024	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH104R, BH107R, BH112R	**06-Aug-2024**	**09-Aug-2024**	03-Sep-2024	✓	**09-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH145R	**07-Aug-2024**	**09-Aug-2024**	04-Sep-2024	✓	**09-Aug-2024**	04-Sep-2024	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH104R, BH107R, BH112R	**06-Aug-2024**	**09-Aug-2024**	03-Sep-2024	✓	**09-Aug-2024**	03-Sep-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH145R	**07-Aug-2024**	**09-Aug-2024**	04-Sep-2024	✓	**09-Aug-2024**	04-Sep-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
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) BH104R, BH107R, BH112R	**06-Aug-2024**	**----**	----	**----**	**08-Aug-2024**	08-Aug-2024	✓
Clear Plastic Bottle - Natural (EK071G) BH145R	**07-Aug-2024**	**----**	----	**----**	**08-Aug-2024**	09-Aug-2024	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R, BH112R	**06-Aug-2024**	**09-Aug-2024**	13-Aug-2024	✓	**13-Aug-2024**	18-Sep-2024	✓
Amber Glass Bottle - Unpreserved (EP071) BH145R	**07-Aug-2024**	**09-Aug-2024**	14-Aug-2024	✓	**13-Aug-2024**	18-Sep-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**01-Aug-2024**	**08-Aug-2024**	15-Aug-2024	✓	**09-Aug-2024**	15-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R, BH112R	**06-Aug-2024**	**08-Aug-2024**	20-Aug-2024	✓	**09-Aug-2024**	20-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**07-Aug-2024**	**08-Aug-2024**	21-Aug-2024	✓	**09-Aug-2024**	21-Aug-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R, BH112R	**06-Aug-2024**	**09-Aug-2024**	13-Aug-2024	✓	**13-Aug-2024**	18-Sep-2024	✓
Amber Glass Bottle - Unpreserved (EP071) BH145R	**07-Aug-2024**	**09-Aug-2024**	14-Aug-2024	✓	**13-Aug-2024**	18-Sep-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**01-Aug-2024**	**08-Aug-2024**	15-Aug-2024	✓	**09-Aug-2024**	15-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R, BH112R	**06-Aug-2024**	**08-Aug-2024**	20-Aug-2024	✓	**09-Aug-2024**	20-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**07-Aug-2024**	**08-Aug-2024**	21-Aug-2024	✓	**09-Aug-2024**	21-Aug-2024	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) Trip Spike, Trip Blank	**01-Aug-2024**	**08-Aug-2024**	15-Aug-2024	✓	**09-Aug-2024**	15-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R, BH112R	**06-Aug-2024**	**08-Aug-2024**	20-Aug-2024	✓	**09-Aug-2024**	20-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**07-Aug-2024**	**08-Aug-2024**	21-Aug-2024	✓	**09-Aug-2024**	21-Aug-2024	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	4	27	**14.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	5	44	**11.36**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	15	**13.33**	**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	4	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	7	**28.57**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	3	44	**6.82**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	8	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	5	40	**12.50**	**12.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	5	40	**12.50**	**12.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	17	**17.65**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	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	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	3	44	**6.82**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**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	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	3	44	**6.82**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**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	4	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(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 SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. 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-NO3- F. Combined oxidised Nitrogen (NO2+NO3) 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-NO3-. 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)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
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)

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

eurofins mgt

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

☐ Brisbane
Unit 1-21 Smallwood Place, Murrarie
Phone: +617 3902 4600
Email: enviro.bris@mgtlabmark.com.a

☐ Melbourne
2 Kingston Town Close, Oakleigh, VIC 3166
Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mgtlabmark.com.au

CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Page 1 of 1

Company Name : GHD Pty Ltd, Sydney	**Contact Name : Lia Saunders** 0411 213 724	**Purchase Order :** 12554717
Office Address : Level 15, 133 Castlereagh Street, Sydney NSW 2000	**Project Manager: Henry Luo** 0414 090 002	**PROJECT Number :** 12554717
	Email for results : emily.smith@ghd.com; nica.hugo@ghd.com; lia.saunders@ghd.com, henry.luo@ghd.com; ghdlabreports@ghd.com	**PROJECT Name :** M12 Water Sampling

COC Number :

Eurofins | mgt quote ID :

Data output format: ESDAT

Special Directions & Comments :

Sent from ALS

Eurofins | mgt DI water batch number:

	Sample ID	Date	Matrix	Dissolved metals	Total metals	Analytes					
1	SWDUP2	7/08/2024	Water		X						
2	GWDUP2	6/08/2024	Water	X							
3											
4											
5											
6											
7											
8											
9											
10											

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:

500P	250P	60P	1LA	40mL vial	200mL A	Jar	Bag	Sample comments:
		1						
		1						

Relinquished By: Lia Saunders

Date & Time : 07/08/2024 15:15

Signature: Lia Saunders

Laboratory Staff

Received By: Elizabeth Brotherton

Date & Time : 8/8 8:44am

Signature: EB

Method Of Shipment

☐ Courier
☐ Hand Delivered
☐ Postal
☐ Courier Consignment # :

Temperature on arrival: 8.3

Report number: 1127260

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd

ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Sample Receipt Advice

Company name: GHD Pty Ltd NSW
Contact name: Henry Luo
Project name: M12 WATER SAMPLING
Project ID: 12554717
Turnaround time: 5 Day
Date/Time received Aug 9, 2024 8:44 PM
Eurofins reference 1127260

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 : 8.3 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

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

Contact

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

Adam Bateup on phone : or by email: AdamBateup@eurofins.com

Results will be delivered electronically via email to Henry Luo - henry.luo@ghd.com.

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

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Order No.: 12554717
Report #: 1127260
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Aug 9, 2024 8:44 PM
Due: Aug 16, 2024
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Adam Bateup

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	Aug 07, 2024		Water	S24-Au0028838	X	
2	GWDUP2	Aug 06, 2024		Water	S24-Au0028839		X
Test Counts						1	1

GHD Pty Ltd NSW
Level 15, 133 Castlereagh Street
Sydney
NSW 2000

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: **Henry Luo**

Report **1127260-W**
Project name M12 WATER SAMPLING
Project ID 12554717
Received Date Aug 09, 2024

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S24-Au0028838**	**S24-Au0028839**
Date Sampled			**Aug 07, 2024**	**Aug 06, 2024**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	< 0.001	-
Arsenic (filtered)	0.001	mg/L	-	0.003
Cadmium	0.0002	mg/L	< 0.0002	-
Cadmium (filtered)	0.0002	mg/L	-	< 0.0002
Chromium	0.001	mg/L	< 0.001	-
Chromium (filtered)	0.001	mg/L	-	< 0.001
Copper	0.001	mg/L	0.004	-
Copper (filtered)	0.001	mg/L	-	< 0.001
Lead	0.001	mg/L	< 0.001	-
Lead (filtered)	0.001	mg/L	-	< 0.001
Mercury	0.0001	mg/L	< 0.0001	-
Mercury (filtered)	0.0001	mg/L	-	< 0.0001
Nickel	0.001	mg/L	0.001	-
Nickel (filtered)	0.001	mg/L	-	0.010
Zinc	0.005	mg/L	0.017	-
Zinc (filtered)	0.005	mg/L	-	0.010

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
Metals M8	Sydney	Aug 16, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Aug 16, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Order No.: 12554717
Report #: 1127260
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Aug 9, 2024 8:44 PM
Due: Aug 16, 2024
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Adam Bateup

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	Aug 07, 2024		Water	S24-Au0028838	X	
2	GWDUP2	Aug 06, 2024		Water	S24-Au0028839		X
Test Counts						1	1

