M12 Motorway Groundwater Monitoring

Report 9 – April 2023 to September 2023
M12CDD-GHDA-ALL-EV-RPT-000031

Transport for NSW

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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 a distance of 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 2023 and September 2023.

Scope of work

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

– Monthly sampling the redrilled monitoring wells (BH104R, BH107R, BH112R, BH145R) along the proposed project alignment over the six months. The analytical suite includes physiochemical parameters, nutrients, major anions and cations, metals, pesticides, 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 2023 to September 2023) indicated the following differences between the baseline and construction monitoring period:

– Field Parameters
  - Increases in dissolved oxygen at BH104/BH104R and BH107/BH107R.
  - Fluctuations in electrical conductivity and redox in all wells after monitoring of replacement wells.
  - pH concentrations are tending more alkaline across all wells.
– Major Cations and Anions
  - Decreases in sulfate concentrations at BH104/BH104R and BH107/BH107R, and increases at BH112/BH12R and BH145/BH145R 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 increases in bicarbonate and carbonate ions

towards a sodium bicarbonate type. BH112R has increased towards chloride and fluoride and BH145R has increased towards calcium and magnesium.

– Nutrients
  - Increases in concentrations above the baseline for Ammonia coinciding with monitoring of the replacement wells.
  - Increases in nitrate, Total Oxidised Nitrogen (NOx), and total nitrogen above the baseline which reduced after monitoring of replacement wells.
  - Fluctuating nitrite concentrations above the baseline since the beginning of the construction period at BH104/BH104R and BH107/BH107R.
  - Decreased concentrations in BH145/BH145R coinciding with the monitoring of replacement well BH145 for nutrient analytes.
– Metals
  - Arsenic 80th percentile concentrations in the current and construction period were reported above the baseline in BH104/BH104R and BH107/BH107R, and BH112/BH112R in the current period only. This may be attributable to increased concentrations coinciding with the monitoring of the replacement wells.
  - Copper 80th percentile concentrations in the construction monitoring period are above the baseline 80th percentile at BH104/BH104R. Copper 20th percentile concentrations were below the baseline 20th percentile in the current and construction monitoring periods at BH145/BH145R.
  - Iron 80th percentile concentrations in the current and construction monitoring periods were reported above the baseline 80th percentile at BH104/BH104R.
  - Manganese, nickel, and zinc 20th percentile concentrations at all locations within the current and construction monitoring period were below the baseline period 20th percentiles, with the exception of BH112/BH112R for zinc.
  - Exceedances of adopted criteria were completely 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, BH112/BH112R, and BH145/BH145R prior to monitoring of replacement wells.
  - Increasing trend of TDS concentrations at BH145/BH145R since the start of the construction period.

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.

Summary of gauging data

– Groundwater levels in the western well BH107R decreased slightly, with BH104R dropping over 2m. Water levels in replacement well BH112R were over 3m lower in August 2023 when compared to the last measurement taken at BH112 in November 2022.
– In the central area, water levels in replacement well BH145R remained relatively stable over the current monitoring period. Gauging well BH219 remained relatively stable through the monitoring period.
– In the eastern area, water levels in wells BH162 and BH175 have a slight decreasing trend in height, dropping less than 1m during the monitoring period. BH155 remained dry throughout the monitoring period, and BH170 was unable to be located.
– This decreasing trend observed in western and eastern wells coincides with a period of reduced rainfall, with the 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 nutrients and metals concentrations. These increases have occurred with the replacements of the monitoring wells and therefore no management actions are required cumulating from this monitoring period.

Recommendations

GHD recommends the following improvements of the construction monitoring program:

– Removal of TSS from the analytical suite of future monitoring events as this does not provide reflect the potential impacts upon groundwater quality that may arise from construction
– Completion of one round of monitoring during within the next six-monthly monitoring period for phenols to comply with CEMP

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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 eighth for the monitoring program. Reports 1, 2, 3, 4, 5, 6, 7, and 8 describe the 2019 through to March 2023 monitoring program, further detailing baseline and construction phase data. This report (Report 9) provides details of the monitoring locations, sampling methodology, and results of the groundwater samples collected between April 2023 to September 2023.

This current monitoring period and six-monthly report sits is work described 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. Early phase construction data has been collected from August 2022 onwards. This baseline and construction phase data has been documented in seven reports, including:

– Report 1 (GHD, 2019), presenting data from April 2019 to September 2019
– Report 2 (GHD, 2020), presenting data from October 2019 to March 2020
– Report 3 (GHD, 2021a), presenting data from April 2020 to September 2020
– Report 4 (GHD, 2021b), presenting data from October 2020 to March 2021
– Report 5 (GHD, 2022a) presenting data from April 2021 to September 2021

– Report 6, (GHD, 2022b), presenting data from October 2021 to March 2022
– Report 7 (GHD, 2022c), presenting data from April 2022 to September 2022
– Report 8 (GHD, 2023), presenting data from October 2023 to March 2023

This report summarises the groundwater monitoring program from April 2023 to September 2023, comprising the construction phase.

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 wells.

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 33.0 millimetres (mm) in July to 109.5 mm in March, with an average annual rainfall of 724.4 mm (Badgerys Creek AWS, ID 067108) (BOM, 2023) Long-term maximum mean temperatures range between 19.4°C in June to 35.1°C in January, and minimum mean temperatures between 15.4°C in July to 26.8°C in January (Badgerys Creek AWS, ID 067108) (BOM, 2023). 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 2023), groundwater levels within the project range between 0.30 m below top of casing (mbTOC) (BH219, June 2023) and 19.85 mbTOC (BH145, May 2021).

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 49 – 4 and 5 April 2023
– Event 50 – 2 May 2023
– Event 51 – 6 and 7 June 2023
– Event 52 – 5 July 2023
– Event 53 – 8 and 9 August 2023
– Event 54 – 5 and 6 September 2023

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 monitoring locations

The current sampling locations for the groundwater wells are summarised below in Table 3 and Figure 1, Appendix A. These existing monitoring wells are located in the vicinity of the project and allow monitoring of water quality. These locations 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 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 been poorly installed.

Due to access restrictions of BH112R between April 2023 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. BH107R was not sampled in the June 2023 event due to access restrictions also. 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 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 in December 2022
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 in December 2022

Well ID	Latitude	Longitude	Package	Comment
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 5.3.

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 will change as the construction phase progresses.

3.4.2 Purging

A micropurge Q10 bladder-pump unit with CO_2 gas controller 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). Calibration certificates for the water quality meter are provided in Appendix E.

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. This occurred at BH107R in May 2023 when all parameters except DO were stable, and at BH107R in July and August 2023 when poor recharge was observed.

Additionally, low-yielding wells with poor recovery may require samples to be collected prior to stabilisation of field parameters and/or SWL, ensuring groundwater samples are collected prior to the well being pumped dry. There were no occurrences of this in the current monitoring period.

Exceptions to the above methodology may also occur due to unforeseen equipment failure. This occurred during the current monitoring period in August 2023 where micropurge pump failure prevented the use of low flow methodologies (BH112R and BH145R) and collection of field measurements (BH145R). A bailer was subsequently used to collect groundwater samples for laboratory analysis for BH112R and BH145R during the August 2023 monitoring round.

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

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 D). 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 2023 and September 2023.

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)
– Total dissolved solids (TDS)
– Total suspended solids (TSS)
– Major anions and cations with alkalinity (chloride, sulfate, sodium, potassium, magnesium, calcium, carbonate and bicarbonate)
– Total hardness as CaCO3.

The laboratory analytical schedule is consistent with the groundwater monitoring indicator requirements as stated in the EIS (JAJV, 2019). However, the OCEMP (TfNSW, 2021) also includes PAH and phenols which have not

been analysed since March 2022. 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, 2023) 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 CaCO3

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 D. 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, 2023); accessed 19 October 2023 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 three groundwater wells located within a 500 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 B6, Appendix B, the construction monitoring period to date in Table B7, Appendix B, and the current monitoring period in Table B8, 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 September 2023), and the current construction monitoring events (April 2023 to September 2023) were calculated for sampling wells BH104/BH104R, BH107/BH107R, BH112/BH112R, and BH145/BH145R. These included the 20th and 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. A comparison of results between BH145 and BH145R is not included as BH145 was not installed correctly. This is based on less than 1m of groundwater recorded in BH145 with water in the well suspected to be from surface runoff infiltration. Due to the limited dataset for BH112/BH112R during the current monitoring period, comparisons of the 20th and 80th percentiles to the baseline period are unrepresentative.

It is noted that current and construction period summary statistics do not include monitoring rounds between December 2022 and March 2023 for BH145R, and December 2022 to July 2023 for BH112R. This is due to access and/or insufficient water available to measure field parameters, resulting in 8 rounds of parameter data in BH145/BH145R during the construction period, and 6 rounds of parameter data in BH112/BH112R during the construction period, and 2 rounds of parameter data in BH112/BH112R during the current period.

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 as mentioned above (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)

DO monitoring data indicates that construction and current monitoring period 80th percentile DO concentrations in all locations are outside the baseline period 80th percentile DO concentrations, with the exception of BH112/BH121R in the current monitoring period. Current and construction monitoring period 20th percentile concentrations are below the baseline in BH104/BH104R and BH145/BH145R, with current period 20th percentile concentrations also below the baseline in BH145/BH145R.

Construction period measurements above the baseline in BH104/BH104R and BH107/BH107R may be attributed to increased DO results recorded since May 2023.

The 20th and 80th percentile DO values calculated for the current monitoring and construction monitoring period 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 monitoring

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	**0.130**	**5.200**	14	**0.364**	**3.040**	34	0.372	2.058
BH107 / BH107R	5	1.184	**8.114**	12	**0.380**	**4.886**	31	0.670	3.530
BH112 / BH112R	2	1.924	**6.766**	6	1.170	**4.560**	29	0.558	2.926
BH145 / BH145R	6	**0.160**	0.500	8	**0.164**	**2.190**	13	0.434	1.332

Notes: 1. **BOLD** = sits outside the baseline data (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.

5.1.2 Electrical conductivity (EC)

EC monitoring data from the construction period indicates that construction period 20th percentiles in BH104/BH104R, BH107/BH107R and BH112/BH112R are below the baseline 20th percentile, with current period 20th percentiles in BH104/BH104R and BH107/BH107R also below the baseline 20th percentile. Construction period 80th percentiles are above the baseline in BH104/BH104R, BH112/BH12R, and BH145/BH145R, with current period 80th percentiles above the baseline 80th percentiles in BH112/BH112R and BH145/BH145R.

EC measurements in BH112/BH112R and BH145/BH145R increased after the wells were monitored for the first time after monitoring of the replacement wells began in August 2023 and April 2023, respectively, and decreased in wells BH104/BH104R and BH107/BH107R after monitoring of the replacement wells began. Construction period 80th percentiles above the baseline in BH104/BH104R are attributed to an increase in EC measurements between May 2022 and the decommissioning of BH104 in November 2022, with EC measurements lower in replacement well BH104R.

The 20th and 80th percentile EC values 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 monitoring

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	**8072.00**	**8350.00**	14	**6213.20**	**21148.00**	34	10441.80	16920.60
BH107 / BH107R	5	**2562.80**	**3114.40**	12	**2685.60**	**4600.00**	31	4654.00	9375.00
BH112 / BH112R	2	**14520.60**	**14858.40**	6	**3226.00**	**14408.00**	29	6479.20	12589.80
BH145 / BH145R	6	**10273.00**	**13966.00**	8	5093.40	**13524.80**	13	3331.80	5778.76

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

5.1.3 Redox conditions

Redox monitoring data from the current period indicates that current period 20th percentiles are below the baseline 20th percentiles in BH112/BH112R. Construction period 80th percentiles are above the baseline 80th

percentiles in all wells with the exception of BH107/BH107R, with current period 80th percentiles above the baseline in BH107/BH107R and BH112/BH112R.

Redox concentrations in BH104/BH104R and BH145/BH145R decreased after monitoring of the replacement wells began in December 2022 and April 2023 respectively.

The 20th and 80th percentile redox values calculated for the current and construction monitoring periods compared to the baseline monitoring period are presented in Table 7 below. Variations in EC 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 monitoring

Redox (mV)									
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	198.00	237.20	14	157.46	**354.64**	34	98.82	272.08
BH107 / BH107R	5	260.86	**385.26**	12	244.30	**309.32**	31	151.30	291.40
BH112 / BH112R	2	271.68	**306.42**	6	260.10	**318.00**	29	225.88	301.18
BH145 / BH145R	6	**62.00**	125.30	8	**71.20**	266.90	13	194.96	355.80

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

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

5.1.4 pH

Groundwater pH monitoring data from the current and construction monitoring periods indicate that the construction period 80th percentiles in all wells have increased above the baseline period 80th percentiles, with 20th percentile concentrations in the current monitoring period also above the baseline period 80th percentiles.

pH concentrations across all wells are tending more alkaline in an increasing trend since around February 2022.

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 monitoring

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	**6.80**	**6.89**	14	6.54	**6.86**	34	6.20	6.70
BH107 / BH107R	5	**7.09**	**7.46**	12	**6.95**	**7.41**	31	6.57	6.91
BH112 / BH112R	2	**6.74**	**6.85**	6	**6.72**	**7.24**	29	6.45	6.71
BH145 / BH145R	6	**6.61**	**6.93**	8	6.32	**6.87**	13	6.05	6.54

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

5.1.5 Temperature

Groundwater temperature data from the construction monitoring period indicates that the construction 20th and 80th percentiles are largely within baseline period 20th and 80th percentiles with a few exceptions. BH107/BH107R current and construction 20th percentiles are slightly below the baseline 20th percentiles, with BH104/BH104R construction period 20th percentiles are also below the baseline.

The 20th and 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 monitoring

Temperature (°C)									
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	18.80	19.50	14	**18.60**	19.50	34	18.70	20.10
BH107 / BH107R	5	**18.34**	18.92	12	**18.46**	19.38	31	18.70	20.20
BH112 / BH112R	2	19.74	19.86	6	18.90	19.90	29	18.86	20.16
BH145 / BH145R	6	18.30	18.90	8	18.38	19.10	13	16.74	19.80

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.

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 B8, Appendix B). LNAPL was not detected in any of the sampled wells during the baseline and construction monitoring periods.

The measured SWL at monitoring well locations were relatively consistent across the monitoring period at BH112R and BH145R, with small to moderate decreases in recorded at BH104R and BH107R as discussed in Section 6. 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 B8, Appendix B.