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

1. 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.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. 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 sampling date; 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 seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**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	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should 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 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	86			80-120	Pass	
Cadmium	%	97			80-120	Pass	
Chromium	%	95			80-120	Pass	
Copper	%	93			80-120	Pass	
Lead	%	85			80-120	Pass	
Mercury	%	97			80-120	Pass	
Nickel	%	94			80-120	Pass	
Zinc	%	93			80-120	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	92			80-120	Pass	
Cadmium (filtered)	%	98			80-120	Pass	
Chromium (filtered)	%	104			80-120	Pass	
Copper (filtered)	%	102			80-120	Pass	
Lead (filtered)	%	91			80-120	Pass	
Mercury (filtered)	%	108			80-120	Pass	
Nickel (filtered)	%	104			80-120	Pass	
Zinc (filtered)	%	105			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S24-Au0028838	CP	%	88			75-125	Pass	
Cadmium	S24-Au0028838	CP	%	94			75-125	Pass	
Chromium	S24-Au0028838	CP	%	91			75-125	Pass	
Copper	S24-Au0028838	CP	%	89			75-125	Pass	
Lead	S24-Au0031081	NCP	%	85			75-125	Pass	
Mercury	S24-Au0028838	CP	%	93			75-125	Pass	
Nickel	S24-Au0028838	CP	%	90			75-125	Pass	
Zinc	S24-Au0028838	CP	%	85			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	X24-Au0023606	NCP	%	102			75-125	Pass	
Cadmium (filtered)	X24-Au0023606	NCP	%	98			75-125	Pass	
Chromium (filtered)	X24-Au0023606	NCP	%	89			75-125	Pass	
Copper (filtered)	X24-Au0023606	NCP	%	89			75-125	Pass	
Lead (filtered)	X24-Au0023606	NCP	%	94			75-125	Pass	
Mercury (filtered)	X24-Au0023606	NCP	%	93			75-125	Pass	
Nickel (filtered)	X24-Au0023606	NCP	%	87			75-125	Pass	
Zinc (filtered)	X24-Au0023606	NCP	%	86			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	X24-Au0023629	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	X24-Au0023628	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	X24-Au0023629	NCP	mg/L	0.002	0.002	11	30%	Pass	
Copper	X24-Au0023629	NCP	mg/L	0.001	0.001	3.0	30%	Pass	
Lead	X24-Au0023629	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	X24-Au0023629	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	X24-Au0023629	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	X24-Au0023629	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	X24-Au0023628	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	X24-Au0023628	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	X24-Au0023628	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	X24-Au0023628	NCP	mg/L	0.002	0.002	8.0	30%	Pass	
Lead (filtered)	X24-Au0023628	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	X24-Au0023628	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	X24-Au0023628	NCP	mg/L	0.004	0.004	2.0	30%	Pass	
Zinc (filtered)	X24-Au0023628	NCP	mg/L	0.007	0.024	110	30%	Fail	Q15

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
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
Fang Yee Tan	Senior Analyst-Metal
Mickael Ros	Senior Analyst-Metal

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.

Subcon / To: [illegible] Lab / Split WO

Lab / Analyst: Eurofins - GWDUP2

Organised Date:

Relinquished By / Date:

Connote / Courier:

WO No:

Attached By / Internal Sheet:

Environmental Division Sydney
Work Order Reference
ES2429962

Telephone : +61-2-8784 8555

CHAIN OF CUSTODY

ALS Laboratory: please tick →

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 Ph: 08 8359 0890 E: adelaide@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5700 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee mail@alsglobal.com
NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4014 2500 E: newcastle@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREME ☐ Standard TAT (List due date): STANDARD TAT	FOR LABORATOF	
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g., Ultra Trace) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	N/A
PROJECT: M12 Groundwater	ALS QUOTE NO.: SY/322/21 V5	Free Ice / frozen Ice b	N/A
ORDER NUMBER: 12554717	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7	Random Sample Tem	
PROJECT MANAGER: Henry Luo	CONTACT PH: Henry Luo 0414 090 002 OF: 1 2 3 4 5 6 7	Other comment:	

SAMPLER: Lia Saunders, Nica Hugo	SAMPLER MOBILE: 0468 301 344	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY: / RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT	Nica Hugo	Thanh Le	
Email Reports to: emily.smith@ghd.com; andrew.duval@ghd.com; lia.saunders@ghd.com, henry.luo@ghd.com, nica.hugo@ghd.com, ghdlabreports@ghd.com		DATE/TIME: 12/09/2024 @ 16:30	DATE/TIME: 12/9/24 1600	DATE/TIME: / DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: ANALYSIS OF NITRITE 48 HRS HOLDING TIME REQUIRED. PLEASE DO NOT LOG ALL SAMPLES RECEIVED IN ONE WORKORDER. LOG AS TWO SEPARATE WORKORDERS AS PER THE TWO COCs PROVIDED.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).												
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	Comments	TOTAL CONTAINERS	W-02 (dissolved 8 metals)	EG020F (dissolved Fe, Mn)	W-04 (TRH/BTEXN)	NT-08A (TN, NO2, NO3, NH3, TP, soluble Reactive P)	NT-01D & 02 (major cations & anions, Hardness)	EA015H (TDS)	EA025H (TSS)	EP075A (SIM) (Phenols – Standard level (15 analytes))	W-02T (8 total metals)	BTEXN		
1	BH104R	12/09/2024	Water		6	X	X	X	X	X	X	X					
2	BH107R	12/09/2024	Water		6	X	X	X	X	X	X	X					
3	BH112R	12/09/2024	Water		6	X	X	X	X	X	X	X		0			
4	BH145R	11/09/2024	Water		6	X	X	X	X	X	X	X					
5	GWDUP1	11/09/2024	Water		1	X											
FwD	GWDUP2	12/09/2024	Water	PLEASE FORWARD TO EUROFINS WITH ATTACHED COC	1												
6	GWRB1	12/09/2024	Water		1									X			
7	Trip spike	9/09/2024	Water		1										X		
8	Trip blank	9/09/2024	Water		1										X		

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2429962**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: henry.luo@ghd.com	E-mail	: samiksha.sathish@alsglobal.com
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9239 7199	Facsimile	: +61-2-8784 8500
Project	: 12554717	Page	: 1 of 3
Order number	: 12554717	Quote number	: ES2021GHDSER0026 (SY/322/21_V5)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Lia Saunders, NICA HUGO		

Dates

Date Samples Received	: 12-Sep-2024 16:00	Issue Date	: 12-Sep-2024
Client Requested Due Date	: 18-Sep-2024	Scheduled Reporting Date	: **18-Sep-2024**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 7	Temperature	: 3.85, 4.8, 4.2'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

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 GWDUP2 has been forwarded to Eurofins.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Sydney, NATA accreditation no. 825, site no. 10911.
- 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.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EA025H Suspended Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - NT-01D & 02 Major Cations & Anions (Ca, Mg, Na, K, Cl, SO4,	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-02 8 Metals	WATER - W-04 TRH/BTEXN
ES2429962-001	12-Sep-2024 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2429962-002	12-Sep-2024 00:00	BH107R	✓	✓	✓	✓	✓	✓	✓
ES2429962-003	12-Sep-2024 00:00	BH112R	✓	✓	✓	✓	✓	✓	✓
ES2429962-004	11-Sep-2024 00:00	BH145R	✓	✓	✓	✓	✓	✓	✓
ES2429962-005	11-Sep-2024 00:00	GWDUP1						✓	

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP080 BTEXN	WATER - W-02T 8 metals (Total)	WATER - W-18 TRH(C6 - C9)/BTEXN
ES2429962-006	12-Sep-2024 00:00	GWRB1		✓	
ES2429962-007	09-Sep-2024 00:00	Trip spike	✓		
ES2429962-008	09-Sep-2024 00:00	Trip blank			✓

Proactive Holding Time Report

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

Requested Deliverables

Accounts Payable Australia		
- A4 - AU Tax Invoice (INV)	Email	accountspayableAU@ghd.com
ANDREW DUVAL		
- *AU Certificate of Analysis - NATA (COA)	Email	andrew.duval@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	andrew.duval@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	andrew.duval@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	andrew.duval@ghd.com
- Chain of Custody (CoC) (COC)	Email	andrew.duval@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	andrew.duval@ghd.com
- EDI Format - XTab (XTAB)	Email	andrew.duval@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	andrew.duval@ghd.com
EMILY SMITH		
- *AU Certificate of Analysis - NATA (COA)	Email	emily.smith@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	emily.smith@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	emily.smith@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	emily.smith@ghd.com
- Chain of Custody (CoC) (COC)	Email	emily.smith@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	emily.smith@ghd.com
- EDI Format - XTab (XTAB)	Email	emily.smith@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	emily.smith@ghd.com
GHD LAB REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	ghdlabreports@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ghdlabreports@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ghdlabreports@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ghdlabreports@ghd.com
- Chain of Custody (CoC) (COC)	Email	ghdlabreports@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	ghdlabreports@ghd.com
- EDI Format - XTab (XTAB)	Email	ghdlabreports@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	ghdlabreports@ghd.com
HENRY LUO		
- *AU Certificate of Analysis - NATA (COA)	Email	henry.luo@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	henry.luo@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	henry.luo@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	henry.luo@ghd.com
- Chain of Custody (CoC) (COC)	Email	henry.luo@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	henry.luo@ghd.com
- EDI Format - XTab (XTAB)	Email	henry.luo@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	henry.luo@ghd.com
Lia Saunders		
- *AU Certificate of Analysis - NATA (COA)	Email	Lia.Saunders@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lia.Saunders@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lia.Saunders@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lia.Saunders@ghd.com
- Chain of Custody (CoC) (COC)	Email	Lia.Saunders@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	Lia.Saunders@ghd.com
- EDI Format - XTab (XTAB)	Email	Lia.Saunders@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	Lia.Saunders@ghd.com
NICA HUGO		
- *AU Certificate of Analysis - NATA (COA)	Email	nica.hugo@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	nica.hugo@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	nica.hugo@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	nica.hugo@ghd.com
- Chain of Custody (CoC) (COC)	Email	nica.hugo@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	nica.hugo@ghd.com
- EDI Format - XTab (XTAB)	Email	nica.hugo@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	nica.hugo@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2429962**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 12-Sep-2024 16:00
Order number	: 12554717	Date Analysis Commenced	: 13-Sep-2024
C-O-C number	: ----	Issue Date	: 18-Sep-2024 15:50
Sampler	: Lia Saunders, NICA HUGO		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	12-Sep-2024 00:00	12-Sep-2024 00:00	12-Sep-2024 00:00	11-Sep-2024 00:00	11-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		ES2429962-001	ES2429962-002	ES2429962-003	ES2429962-004	ES2429962-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		4620	2270	9860	11100	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		38	22	24	25	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		732	522	2220	2690	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		1090	1570	1320	1050	----
Total Alkalinity as CaCO3	----	1	mg/L		1090	1570	1320	1050	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		224	228	1860	333	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		1980	323	3890	6320	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		100	41	211	209	----
Magnesium	7439-95-4	1	mg/L		117	102	410	526	----
Sodium	7440-23-5	1	mg/L		1540	754	2880	3100	----
Potassium	7440-09-7	1	mg/L		17	15	41	18	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		0.003	<0.001	0.002	0.002	0.002
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	0.002	0.004	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		0.001	<0.001	0.005	0.001	0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	0.007	0.013	0.007	0.007