Table 10 Summary of groundwater observations during current monitoring period

Well ID	Observations during current monitoring period (April 2023 to September 2023)
BH104R	Generally clear, or with a yellow or light brown tinge, with no odour or sheen
BH107R	Generally clear, or with a pale brown tinge, no odour or sheen
BH112R	Clear of light brown, no odour or sheen
BH145R	Clear or grey-brown tinge, no odour, no sheen

5.3 Groundwater gauging

Gauging results are discussed in Section 6.

5.4 Laboratory analytical results

The laboratory analytical results of groundwater samples for the current monitoring period are tabulated in Table B5, Appendix B, and all baseline results are tabulated in Table B3, Appendix B, and all construction results are tabulated in Table B4, 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. It is noted that no analytical results for BH107/107R in June 2023, due to access issues.

5.4.1 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.

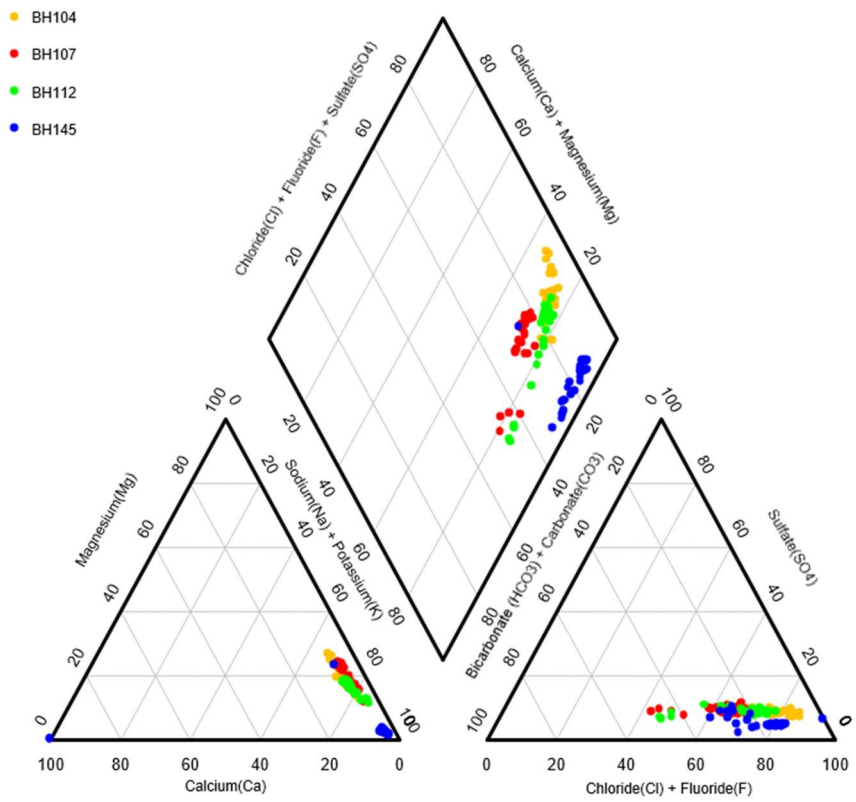


Figure 1 *Piper plot for groundwater changes throughout the baseline monitoring period (July 2019 to July 2022)*

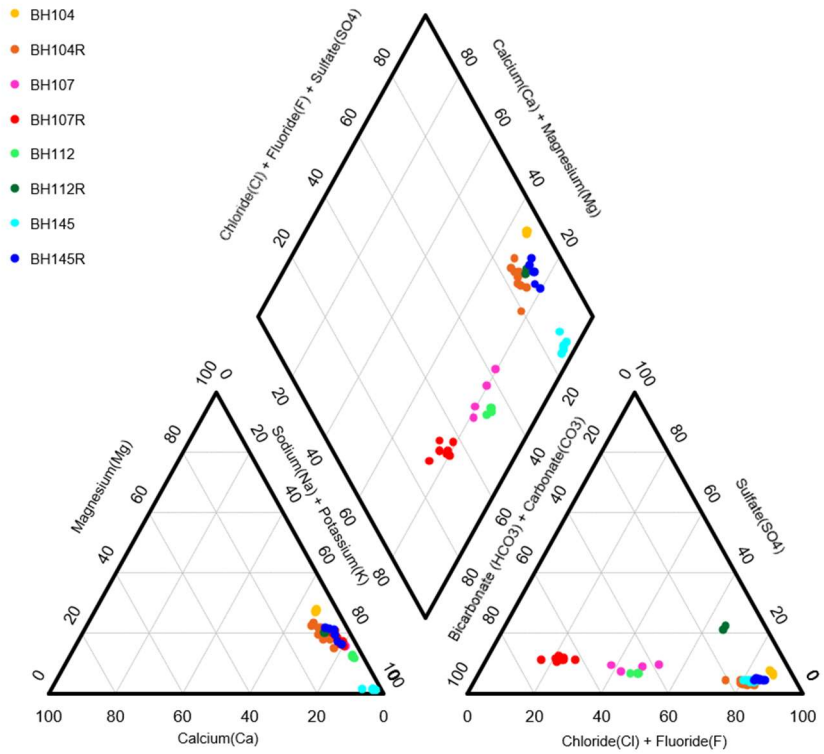


Figure 2 ***Piper plot for groundwater changes throughout the construction monitoring period (August 2022 to September 2023)***

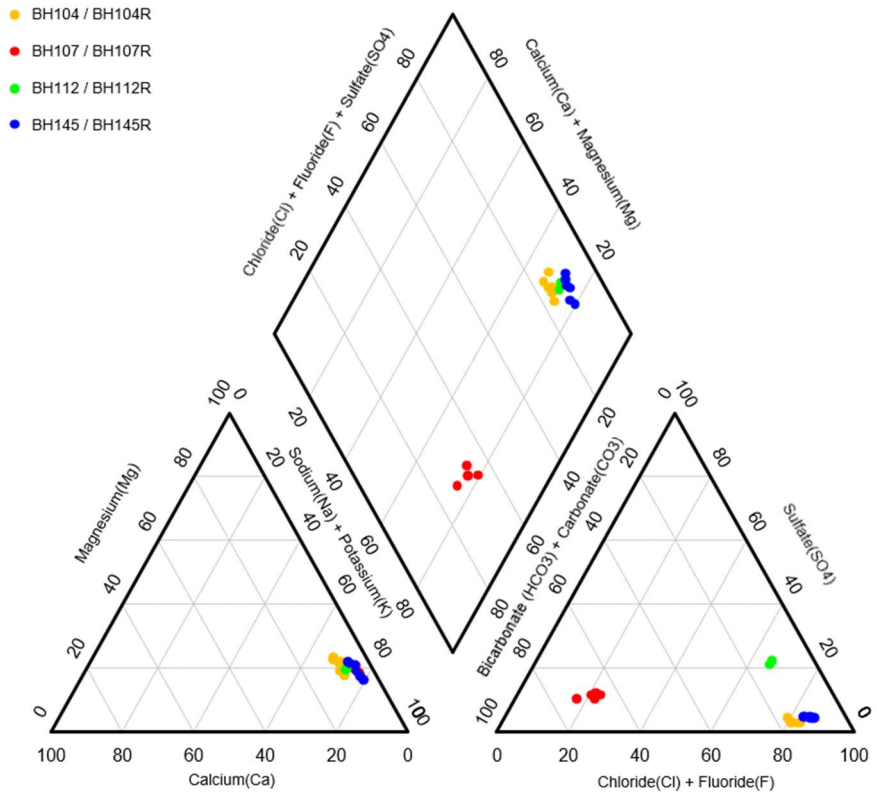


Figure 3 ***Piper plot for groundwater changes throughout the current monitoring period (April 2023 to September 2023)***

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/BH145R recorded a higher sodium chloride concentration when compared to the western wells (BH104/BH104R, BH107/BH107R and BH112/BH112R). The western wells recorded higher calcium and magnesium concentrations when compared to eastern well BH145.

Major cations and anions in replacement wells are different from their original wells. BH104R has reduced calcium and magnesium and BH107R has increases in bicarbonate and carbonate ions towards a sodium bicarbonate type. BH112R has increased towards chloride and BH145R has increased towards calcium and magnesium.

5.4.2 Nutrients

The majority of groundwater samples had reported concentrations above the LOR for nutrients 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 2023), and the current monitoring period (April 2023 to September 2023) are provided in Table 8 to Table 16. All baseline monitoring results are presented in Table B3, Appendix B, monitoring results from the construction monitoring period are presented in Table B4, Appendix B, and results from the current monitoring are presented in Table B5, Appendix B. Boxplots comparisons between the baseline monitoring period and the construction monitoring period for ammonia, nitrate, nitrogen (total oxidised) (as N), nitrogen (total), and phosphorus are provided in Figures 6 to 10, Appendix D.

Due to the limited dataset for BH112/BH112R during the current monitoring period, comparisons of the 20th and 80th percentiles to the baseline period may be unrepresentative.

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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	**1.100**	**1.350**	14	0.112	**1.426**	35	0.084	0.328
BH107 / BH107R	5	0.028	**0.142**	12	**0.010**	**0.228**	32	0.020	0.070
BH112 / BH112R	2	**2.334**	**2.376**	6	**0.010**	**2.320**	32	0.578	1.978
BH145 / BH145R	6	1.670	1.860	13	**0.290**	1.800	28	0.724	2.852

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

Construction and current period 80th percentiles for ammonia are above the baseline 80th percentile in all wells with the exception of BH145/BH145R. 20th percentile concentrations are also above the baseline 80th percentile.

This increase in concentrations above the baseline coincides with the drilling of the replacement wells, with concentrations in BH104R and BH107R slowly reducing towards the baseline concentrations, as indicated by a lower current period 80th percentile compared to the total construction period 80th percentile. Concentrations in BH145/BH145R have reduced and BH112/BH112R have increased since the monitoring of the replacement wells.

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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	0.020	0.040	14	0.020	**7.544**	35	0.020	0.122
BH107 / BH107R	5	1.830	**3.070**	12	0.858	**8.876**	32	0.062	2.484
BH112 / BH112R	2	0.718	1.222	6	0.140	0.550	32	0.130	1.922
BH145 / BH145R	6	**0.010**	**0.010**	13	**0.010**	59.840	28	9.866	85.020

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

Construction period 80th percentiles for nitrate are above the baseline 80th percentile in BH104/BH104R and BH107/BH107R, with current period 80th percentile concentrations above the baseline in BH107/BH107R only. Construction and current period 20th percentile concentrations are below the baseline 20th percentile at BH145/BH145R.

The increase in 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. Whilst concentrations in BH104R in the current monitoring period are below the baseline, BH107R remains above the baseline with a slight increasing trend. Concentrations in BH145/BH145R have reduced and BH112/BH112R have increased since the monitoring of the replacement well.

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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	0.010	**0.020**	14	0.010	**0.020**	35	0.010	0.010
BH107 / BH107R	5	0.010	0.010	12	0.010	**0.074**	32	0.010	0.020
BH112 / BH112R	2	**1.472**	**1.868**	6	0.010	**1.340**	32	0.010	0.018
BH145 / BH145R	6	**0.010**	**0.010**	13	**0.010**	0.894	28	0.372	6.156

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

Construction period 80th percentiles for nitrite are above the baseline 80th percentile in BH104/BH104R, BH107/BH107R, and BH112/BH112R with current period 80th percentile concentrations above the baseline in BH104/BH104R, BH112/BH12R, and BH145/BH145R. Construction and current period 20th percentile concentrations are below the baseline 20th percentile at BH145/BH145R.

Nitrite concentrations in BH104/BH104R and BH107/BH107R have been fluctuating at levels above the baseline since the beginning of the construction period. Concentrations in BH145/BH145R have reduced and BH112/BH112R have increased since the monitoring of the replacement well.

Table 14 Summary Statistics for NOx

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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	0.020	0.060	14	0.020	**7.584**	35	0.020	0.122
BH107 / BH107R	5	1.830	**3.070**	12	0.858	**8.938**	32	0.062	2.534
BH112 / BH112R	2	**2.586**	**2.694**	6	0.140	**2.550**	32	0.130	1.922
BH145 / BH145R	6	**0.010**	**0.010**	13	**0.010**	60.680	28	12.260	88.240

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

Construction period 80th percentiles for NOx are above the baseline 80th percentile in BH104/BH104R, BH107/BH107R, and BH112/BH112R, with current period 80th percentile concentrations above the baseline in BH107/BH107R and BH112/BH112R. Construction and current period 20th percentile concentrations are below the baseline 20th percentile at BH145/BH145R.

The increase in 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. BH107/BH107R coincides with the drilling of the replacement wells. Whilst concentrations in BH104R in the current monitoring period are below the baseline, BH107R remains above the baseline with a slight increasing trend. Concentrations in BH145/BH145R have reduced and BH112/BH112R have increased since the monitoring of the replacement well.

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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	**1.300**	**1.700**	14	**1.480**	**8.320**	35	0.300	1.260
BH107 / BH107R	5	2.440	**3.600**	12	1.820	**10.440**	32	0.200	3.080
BH112 / BH112R	2	**5.540**	**5.960**	6	0.600	**5.400**	32	2.300	3.840
BH145 / BH145R	6	**1.900**	**2.000**	13	**1.900**	68.500	28	19.940	98.360

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

Construction and current period 80th percentiles for total nitrogen are above the baseline 80th percentile in BH104/BH104R, BH107/BH107R, and BH112/BH112R. Construction and current period 20th percentile concentrations are below the baseline 20th percentile at BH145/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. However, BH104R and BH107R in the current monitoring period remain above the baseline with a slight increasing trend. Concentrations in BH145/BH145R have reduced and BH112/BH112R have increased since the monitoring of the replacement well.

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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	0.100	**0.320**	14	0.062	**0.228**	35	0.020	0.108
BH107 / BH107R	5	0.082	0.106	12	0.066	0.138	32	0.020	0.222
BH112 / BH112R	2	**0.504**	**0.906**	6	0.240	**1.040**	32	0.052	0.432
BH145 / BH145R	6	**0.060**	**0.110**	13	**0.060**	0.666	28	0.156	1.208

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

Construction and current period 80th percentiles for total phosphorus are above the baseline 80th percentile in BH104/BH104R and BH112/BH112R. Construction and current period 20th percentile concentrations are below the baseline 20th percentile at BH145/BH145R.