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	12-Sep-2024 00:00	12-Sep-2024 00:00	12-Sep-2024 00:00	11-Sep-2024 00:00	11-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		ES2429962-001	ES2429962-002	ES2429962-003	ES2429962-004	ES2429962-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		**0.072**	**0.004**	**0.077**	**0.099**	----
Iron	7439-89-6	0.05	mg/L		**1.24**	<0.05	<0.05	**2.43**	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**1.81**	**0.02**	**2.40**	**2.17**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	**0.01**	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	**2.45**	**0.39**	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	**2.45**	**0.40**	<0.01	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**2.0**	**0.3**	**2.6**	**2.3**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**2.0**	**2.8**	**3.0**	**2.3**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.06**	**0.04**	**0.11**	**0.04**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	**0.04**	<0.01	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**82.3**	**45.2**	**175**	**206**	----
ø Total Cations	----	0.01	meq/L		**82.0**	**43.6**	**170**	**189**	----
ø Ionic Balance	----	0.01	%		**0.16**	**1.81**	**1.23**	**4.34**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	12-Sep-2024 00:00	12-Sep-2024 00:00	12-Sep-2024 00:00	11-Sep-2024 00:00	11-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		ES2429962-001	ES2429962-002	ES2429962-003	ES2429962-004	ES2429962-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**94.8**	**102**	**103**	**100**	----
Toluene-D8	2037-26-5	2	%		**95.0**	**104**	**104**	**98.8**	----
4-Bromofluorobenzene	460-00-4	2	%		**100**	**107**	**106**	**106**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	GWRB1	Trip spike	Trip blank	----	----
				Sampling date / time	12-Sep-2024 00:00	09-Sep-2024 00:00	09-Sep-2024 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2429962-006	ES2429962-007	ES2429962-008	--------	--------
					Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
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		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	----	<20	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	----	<20	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		----	----	<20	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	**17**	<1	----	----
Toluene	108-88-3	2	µg/L		----	**17**	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		----	**16**	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	**17**	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		----	**18**	<2	----	----
^ **Total Xylenes**	----	2	µg/L		----	**35**	<2	----	----
^ **Sum of BTEX**	----	1	µg/L		----	**85**	<1	----	----
Naphthalene	91-20-3	5	µg/L		----	**22**	<5	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	**101**	**103**	----	----
Toluene-D8	2037-26-5	2	%		----	**100**	**101**	----	----
4-Bromofluorobenzene	460-00-4	2	%		----	**103**	**106**	----	----

Surrogate Control Limits

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

QUALITY CONTROL REPORT

Work Order	: **ES2429962**	Page	: 1 of 11
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Samiksha Sathish
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 12-Sep-2024
Order number	: 12554717	Date Analysis Commenced	: 13-Sep-2024
C-O-C number	: ----	Issue Date	: 18-Sep-2024
Sampler	: Lia Saunders, NICA HUGO		
Site	: ----		
Quote number	: SY/322/21_V5		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

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 (%)
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 6060854)									
ES2429962-001	BH104R	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	4620	4590	0.7	0% - 20%
ES2430346-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1080	1000	7.1	0% - 20%
EW2404202-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	34	45	27.8	No Limit
EW2404207-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	54	56	1.8	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 6060855)									
ES2429962-001	BH104R	EA025H: Suspended Solids (SS)	----	5	mg/L	38	34	11.0	No Limit
ES2430346-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
EW2404202-005	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
EW2404207-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 6055811)									
ES2429962-001	BH104R	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1090	1100	1.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	1090	1100	1.0	0% - 20%
EW2404177-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	390	393	0.8	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	390	393	0.8	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6053880)									
EW2404236-005	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	6	6	0.0	No Limit
ES2429766-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	6	6	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6054906)									

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6054906) - continued									
ES2429962-001	BH104R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	224	225	0.7	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6053879)									
EW2404236-005	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	30	30	0.0	0% - 20%
ES2429766-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	12	12	0.0	0% - 50%
ED045G: Chloride by Discrete Analyser (QC Lot: 6054905)									
ES2429962-001	BH104R	ED045G: Chloride	16887-00-6	1	mg/L	1980	1990	0.3	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 6057079)									
EW2404202-005	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	1	1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	7	7	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
ES2429962-002	BH107R	ED093F: Calcium	7440-70-2	1	mg/L	41	41	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	102	102	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	754	753	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	15	15	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6057080)									
EW2404202-005	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: Manganese	7439-96-5	0.001	mg/L	0.007	0.007	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.034	148	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.06	0.07	0.0	No Limit
ES2429962-002	BH107R	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	0.002	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.007	0.006	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6059402)									
ES2429905-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6059402) - continued									
ES2429905-002	Anonymous	EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.330	0.328	0.7	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.034	0.034	0.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.008	0.009	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.08	0.08	0.0	No Limit
EW2404137-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.017	0.017	0.0	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.012	0.013	0.0	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.052	0.051	0.0	0% - 50%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 6058920)									
ES2429853-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.007	0.006	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.856	0.838	2.0	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.002	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.047	0.048	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 6057081)									
ES2429962-002	BH107R	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 6059400)									
EN2410741-004	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2429734-004	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 6058914)									
ES2429853-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ME2401472-002	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6056249)									
ES2429953-012	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.03	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6053877)									
ES2429640-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.14	0.15	0.0	0% - 50%
ES2429953-005	Anonymous	EK057G: Nitrite as N	14797-65-0	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 (%)*
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6054907)									
ES2429962-001	BH104R	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 6056248)									
ES2429953-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2429953-011	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.08	0.09	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 6056244)									
ES2429953-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	1.2	0.0	0% - 50%
ES2429953-012	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.5	1.4	0.0	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 6056243)									
ES2429953-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.13	0.14	8.0	0% - 50%
ES2429953-012	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.13	0.14	0.0	0% - 50%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 6053878)									
EW2404235-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2429766-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 6054904)									
ES2429962-001	BH104R	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 6053984)									
ES2429717-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	0.34 mg/L	310	8.8	0% - 50%
ES2429905-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 6053984)									
ES2429717-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	0.36 mg/L	340	6.8	0% - 50%
ES2429905-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 6053984)									
ES2429717-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<0.001 mg/L	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	0.205 mg/L	198	3.2	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002 mg/L	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	0.006 mg/L	5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	0.002 mg/L	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	0.005 mg/L	5	0.0	No Limit
ES2429905-004	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 Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 6060854)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	97.1	87.0	109
				<10	293 mg/L	107	75.2	126
				<10	2410 mg/L	99.8	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 6060855)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	100	83.0	129
				<5	1000 mg/L	97.9	82.0	110
				<5	879 mg/L	94.8	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 6055811)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	102	81.0	115
				----	50 mg/L	103	80.0	128
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6053880)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	100	82.0	122
				<1	500 mg/L	95.3	82.0	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6054906)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	82.0	122
				<1	500 mg/L	109	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 6053879)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	100	80.9	127
				<1	1000 mg/L	107	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 6054905)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	99.1	80.9	127
				<1	1000 mg/L	94.1	80.9	127
ED093F: Dissolved Major Cations (QCLot: 6057079)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	109	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	104	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	103	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 6057080)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	86.8	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	85.8	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	86.8	85.0	111