The increase in construction period concentrations above the baseline at BH104/BH104R is attributed to increases recorded since monitoring began in the replacement well. Increases in construction period concentrations above the baseline at BH112/BH112R can be attributed to an increase in concentrations observed at BH112 in November 2022 and sustained in monitoring of replacement well BH112R in August 202. However, total phosphorus results remain below the historical maximum of the baseline period. Concentrations in BH145/BH145R have reduced since the monitoring of the replacement well.

5.4.3 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 2023), and current construction monitoring period (April 2023 to September 2023) are provided in Table 17 to Table 26. All baseline monitoring results are presented in Table B3, Appendix B, monitoring results from the construction monitoring period (October 2022 to September 2023) are presented in Table B4, Appendix B, and results from the current monitoring period (April 2023 to September 2023) are presented in Table B5, Appendix B. Boxplots 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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	0.001	**0.003**	14	0.001	**0.003**	35	0.001	0.001
BH107 / BH107R	5	0.001	0.001	12	0.001	0.001	32	0.001	0.001
BH112 / BH112R	2	**0.015**	**0.017**	6	0.001	**0.014**	32	0.001	0.001
BH145 / BH145R	6	**0.006**	**0.016**	14	0.001	0.010	27	0.001	0.001

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline 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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	0.0001	0.0001	14	0.0001	0.0001	35	0.0001	0.0001
BH107 / BH107R	5	0.0001	0.0001	12	0.0001	0.0001	32	0.0001	0.0001
BH112 / BH112R	2	0.0001	0.0001	6	0.0001	0.0001	32	0.0001	0.0001
BH145 / BH145R	6	0.0001	0.0001	14	0.0001	0.0001	27	0.0001	0.0001

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline 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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	0.001	0.001	14	0.001	0.001	35	0.001	0.001

Chromium (mg/L)									
Adopted criterion	ANZG 2018 – 95% Freshwater: 0.001 mg/L								
BH107 / BH107R	5	0.001	0.001	12	0.001	0.001	32	0.001	0.001
BH112 / BH112R	2	0.001	0.001	6	0.001	0.001	32	0.001	0.001
BH145 / BH145R	6	0.001	0.001	14	0.001	0.001	27	0.001	0.001

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline 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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	0.0010	0.0010	14	0.0010	**0.0312**	35	0.0010	0.0276
BH107 / BH107R	5	0.0044	0.0058	12	0.0032	0.0050	32	0.0010	0.0324
BH112 / BH112R	2	0.0034	0.0106	6	0.0020	0.0060	32	0.0010	0.0328
BH145 / BH145R	6	**0.0010**	0.0010	14	**0.0010**	0.0044	27	0.0020	0.0566

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

Table 21 Summary statistics for Iron

Iron (mg/L)									
Adopted criterion	None								
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	0.48	**1.24**	14	0.05	**1.29**	24	0.11	1.05
BH107 / BH107R	5	0.05	0.05	12	0.05	0.05	23	0.05	0.16
BH112 / BH112R	2	0.05	0.05	6	0.05	0.05	23	0.05	0.18
BH145 / BH145R	6	3.66	4.82	14	0.05	4.41	20	0.05	19.64

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline 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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	0.0010	0.0010	14	0.0010	0.0010	35	0.0010	0.0010
BH107 / BH107R	5	0.0010	0.0010	12	0.0010	0.0010	32	0.0010	0.0010
BH112 / BH112R	2	0.0010	0.0010	6	0.0010	0.0010	32	0.0010	0.0010
BH145 / BH145R	6	0.0010	0.0010	14	0.0010	0.0010	27	0.0010	0.0010

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline 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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	**0.1780**	**0.1980**	14	**0.1480**	**0.2726**	24	0.2890	0.6990
BH107 / BH107R	5	**0.0300**	**0.0514**	12	**0.0210**	**0.0906**	23	0.2472	0.5016
BH112 / BH112R	2	**0.1344**	0.1476	6	**0.0070**	0.1520	23	0.1402	0.2658
BH145 / BH145R	6	**0.3480**	**0.5080**	14	**0.4372**	1.0460	20	0.7506	1.8900

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline 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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	0.0001	0.0001	14	0.0001	0.0001	35	0.0001	0.0001
BH107 / BH107R	5	0.0001	0.0001	12	0.0001	0.0001	32	0.0001	0.0001
BH112 / BH112R	2	0.0001	0.0001	6	0.0001	0.0001	32	0.0001	0.0001
BH145 / BH145R	6	0.0001	0.0001	14	0.0001	0.0001	27	0.0001	0.0001

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline 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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	**0.0020**	**0.0040**	14	**0.0010**	**0.0088**	35	0.0302	0.1054
BH107 / BH107R	5	**0.0020**	**0.0068**	12	**0.0010**	**0.0020**	32	0.0186	0.0696
BH112 / BH112R	2	**0.0238**	**0.0412**	6	**0.0010**	**0.0180**	32	0.0336	0.1162
BH145 / BH145R	6	**0.0010**	0.0250	14	**0.0020**	**0.0050**	27	0.0064	0.0656

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline 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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	**0.0050**	**0.0120**	14	**0.0050**	0.0136	35	0.0080	0.0962
BH107 / BH107R	5	**0.0084**	0.0148	12	**0.0060**	0.0120	32	0.0096	0.0848
BH112 / BH112R	2	0.0102	0.0168	6	**0.0050**	0.0190	32	0.0092	0.1276
BH145 / BH145R	6	**0.0050**	**0.0060**	14	**0.0050**	0.0732	27	0.0724	1.3700

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

Current and construction period 20th and 80th percentiles for the majority of analytes were within the 20th to 80th percentile range of the baseline monitoring period, with the exception of the following:

– Arsenic 80th percentile concentrations in the current and construction period were reported above the baseline in BH104/BH104R and BH107/BH107R, and BH112/BH112R in the current period only. This may be attributable to increased concentrations coinciding with the monitoring of the replacement wells.
– Copper 80th percentile concentrations in the construction monitoring period are above the baseline 80th percentile at BH104/BH104R. Copper 20th percentile concentrations were below the baseline 20th percentile in the current and construction monitoring periods at BH145/BH145R. Exceedances above the baseline at BH104/BH104R are attributed to increased concentrations in BH104 between June and November 2022, since monitoring of the replacement wells began, all concentrations in BH104R have remained at or slightly above the LOR.
– Iron 80th percentile concentrations in the current and construction monitoring periods were reported above the baseline 80th percentile at BH104/BH104R. This may be attributed to higher concentrations recorded since the installation of BH104R, with concentrations since the monitoring of replacement wells below the maximum recorded concentrations in the baseline period.
– Manganese and Nickel 20th percentile concentrations at all locations within the current and construction monitoring period were below the baseline period 20th percentiles.

– Zinc 20th percentile concentrations within the construction monitoring period at all locations are below the baseline 20th percentile, with current period concentrations below the baseline 20th percentile at all locations with the exception of BH112/BH112R.

Due to the limited dataset for BH112/BH112R during the current monitoring period, comparisons of the 20th and 80th percentiles to the baseline period are unrepresentative.