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 6057080) - continued								
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	83.2	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	85.3	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	82.8	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	83.3	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	83.2	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	88.0	82.0	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 6059402)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.9	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	92.7	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.6	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	94.7	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.6	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.5	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.6	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.5	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	109	82.0	112
EG020T: Total Metals by ICP-MS (QCLot: 6058920)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	93.1	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	85.2	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.1	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	94.2	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	92.5	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.1	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	89.4	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 6057081)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	86.9	83.0	105
EG035F: Dissolved Mercury by FIMS (QCLot: 6059400)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	98.8	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 6058914)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	87.6	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6056249)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	107	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6053877)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	82.0	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6054907)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	100	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6056248)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	100	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6056244)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	92.4	69.0	123
				<0.1	1 mg/L	100	70.0	123
				<0.1	5 mg/L	96.9	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6056243)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	93.9	71.3	126
				<0.01	0.442 mg/L	108	71.3	126
				<0.01	1 mg/L	109	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 6053878)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	102	85.0	117
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 6054904)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	107	85.0	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6053833)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	63.5	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	88.1	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	102	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6053984)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	79.9	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6053833)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	91.8	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	98.2	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	81.3	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6053984)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	79.9	75.0	127
EP080: BTEXN (QCLot: 6053984)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	91.8	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	96.1	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	97.6	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	94.3	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	97.8	76.4	123

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080: BTEXN (QCLot: 6053984) - continued								
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	124	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**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6053880)							
ES2429766-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	110	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6054906)							
ES2429962-001	BH104R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6053879)							
ES2429766-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	92.5	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6054905)							
ES2429962-001	BH104R	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 6057080)							
ES2429962-003	BH112R	EG020A-F: Arsenic	7440-38-2	1 mg/L	90.7	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	78.7	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	78.2	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	80.7	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	75.7	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	77.4	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	82.0	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	82.2	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 6059402)							
ES2429905-003	Anonymous	EG020A-F: Arsenic	7440-38-2	2 mg/L	79.1	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.5 mg/L	76.6	70.0	130
		EG020A-F: Chromium	7440-47-3	2 mg/L	78.1	70.0	130
		EG020A-F: Copper	7440-50-8	2 mg/L	76.3	70.0	130
		EG020A-F: Lead	7439-92-1	2 mg/L	75.1	70.0	130
		EG020A-F: Manganese	7439-96-5	2 mg/L	76.5	70.0	130
		EG020A-F: Nickel	7440-02-0	2 mg/L	78.3	70.0	130
		EG020A-F: Zinc	7440-66-6	2 mg/L	81.2	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 6058920)							
ES2429853-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	91.9	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	82.6	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	86.6	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	93.9	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	84.0	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	93.9	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	90.4	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 6057081)							
ES2429962-001	BH104R	EG035F: Mercury	7439-97-6	0.01 mg/L	80.0	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 6059400)							
EN2410741-003	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	111	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 6058914)							
ES2429783-005	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	81.2	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6056249)							
ES2429953-012	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	108	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6053877)							
ES2429640-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	103	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6054907)							
ES2429962-001	BH104R	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	112	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6056248)							
ES2429953-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	106	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6056244)							
ES2429953-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	92.4	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6056243)							
ES2429953-003	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	94.6	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 6053878)							
ES2429766-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	110	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 6054904)							
ES2429962-001	BH104R	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	116	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6053984)							
ES2429717-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	81.7	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6053984)							
ES2429717-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	75.4	70.0	130
EP080: BTEXN (QCLot: 6053984)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080: BTEXN (QCLot: 6053984) - continued							
ES2429717-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	99.6	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	# Not Determined	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	112	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	108	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	113	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	104	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2429962**	Page	: 1 of 11
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Telephone	: +61-2-8784 8555
Project	: 12554717	Date Samples Received	: 12-Sep-2024
Site	: ----	Issue Date	: 18-Sep-2024
Sampler	: Lia Saunders, NICA HUGO	No. of samples received	: 8
Order number	: 12554717	No. of samples analysed	: 8

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, 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
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2429962--001	BH104R	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	ES2429962--001	BH104R	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080: BTEXN	ES2429717--001	Anonymous	**Toluene**	108-88-3	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
TRH - Semivolatile Fraction	EP071	0	10	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
TRH - Semivolatile Fraction	EP071	0	10	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*
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) BH145R	**11-Sep-2024**	**----**	----	----	**17-Sep-2024**	18-Sep-2024	✓
Clear Plastic Bottle - Natural (EA015H) BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**17-Sep-2024**	19-Sep-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
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
BH145R	**11-Sep-2024**	**----**	----	----	**17-Sep-2024**	18-Sep-2024	✓
Clear Plastic Bottle - Natural (EA025H)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**17-Sep-2024**	19-Sep-2024	✓
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH145R	**11-Sep-2024**	**----**	----	----	**16-Sep-2024**	09-Oct-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**16-Sep-2024**	10-Oct-2024	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
BH145R	**11-Sep-2024**	**----**	----	----	**15-Sep-2024**	25-Sep-2024	✓
Clear Plastic Bottle - Natural (ED037-P)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**15-Sep-2024**	26-Sep-2024	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
BH145R	**11-Sep-2024**	**----**	----	----	**13-Sep-2024**	09-Oct-2024	✓
Clear Plastic Bottle - Natural (ED041G)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**13-Sep-2024**	10-Oct-2024	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
BH145R	**11-Sep-2024**	**----**	----	----	**13-Sep-2024**	09-Oct-2024	✓
Clear Plastic Bottle - Natural (ED045G)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**13-Sep-2024**	10-Oct-2024	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH145R	**11-Sep-2024**	**----**	----	----	**16-Sep-2024**	09-Oct-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**16-Sep-2024**	10-Oct-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
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH145R	**11-Sep-2024**	**----**	----	----	**16-Sep-2024**	10-Mar-2025	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
GWDUP1	**11-Sep-2024**	**----**	----	----	**17-Sep-2024**	10-Mar-2025	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**16-Sep-2024**	11-Mar-2025	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
GWRB1	**12-Sep-2024**	**16-Sep-2024**	11-Mar-2025	✓	**16-Sep-2024**	11-Mar-2025	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH145R, GWDUP1	**11-Sep-2024**	**----**	----	----	**18-Sep-2024**	09-Oct-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**18-Sep-2024**	10-Oct-2024	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
GWRB1	**12-Sep-2024**	**----**	----	----	**18-Sep-2024**	10-Oct-2024	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH145R	**11-Sep-2024**	**----**	----	----	**14-Sep-2024**	09-Oct-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**14-Sep-2024**	10-Oct-2024	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
BH145R	**11-Sep-2024**	**----**	----	----	**13-Sep-2024**	13-Sep-2024	✓
Clear Plastic Bottle - Natural (EK057G)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**13-Sep-2024**	14-Sep-2024	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH145R	**11-Sep-2024**	**----**	----	----	**14-Sep-2024**	09-Oct-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**14-Sep-2024**	10-Oct-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
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH145R	**11-Sep-2024**	**14-Sep-2024**	09-Oct-2024	✓	**17-Sep-2024**	09-Oct-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH104R, BH107R, BH112R	**12-Sep-2024**	**14-Sep-2024**	10-Oct-2024	✓	**17-Sep-2024**	10-Oct-2024	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH145R	**11-Sep-2024**	**14-Sep-2024**	09-Oct-2024	✓	**17-Sep-2024**	09-Oct-2024	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH104R, BH107R, BH112R	**12-Sep-2024**	**14-Sep-2024**	10-Oct-2024	✓	**17-Sep-2024**	10-Oct-2024	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) BH145R	**11-Sep-2024**	**----**	----	----	**13-Sep-2024**	13-Sep-2024	✓
Clear Plastic Bottle - Natural (EK071G) BH104R, BH107R, BH112R	**12-Sep-2024**	**----**	----	----	**13-Sep-2024**	14-Sep-2024	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BH145R	**11-Sep-2024**	**13-Sep-2024**	18-Sep-2024	✓	**16-Sep-2024**	23-Oct-2024	✓
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R, BH112R	**12-Sep-2024**	**13-Sep-2024**	19-Sep-2024	✓	**16-Sep-2024**	23-Oct-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip blank	**09-Sep-2024**	**16-Sep-2024**	23-Sep-2024	✓	**16-Sep-2024**	23-Sep-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**11-Sep-2024**	**16-Sep-2024**	25-Sep-2024	✓	**16-Sep-2024**	25-Sep-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R, BH112R	**12-Sep-2024**	**16-Sep-2024**	26-Sep-2024	✓	**16-Sep-2024**	26-Sep-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BH145R	**11-Sep-2024**	**13-Sep-2024**	18-Sep-2024	✓	**16-Sep-2024**	23-Oct-2024	✓
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R, BH112R	**12-Sep-2024**	**13-Sep-2024**	19-Sep-2024	✓	**16-Sep-2024**	23-Oct-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip blank	**09-Sep-2024**	**16-Sep-2024**	23-Sep-2024	✓	**16-Sep-2024**	23-Sep-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**11-Sep-2024**	**16-Sep-2024**	25-Sep-2024	✓	**16-Sep-2024**	25-Sep-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R, BH112R	**12-Sep-2024**	**16-Sep-2024**	26-Sep-2024	✓	**16-Sep-2024**	26-Sep-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
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip spike, Trip blank	**09-Sep-2024**	**16-Sep-2024**	23-Sep-2024	✓	**16-Sep-2024**	23-Sep-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH145R	**11-Sep-2024**	**16-Sep-2024**	25-Sep-2024	✓	**16-Sep-2024**	25-Sep-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH112R	**12-Sep-2024**	**16-Sep-2024**	26-Sep-2024	✓	**16-Sep-2024**	26-Sep-2024	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	3	22	**13.64**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	3	22	**13.64**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	38	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	3	23	**13.04**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	3	26	**11.54**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	3	23	**13.04**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	10	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	22	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	23	**17.39**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	5	33	**15.15**	**12.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	5	33	**15.15**	**12.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	16	**18.75**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	16	**18.75**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	10	**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
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(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 SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. 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-NO3- F. Combined oxidised Nitrogen (NO2+NO3) 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-NO3-. 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)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030E. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
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)

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

eurofins mgt

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

☐ **Brisbane**
Unit 1-21 Smallwood Place, Murrarie
Phone: +617 3902 4600
Email: enviro.bris@mgtlabmark.com.au

☐ **Melbourne**
2 Kingston Town Close, Oakleigh, VIC 3166
Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mgtlabmark.com.au

CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Company Name : GHD Pty Ltd, Sydney	**Contact Name :** Lia Saunders 0411 213 724	**Purchase Order :** 12554717	**COC Number :**
Office Address :	**Project Manager: Henry Luo** 0414 090 002	**PROJECT Number :** 12554717	**Eurofins | mgt quote ID :**
Level 15, 133 Castlereagh Street, Sydney NSW 2000	**Email for results :** emily.smith@ghd.com; andrew.duval@ghd.com; lia.saunders@ghd.com, nica.hugo@ghd.com, henry.luo@ghd.com; ghdlabreports@ghd.com	**PROJECT Name :** M12 Water Sampling	**Data output format:** ESDAT

Special Directions & Comments :

Sent from ALS

Eurofins | mgt DI water batch number:

Analytes

	Sample ID	Date	Matrix	Dissolved metals	Total metals					
1	SWDUP2	12/09/2024	Water		X					
2	GWDUP2	12/09/2024	Water	X						
3										
4										
5										
6										
7										
8										
9										
10										

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:

	500P	250P	60P	1LA	40mL vial	200mL A	Jar	Bag	Sample comments:
1			1						
2			1						
3									
4									
5									
6									
7									
8									
9									
10									

Laboratory Staff

Relinquished By: Nica Hugo	**Received By:**
Date & Time : 12/09/2024 @ 16:30	**Date & Time :**
Signature:	**Signature:**

Method Of Shipment

☐ Courier
☐ Hand Delivered
☐ Postal
Courier Consignment # :

Temperature on arrival:

Report number: 1139072

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd

ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Sample Receipt Advice

Company name: GHD Pty Ltd NSW
Contact name: Henry Luo
Project name: M12 WATER SAMPLING
Project ID: 12554717
Turnaround time: 5 Day
Date/Time received Sep 13, 2024 12:30 PM
Eurofins reference 1139072

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 : 1.3 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:

Adam Bateup on phone : or by email: AdamBateup@eurofins.com

Results will be delivered electronically via email to Henry Luo - henry.luo@ghd.com.

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

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Order No.:
Report #: 1139072
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Sep 13, 2024 12:30 PM
Due: Sep 20, 2024
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Adam Bateup

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	Sep 12, 2024		Water	S24-Se0035351	X	
2	GWDUP2	Sep 12, 2024		Water	S24-Se0035352		X
Test Counts						1	1

GHD Pty Ltd NSW
Level 15, 133 Castlereagh Street
Sydney
NSW 2000

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: **Henry Luo**

Report **1139072-W**
Project name M12 WATER SAMPLING
Project ID 12554717
Received Date Sep 13, 2024

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S24-Se0035351**	**S24-Se0035352**
Date Sampled			**Sep 12, 2024**	**Sep 12, 2024**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	< 0.001	-
Arsenic (filtered)	0.001	mg/L	-	0.003
Cadmium	0.0002	mg/L	< 0.0002	-
Cadmium (filtered)	0.0002	mg/L	-	< 0.0002
Chromium	0.001	mg/L	< 0.001	-
Chromium (filtered)	0.001	mg/L	-	< 0.001
Copper	0.001	mg/L	0.002	-
Copper (filtered)	0.001	mg/L	-	0.002
Lead	0.001	mg/L	< 0.001	-
Lead (filtered)	0.001	mg/L	-	< 0.001
Mercury	0.0001	mg/L	< 0.0001	-
Mercury (filtered)	0.0001	mg/L	-	< 0.0001
Nickel	0.001	mg/L	0.001	-
Nickel (filtered)	0.001	mg/L	-	0.001
Zinc	0.005	mg/L	0.014	-
Zinc (filtered)	0.005	mg/L	-	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
Metals M8	Sydney	Sep 17, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Sep 17, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd NSW
Address: Level 15, 133 Castlereagh Street
Sydney
NSW 2000

Project Name: M12 WATER SAMPLING
Project ID: 12554717

Order No.:
Report #: 1139072
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Sep 13, 2024 12:30 PM
Due: Sep 20, 2024
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Adam Bateup

Sample Detail						Metals M8	Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	Sep 12, 2024		Water	S24-Se0035351	X	
2	GWDUP2	Sep 12, 2024		Water	S24-Se0035352		X
Test Counts						1	1

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

1. 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.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. 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 sampling date; 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 seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**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	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should 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 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	97			80-120	Pass	
Cadmium	%	96			80-120	Pass	
Chromium	%	93			80-120	Pass	
Copper	%	91			80-120	Pass	
Lead	%	92			80-120	Pass	
Mercury	%	99			80-120	Pass	
Nickel	%	91			80-120	Pass	
Zinc	%	94			80-120	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	94			80-120	Pass	
Cadmium (filtered)	%	99			80-120	Pass	
Chromium (filtered)	%	99			80-120	Pass	
Copper (filtered)	%	98			80-120	Pass	
Lead (filtered)	%	96			80-120	Pass	
Mercury (filtered)	%	102			80-120	Pass	
Nickel (filtered)	%	97			80-120	Pass	
Zinc (filtered)	%	98			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S24-Se0035761	NCP	%	95			75-125	Pass	
Cadmium (filtered)	S24-Se0035761	NCP	%	97			75-125	Pass	
Chromium (filtered)	S24-Se0035761	NCP	%	89			75-125	Pass	
Copper (filtered)	S24-Se0035761	NCP	%	87			75-125	Pass	
Lead (filtered)	S24-Se0035761	NCP	%	88			75-125	Pass	
Mercury (filtered)	S24-Se0035761	NCP	%	90			75-125	Pass	
Nickel (filtered)	S24-Se0035761	NCP	%	88			75-125	Pass	
Zinc (filtered)	S24-Se0035761	NCP	%	93			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S24-Se0032848	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	S24-Se0043800	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S24-Se0032848	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S24-Se0032848	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead	S24-Se0043800	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	S24-Se0032848	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S24-Se0032848	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	S24-Se0032848	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S24-Se0043844	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S24-Se0043844	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S24-Se0043844	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S24-Se0043844	NCP	mg/L	0.003	0.003	1.0	30%	Pass	
Lead (filtered)	S24-Se0043844	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S24-Se0043844	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S24-Se0043844	NCP	mg/L	0.003	0.002	4.0	30%	Pass	
Zinc (filtered)	S24-Se0043844	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	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

Authorised by:

Adam Bateup	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Mickael Ros	Senior Analyst-Metal