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):** The majority of groundwater samples reported arsenic concentrations below the adopted criteria with the exception of the following:
  - BH145R reported arsenic concentrations above the adopted human health (0.01 mg/L) and ANZG ecological (0.013 mg/L) criteria in April and May 2023, with concentrations above the ADWG also reported in June 2023 (maximum 0.016 mg/L)
  - BH112R reported concentrations above the human health and ANZG ecological criteria in August and September 2023 (maximum 0.018 mg/L)

  Concentrations remained below the stock watering 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 with the exception BH107R which reported concentrations of 0.001 mg/L in July 2023, equal to the ANZG ecological criterion. Concentrations remained below the stock watering criteria.
– **Copper (filtered)**: Exceedances of the adopted ANZG ecological criterion (0.0014 mg/L) for copper were reported in the following groundwater samples:
  - BH145R in July 2023 (0.002 mg/L)
  - BH104R in June 2023 (0.002 mg/L)
  - BH107R in all events (maximum 0.009 mg/L)
  - BH112R in September 2023 (0.013 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)**: The majority of groundwater samples reported iron concentrations above the LOR. The maximum concentration reported was in BH145R in June 2023 (5.08 mg/L). There are no adopted assessment criteria for iron.
– **Lead (filtered)**: All groundwater samples reported lead concentrations below the LOR (0.001 mg/L), and below all adopted criteria.
– **Manganese (filtered)**: All groundwater samples reported manganese concentrations above the LOR. Exceedances of the human health criterion (0.5 mg/L) were reported in BH145R in April (0.639 mg/L) and June (0.508 mg//L) 2023. All reported concentrations were below the ecological criterion.
– **Mercury (filtered)**: All groundwater samples reported mercury concentrations below the LOR (0.0001 mg/L) and all adopted assessment criteria.
– **Nickel (filtered)**: The majority of groundwater samples reported nickel concentrations above the LOR (0.001 mg/L), with the following locations reporting concentrations above the adopted human health (0.02 mg/L) and/or ANZG ecological (0.011 mg/L) assessment criteria:
  - BH145R in April (0.026 mg/L) and September 2023 (0.025 mg/L)
  - BH104R in April 2023 (0.014 mg/L)
  - BH112R in September 2023 (0.047 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 April, May, and September 2023 (maximum 0.036 mg/L)
- BH107R in April, May, July, and September 2023 (maximum 0.026 mg/L)
- BH112R in August and September 2023 (maximum 0.019 mg/L)

5.4.4 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, copper, 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 completely eliminated following the application of HMTVs, with the exceptions summarised in Table 27. No exceedances were detected during the current monitoring period (April 2023 to September 2023)

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

Metal	Well ID	Events
Copper	BH104/BH104R	July 2022
	BH107/BH107R	September 2020 October 2020 February 2021 March 2021 May 2022
	BH112/BH112R	September 2020 October 2020 March 2021 October 2021
	BH145/BH145R	September 2020 January 2021 February 2021 March 2021 November 2021 May 2022
Nickel	BH107/BH107R	March 2022
	BH112/BH112R	May 2021 March 2022
	BH145/BH145R	September 2020 November 2020 December 2020 March 2022
Zinc	BH107/BH107R	December 2021 January 2022 March 2023
	BH112/BH112R	December 2021
	BH145/BH145R	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 B9, Appendix B.

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

All groundwater samples collected in the current monitoring period reported concentrations of BTEXN below the laboratory LOR and adopted criteria with the exception of the following:

– BH145R which reported Benzene concentrations equal to the LOR and human health criterion (1 µg/L) in April and May 2023.
– BH145R reported Toluene concentrations of 3 µg/L above the LOR (2 µg/L) but below the adopted human health criterion in April and May 2023.

5.4.6 Total recoverable hydrocarbons (TRH)

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

5.4.7 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 March September 2023), and construction current monitoring period (April 2023 to September 2023) 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**	
Site ID	Maximum	Average	Maximum	Average	Maximum	Average
BH104 / BH104R	405	204	405	141	219	48
BH107 / BH107R	315	186	1890	319	1910	271
BH112 / BH112R	566	323	2710	1456	8780	937
BH145 / BH145R	288	112	12800	2629	22200	3017

An average concentration of 183 mg/L was reported across all wells over the current monitoring period, with groundwater well BH112R reporting higher maximum and average concentrations than other monitoring wells, however, BH112R was only monitored for two events within the current monitoring period. The highest concentration in the current monitoring period was reported in BH112R in August 2023 (566 mg/L).

Comparisons between summary statistics for TSS concentrations in monitoring wells for sampling events throughout the baseline monitoring period (July 2020 to July 2022), the construction monitoring period (August 2022 to September 2023), and the current construction monitoring period (April 2023 to September 2023) are provided in Table 29.

All baseline monitoring results are presented in Table B3, Appendix B, monitoring results from the construction monitoring period (October 2022 to September 2023) are presented in Table B4, Appendix B, and results from the current monitoring period (April 2023 to September 2023) are presented in Table B5, Appendix B.

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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	**100**	**366**	14	30	**176**	24	20	61
BH107 / BH107R	5	134	261	12	121	272	23	30	275
BH112 / BH112R	2	177	469	6	566	**2120**	23	130	726
BH145 / BH145R	6	**67**	111	12	**81**	**4974**	20	600	3532

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

Construction period 80th percentiles for BH104/BH104R, BH112/BH112R, and BH145/145R exceed the baseline period 80th percentiles for TSS, with current period 80th percentiles at BH104/BH104R also above the baseline. Construction and current period 20th percentiles were below the baseline 20th percentile at BH145/BH145R.

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 83 mg/L and 405 mg/L. Exceedances above the baseline at BH145/BH145R and BH112/BH112R can be attributed to increased concentrations between June 2022 and January 2023, with concentrations in the replacement well significantly lower.

5.4.8 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 monitoring period (October 2021 to March 2022) 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**	
Site ID	Maximum	Average	Maximum	Average	Maximum	Average
BH104 / BH104R	5540	5253	16500	8079	15400	8374
BH107 / BH107R	2240	2110	3200	2433	6360	4753
BH112 / BH112R	10200	10060	10200	4715	8470	6093
BH145 / BH145R	9970	7903	9970	5468	7420	3566

An average concentration of 5253 mg/L was reported across all wells over the current monitoring period, with groundwater well BH112R reporting higher maximum and average concentrations than other monitoring wells, however, BH112R was only monitored for two events within the current monitoring period. The highest concentration in the current monitoring period was reported in BH112R in August 2023 (10,200 mg/L).

All baseline monitoring results are presented in Table B3, Appendix B, monitoring results from the construction monitoring period (October 2022 to September 2023) are presented in Table B4, Appendix B, and results from the current monitoring period (April 2023 to September 2023) are presented in Table B5, Appendix B

Table 31 Summary statistics for Total Dissolved Solids

Total Dissolved 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**		
Site ID	N	20th %ile	80th %ile	N	20th %ile	80th %ile	N	20th %ile	80th %ile
BH104 / BH104R	6	5030	5430	14	**5006**	**15040**	24	6444	9778
BH107 / BH107R	5	**2064**	2200	12	**2120**	**2968**	23	3344	6210
BH112 / BH112R	2	**9976**	**10144**	6	**2020**	**9920**	23	3698	8290
BH145 / BH145R	6	**6230**	**9290**	12	2966	**8482**	20	2284	4700

Notes: 1. **BOLD** = sits outside the baseline (i.e. either below the 20th baseline percentile or above the 80th baseline percentile.)