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

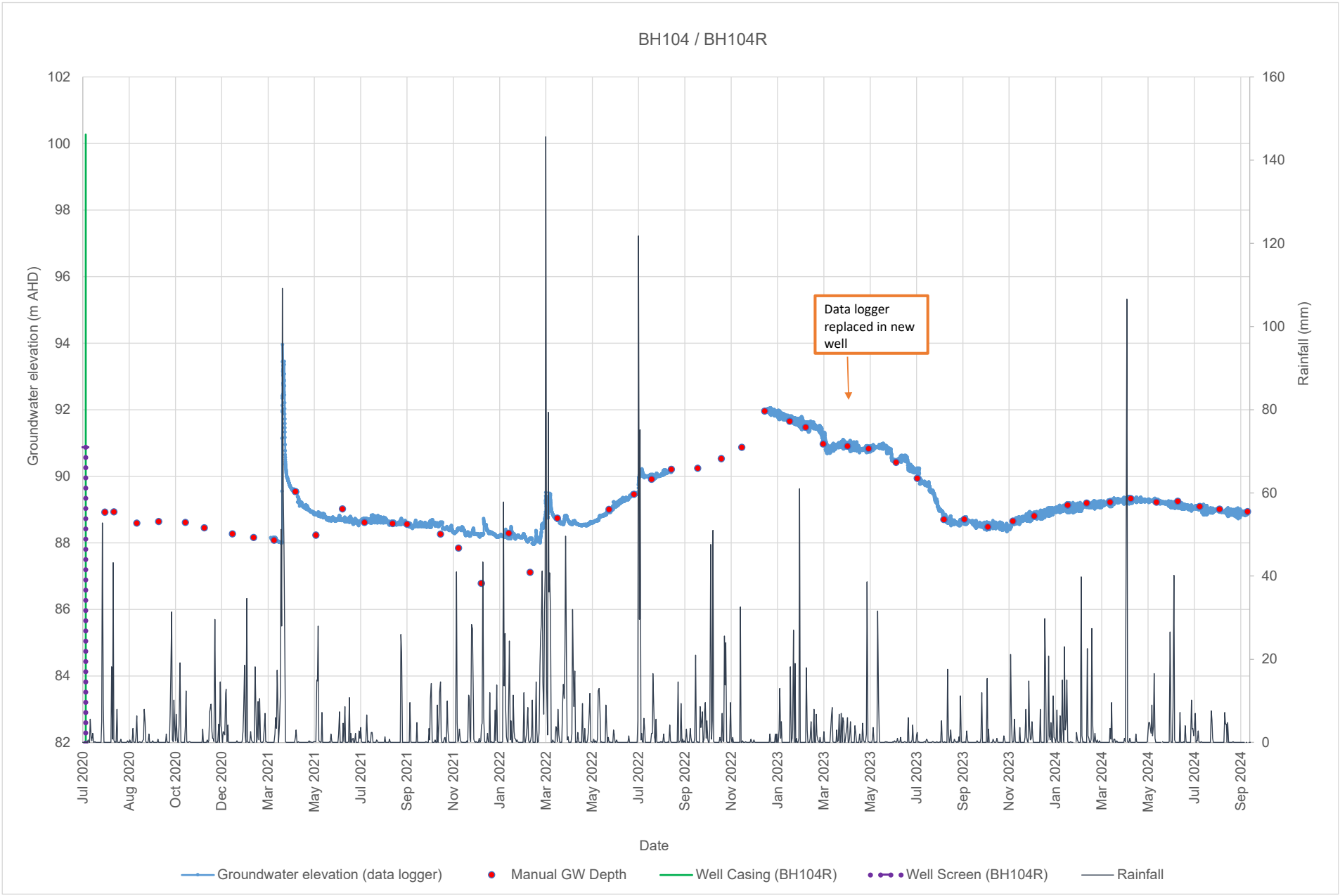
* Indicates NATA accreditation does not cover the performance of this service

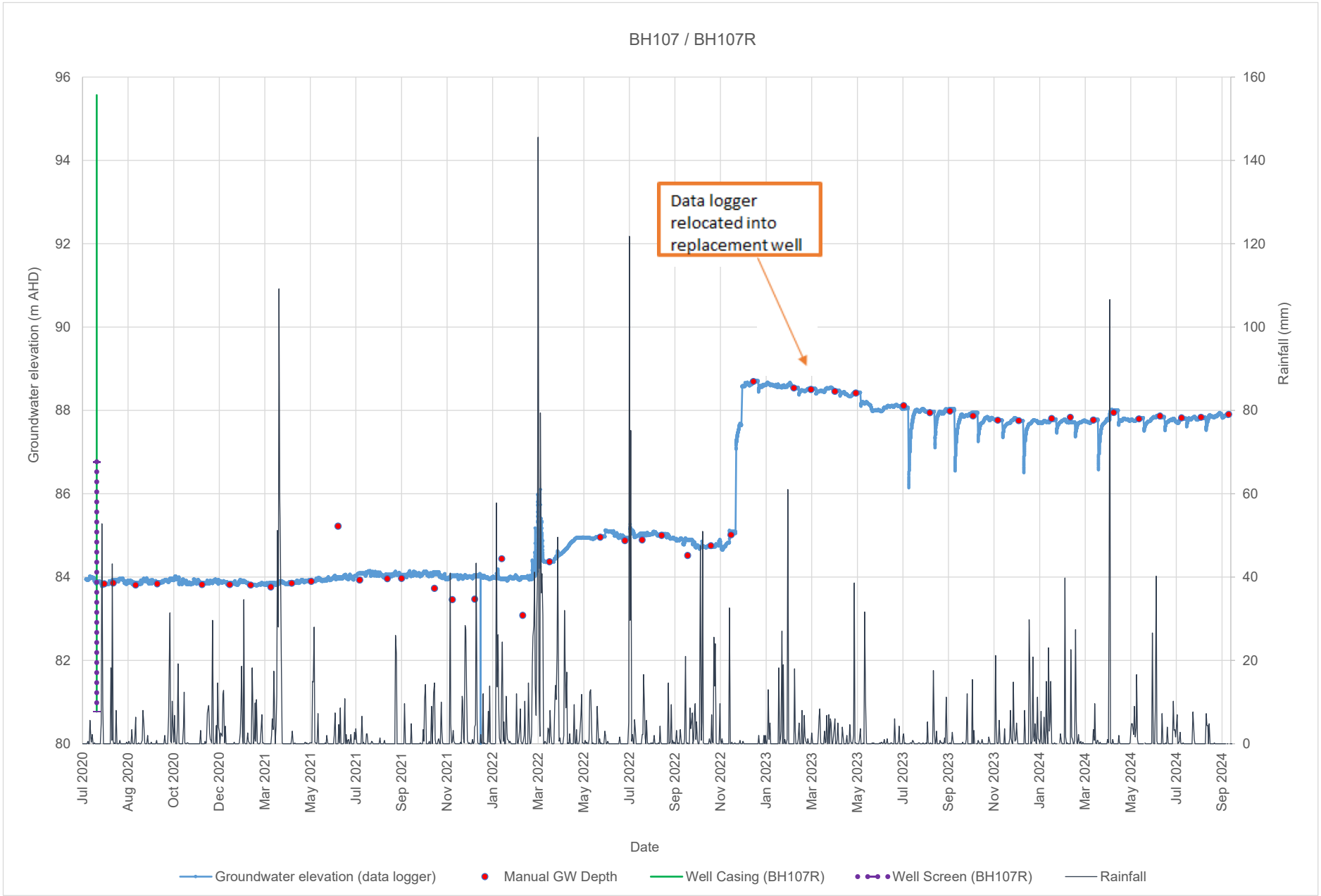
Measurement uncertainty of test data is available on request or please click here.