Construction period 20th percentiles are below the baseline 20th percentile at BH104/BH104R, BH107/BH107R, and BH112/BH112R, with current period concentrations below the baseline in BH107/BH107R only. Construction period 80th percentiles are above the baseline 80th percentile in BH104/BH104R, BH112/BH112R, and BH145/BH145R, with current period concentrations above the baseline in BH112/BH112R and BH145/BH145R.

Exceedances above the baseline in the construction period for BH104/BH104R and BH112/BH112R are attributed to increased TDS concentrations recorded between May 2022 and November 2022, with concentrations reducing after the monitoring of replacement wells BH104R and BH112R in December 2022 and August 2023, respectively. BH107/BH107R concentrations similarly reduced after the installation of replacement well BH107R. Exceedances above the baseline at BH145/BH145R are attributed to an increasing trend in concentrations recorded since August 2022 at the start of the construction period, this may be attributed to increased TDS concentrations in groundwater due to decreases in rainfall.

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 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 date they were last gauged.

Table 32 Schedule of M12 groundwater level wells monitored by GHD during the April to September 2023 monitoring round

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	Gauging 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]	Dry
JAJV	BH162	East	118.62	Yes	Yes	Gauging Well
JAJV	BH170	East	92.41	No	No[2]	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	Gauging Well
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 does not have a logger as it is dry

[2] BH175 WLM data is unavailable for the current monitoring period due to a faulty data logger, a new WLM was installed in August 2023.

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 construction monitoring period (April 2023 – September 2023) are presented in Table B10, Appendix B.

Depth to groundwater for this monitoring round (April 2023 – September 2023) ranged between 7.110 mbTOC (BH107R, April 2023) and 12.425 mbTOC (BH112R, August 2023) 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 groundwater elevation at this well is approximately 101.377 AHD (September 2023), in comparison to western wells in which groundwater elevation is measured to be 88.706m AHD (BH104R, September 2023), 87.987m AHD (BH107R, September 2023), and 76.321m AHD (BH112, September 2023).

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 remained relatively stable during the current monitoring round.

6.4 Results

Manual gauging data is presented in Table B10, Appendix B, and groundwater level plots are presented in Appendix I.

The 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). Where there are gaps in rainfall data as the Badgerys Creek Station is offline, rainfall data from Horsley Park (ID 067119) and Rossmore (ID 67601) stations are used. It is noted that for the current monitoring period only six wells have WLM data for at least one date within the monitoring round (April 2023 to September 2023). The remaining wells were either destroyed, inaccessible, or had broken WLMs, as noted in Table B1, Appendix B.

In the western area, groundwater levels in well BH107R decreased slightly (less than 0.5m) during the current monitoring period, continuing an overall decreasing trend observed in BH107R since it was installed in December 2022. Water levels in BH107R remained above screen throughout the monitoring period, with the exception of two events after purging for groundwater monitoring (July and August 2023). BH104R dropped over 2m between April 2023 and September 2023 and water levels in replacement well BH112R were over 3m lower in August 2023 when compared to the last measurement taken at BH112 in November 2022. However, the water levels in both wells are still within range of the historical water levels recorded since July 2021 to present, and coincide with a decreasing trend in rainfall across the project area. All other gauging wells in the western area have been destroyed.

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 remained relatively stable throughout the monitoring period. All other gauging wells in the central area have been destroyed.

In the eastern area, water levels in wells BH162 and BH175 have a slight decreasing trend in height, dropping less than 1m during the monitoring period, continuing an overall decreasing trend since September 2022. However, the water levels in both wells are still within range of the historical water levels recorded since May 2019 to present and coincide with a decreasing trend in rainfall across the project area. BH155 remained dry throughout the monitoring period, and BH170 was unable to be located. All other gauging wells in the eastern area have been destroyed.

7. Conclusions and recommendations

7.1 Conclusions

The measured groundwater quality parameters and the project analytical suite have provided further data to incorporate into the construction monitoring period percentilervalues. 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 nutrients and metals concentrations. These increases have occurred with the replacements of the monitoring wells and therefore no management actions are required cumulating from this monitoring period.

The data reported in the redrilled monitoring wells of BH104R, and BH107R, BH112R, and BH145R are not similar to the original monitoring wells data (both for construction and baseline) and therefore a full comparison of the dataset has not been provided. These newly installed monitoring wells were installed with water and may not have been fully developed once installed.

7.2 Recommendations

GHD recommends the following improvements of the construction monitoring program:

– Removal of TSS from the analytical suite of future monitoring events as this does not provide reflect the potential impacts upon groundwater quality that may arise from construction.
– Completion of one round of monitoring during within the next six-monthly monitoring period for phenols to comply with CEMP.

8. References

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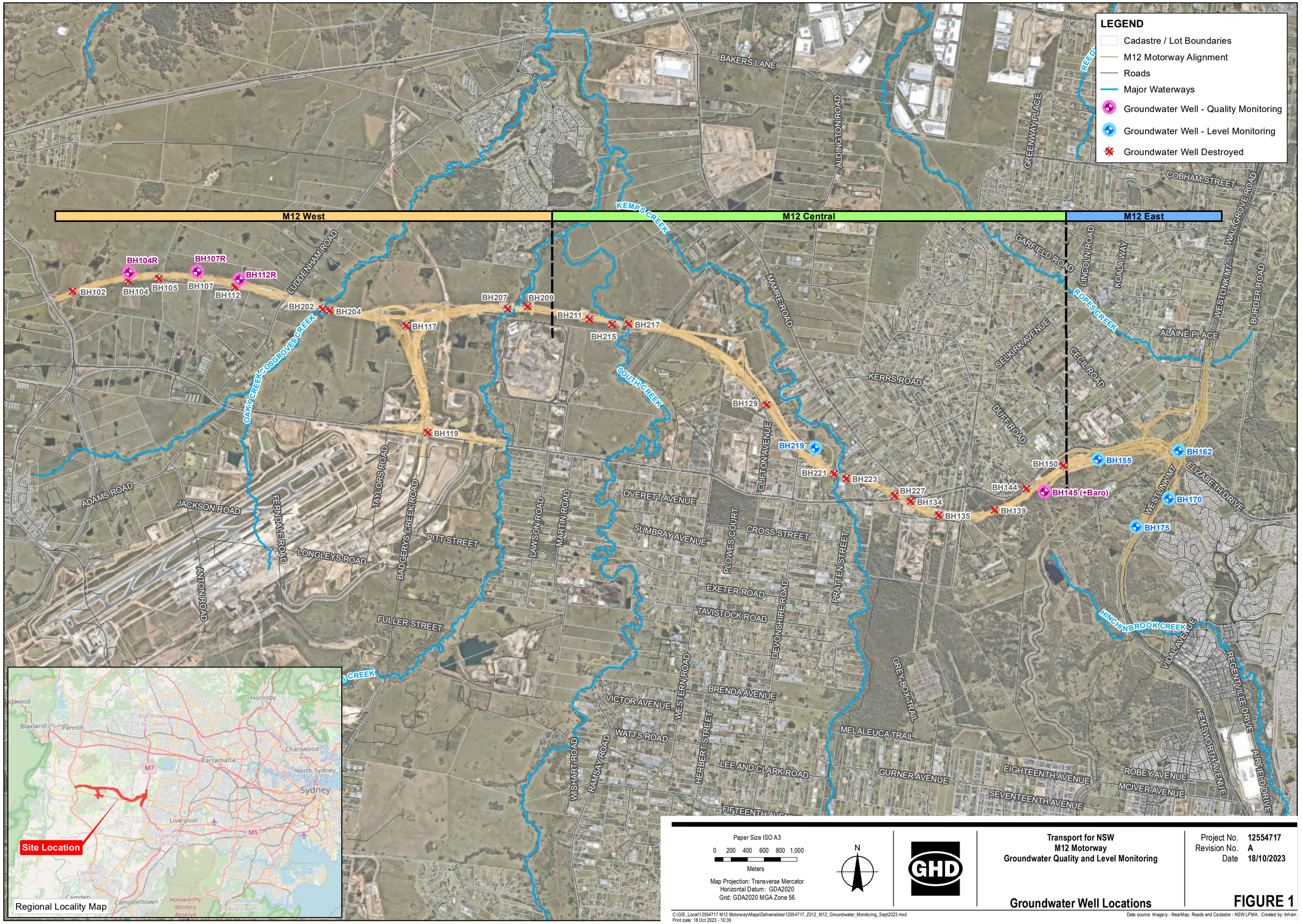
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Appendices