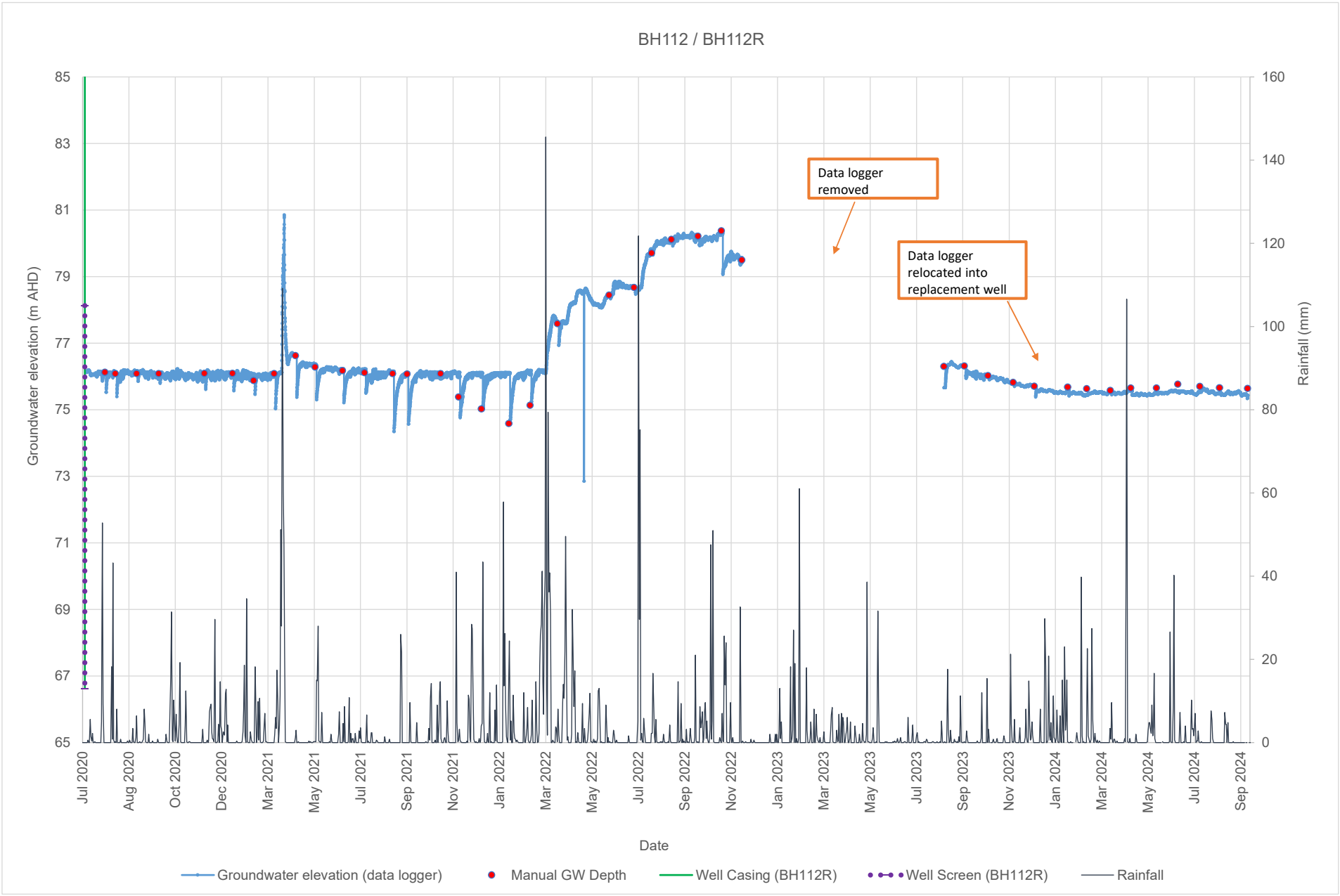
Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost 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.

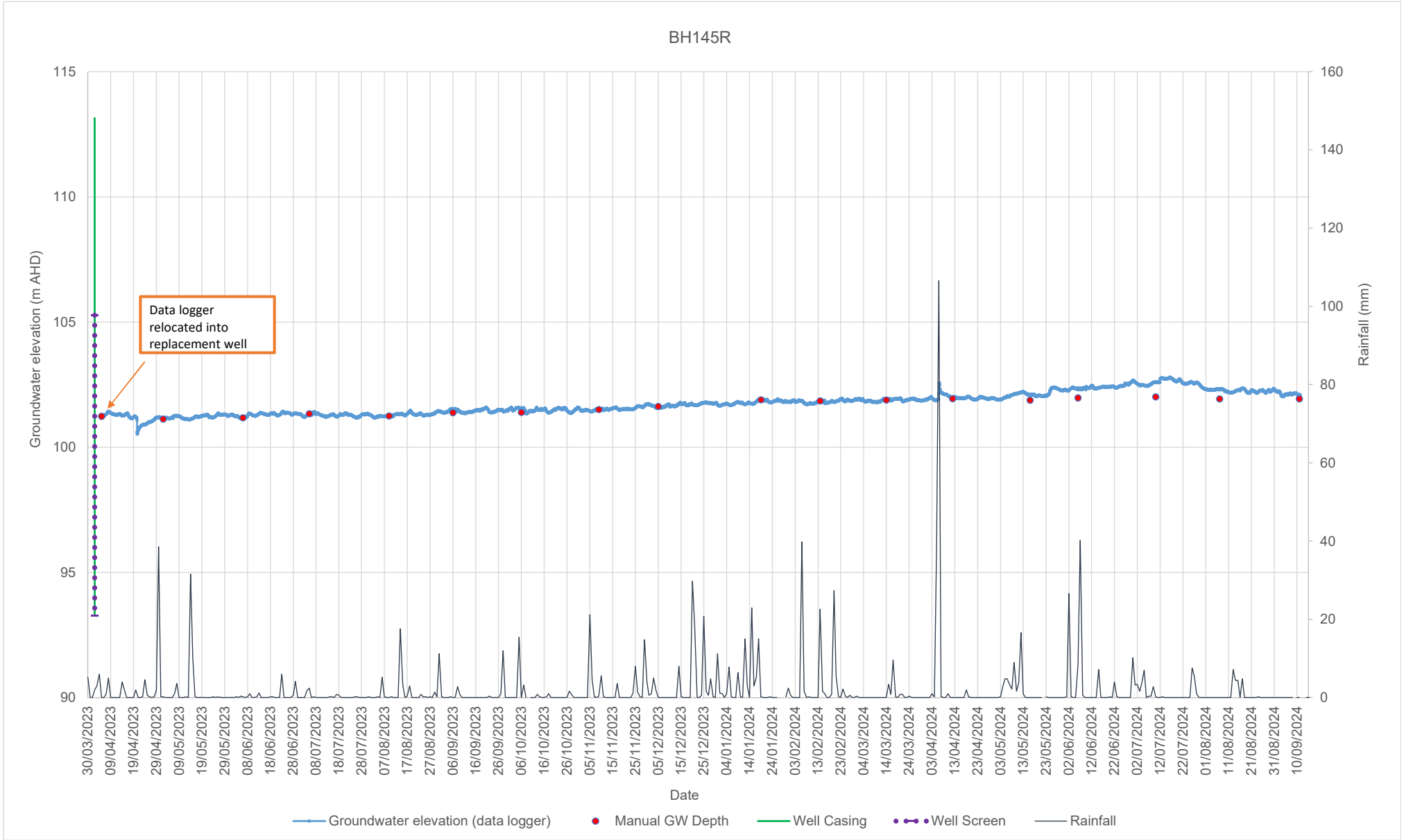
Appendix I

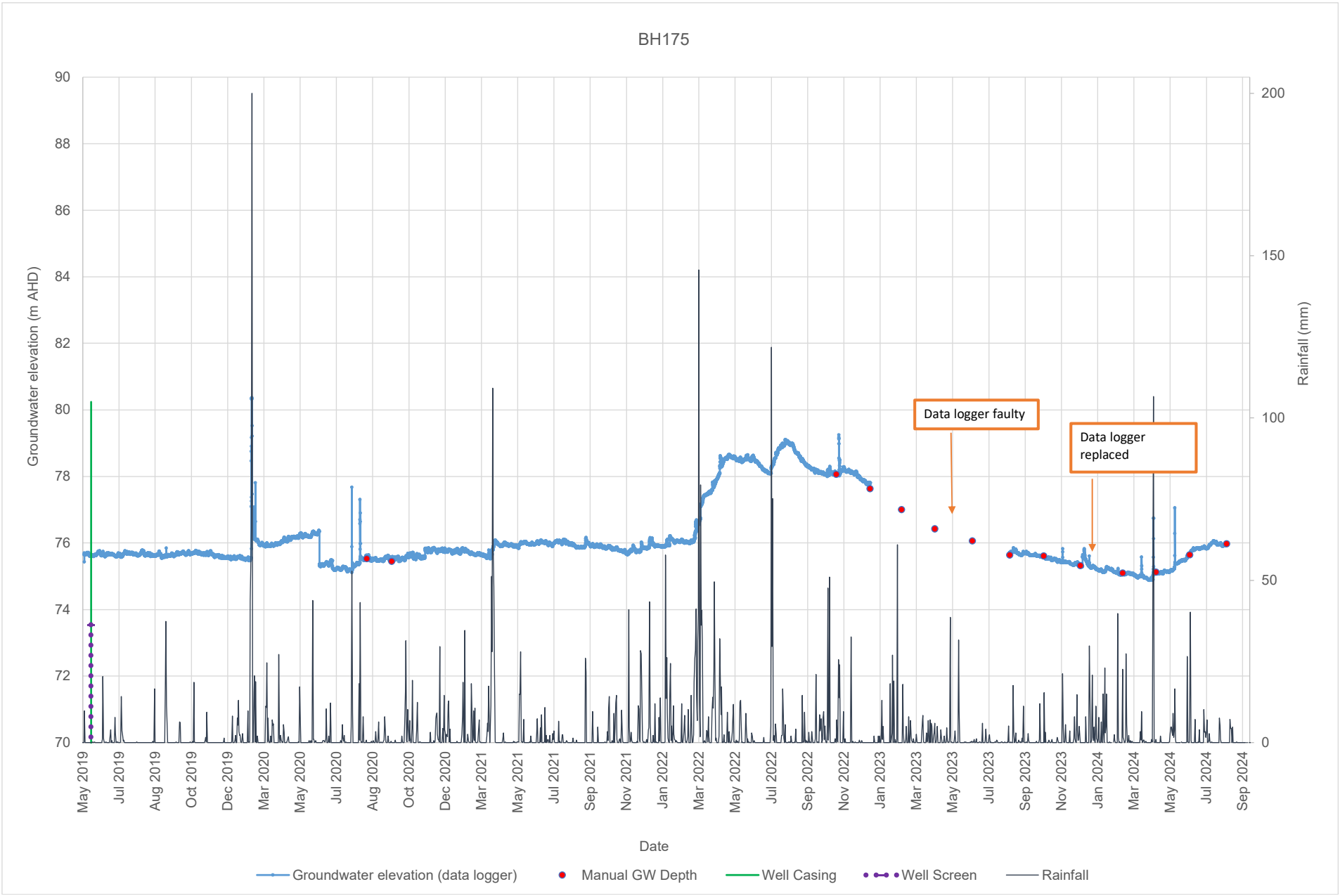
Groundwater level plots

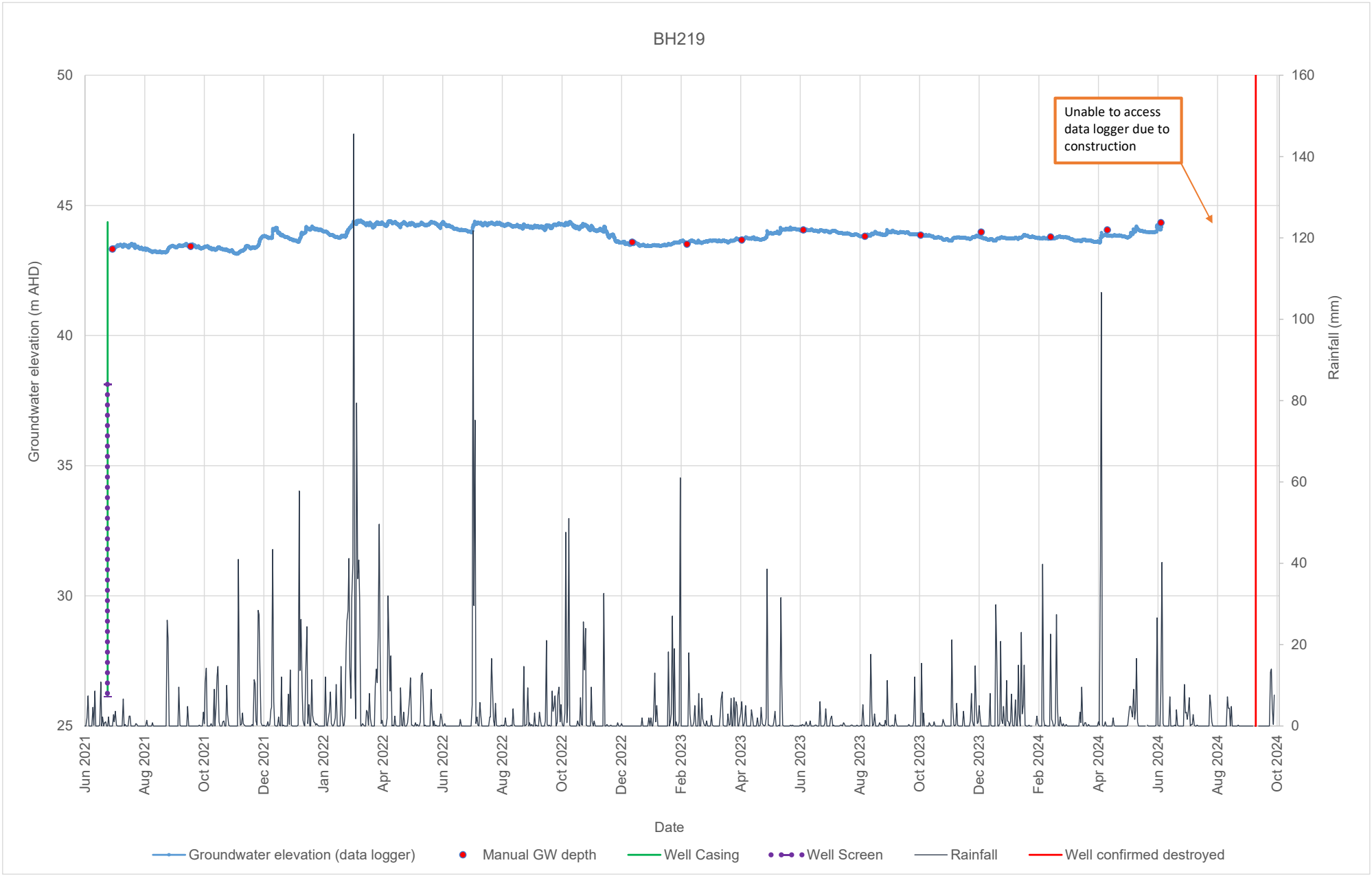

BH104 / BH104R
Groundwater elevation (m AHD)
Rainfall (mm)
Date
Data logger replaced in new well
102
100
98
96
94
92
90
88
86
84
82
160
140
120
100
80
60
40
20
0
Jul 2020
Aug 2020
Oct 2020
Dec 2020
Mar 2021
May 2021
Jul 2021
Sep 2021
Nov 2021
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
Mar 2024
May 2024
Jul 2024
Sep 2024
Groundwater elevation (data logger)
Manual GW Depth
Well Casing (BH104R)
Well Screen (BH104R)
Rainfall


BH107 / BH107R
Data logger relocated into replacement well
Groundwater elevation (m AHD)
Rainfall (mm)
96
94
92
90
88
86
84
82
80
160
140
120
100
80
60
40
20
0
Jul 2020
Aug 2020
Oct 2020
Dec 2020
Mar 2021
May 2021
Jul 2021
Sep 2021
Nov 2021
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
Mar 2024
May 2024
Jul 2024
Sep 2024
Date
Groundwater elevation (data logger)
Manual GW Depth
Well Casing (BH107R)
Well Screen (BH107R)
Rainfall


BH112 / BH112R
Groundwater elevation (m AHD)
Rainfall (mm)
Date
Data logger removed
Data logger relocated into replacement well
85
83
81
79
77
75
73
71
69
67
65
160
140
120
100
80
60
40
20
0
Jul 2020
Aug 2020
Oct 2020
Dec 2020
Mar 2021
May 2021
Jul 2021
Sep 2021
Nov 2021
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
Mar 2024
May 2024
Jul 2024
Sep 2024
Groundwater elevation (data logger)
Manual GW Depth
Well Casing (BH112R)
Well Screen (BH112R)
Rainfall


BH145R
Groundwater elevation (m AHD)
Rainfall (mm)
Data logger relocated into replacement well
115
110
105
100
95
90
160
140
120
100
80
60
40
20
0
30/03/2023
09/04/2023
19/04/2023
29/04/2023
09/05/2023
19/05/2023
29/05/2023
08/06/2023
18/06/2023
28/06/2023
08/07/2023
18/07/2023
28/07/2023
07/08/2023
17/08/2023
27/08/2023
06/09/2023
16/09/2023
26/09/2023
06/10/2023
16/10/2023
26/10/2023
05/11/2023
15/11/2023
25/11/2023
05/12/2023
15/12/2023
25/12/2023
04/01/2024
14/01/2024
24/01/2024
03/02/2024
13/02/2024
23/02/2024
04/03/2024
14/03/2024
24/03/2024
03/04/2024
13/04/2024
23/04/2024
03/05/2024
13/05/2024
23/05/2024
02/06/2024
12/06/2024
22/06/2024
02/07/2024
12/07/2024
22/07/2024
01/08/2024
11/08/2024
21/08/2024
31/08/2024
10/09/2024
Date
Groundwater elevation (data logger)
Manual GW Depth
Well Casing
Well Screen
Rainfall


BH175
Groundwater elevation (m AHD)
Rainfall (mm)
Date
Data logger faulty
Data logger replaced
Groundwater elevation (data logger)
Manual GW Depth
Well Casing
Well Screen
Rainfall


BH219
Unable to access data logger due to construction
Groundwater elevation (m AHD)
Rainfall (mm)
50
45
40
35
30
25
160
140
120
100
80
60
40
20
0
Jun 2021
Aug 2021
Oct 2021
Dec 2021
Jan 2022
Apr 2022
Jun 2022
Aug 2022
Oct 2022
Dec 2022
Feb 2023
Apr 2023
Jun 2023
Aug 2023
Oct 2023
Dec 2023
Feb 2024
Apr 2024
Jun 2024
Aug 2024
Oct 2024
Date
Groundwater elevation (data logger)
Manual GW depth
Well Casing
Well Screen
Rainfall
Well confirmed destroyed

ghd.com

→ The Power of Commitment