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 **18/10/2023**

Groundwater Well Locations

FIGURE 1

C:\GIS_Local\12554717 M12 Motorway\Maps\Deliverables\12554717_Z012_M12_Groundwater_Monitoring_Sept2023.mxd
Print date: 18 Oct 2023 - 10:39

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

Appendix B

Tables

Appendix B
Table B1
Monitoring well status during monitoring program
(April 2019 to September 2023)

		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
Package	West	BH102													
		BH104			No access										
		BH104R													
		BH105													
		BH107	No access	No access	No access	Bailer						No access	Parameters[1]	No access	
		BH107R													
		BH112	No access	No access	No access	Bailer						No access	Parameters[1]	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
		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 14 May 2020	Event 15 June 2020	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
	West	BH102													
		BH104		No access											
		BH104R													
		BH105													
		BH107		No access					No access						
		BH107R													
		BH112	Bailer	No access					No access						
		BH112R													
		BH117													
		BH119													
		BH202													
		BH204													
		BH207													
		BH209													
	Central	BH129													
		BH134													
		BH135													
		BH139													
		BH144													
		BH145		No access		Bailer					Bailer[2]	Bailer[2]			[1,2]
		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 27 June 2021	Event 28 July 2021	Event 29 August 2021	Event 30 September 2021	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
Package	West	BH102													
		BH104												Bailer	
		BH104R													
		BH105													
		BH107												Bailer	Bailer
		BH107R													
		BH112												Bailer	Bailer
		BH112R													
		BH117													
		BH119													
		BH202													
		BH204													
		BH207													
		BH209													
	Central	BH129													
		BH134													
		BH135													
		BH139													
		BH144													
		BH145	Bailer[2]	Bailer[2]	No access	Bailer[2]	Bailer[2]	Bailer[2]	Bailer[2]	Bailer[2]	Bailer[2]	Bailer[2]		Bailer	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

Package		Well ID	Event 40 July 2022	Event 41 August 2022	Event 42 September 2022	Event 43 October 2022	Event 44 November 2022	Event 45 December 2022	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
	West	BH102										Destroyed					
		BH104						Destroyed									
		BH104R															
		BH105						Destroyed									
		BH107	Bailer	Bailer	Bailer			Destroyed									
		BH107R							No access					No access			
		BH112	Bailer	Bailer	Bailer			Destroyed									
		BH112R						No access	No access	No access	No access	No access	No access			Bailer	
		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									Destroyed						
		BH135		Not located				Destroyed									
		BH139		Not located		Not located		Destroyed									
		BH144						Destroyed									
		BH145	Bailer	Bailer[2]	Bailer[2]	Bailer	Bailer	Bailer[2]	Bailer[2]	Bailer[2]	Bailer[2]	Not required					
		BH145R														Bailer	
		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		Not located		Not located		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

Zone	Location	Month	Event	Observations and Deviations
East	BH145R	April 2023	Event 49	First time sampling BH145R replacement well for BH145
West	BH112R	April 2023	Event 49	Not monitored - no access to sampling location. Onsite contractors CPB have no safety barricading or safe access route to monitoring location.
West	BH112R	May 2023	Event 50	Not monitored - no access to sampling location. Onsite contractors CPB have no safety barricading or safe access route to monitoring location.
West	BH107R	June 2023	Event 51	Not monitored - onsite contractors determined no safe access to monitoring location due to ongoing construction activities in the vicinity.
West	BH112R	June 2023	Event 51	Not monitored - monitoring well was redrilled in a new and accessible location, day prior to the monitoring event.
West	BH112R	July 2023	Event 52	Not monitored - monitoring well had not yet been developed at the time of the monitoring event.
Central	BH112R	August 2023	Event 53	Micropurge equipment became faulty during purging and could not be fixed, a grab sample was collected with a disposable bailer. This was the last day of monitoring, equipment could not be swapped with a working unit. First time monitoring.
West	BH145R	August 2023	Event 53	A grab sample was collected with a disposable bailer as the micropurge equipment was faulty. This was the last day of monitoring, equipment could not be swapped with a working unit.

						Inorganics			Acidity & Alkalinity					Major Ions													
						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
						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	%
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
ADWG 2011 Health (v3.7 updated 2022)																							500[#1]	500[#1]			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)						**200**		**6**																			
ANZECC 2000 - Stock Watering							*5000*[#5]							*1000*	*1000*								*1000*	*1000*			
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	-	-	-	<1	-	<1	914	-	-	240	-	517	-	27	-	3,120	5,600	-	842	191	194	0.74
		20-Aug-19	BH104	Normal	ES1926460	-	-	-	<1	-	<1	932	-	-	240	-	565	-	28	-	3,360	5,870	-	882	205	202	0.68
		24-Sep-19	BH104	Normal	ES1930997	-	-	-	<1	-	<1	973	-	-	205	-	542	-	28	-	3,240	6,070	-	810	196	208	2.73
		22-Oct-19	BH104	Normal	ES1934707	-	-	-	<1	-	<1	1,030	-	-	245	-	581	-	27	-	3,360	6,010	-	678	207	204	0.64
		07-Nov-19	BH104	Normal	ES1936840	-	-	-	<1	-	<1	1,180	-	-	280	-	584	-	29	-	3,380	6,160	-	706	210	212	0.53
		12-Dec-19	BH104	Normal	ES1941279	-	-	-	<1	-	<1	1,030	-	-	287	-	624	-	30	-	3,560	6,700	-	892	221	228	1.52
		16-Jan-20	BH104	Normal	ES2001376	-	-	-	<1	-	<1	1,080	-	-	248	-	562	-	35	-	3,430	6,520	-	747	209	221	2.87
		18-Feb-20	BH104	Normal	ES2005577	-	-	-	<1	-	<1	603	-	-	87	-	167	-	14	-	1,190	1,920	-	326	70.2	73	1.95
		12-Mar-20	SD01	Interlab_D	707829	-	-	-	<10	-	<20	810	-	96	-	190	-	17	-	1,600	-	3,400	420	-	-	-	-
		12-Mar-20	BD01	Field_D	ES2008731	-	-	-	<1	-	<1	704	-	-	103	-	182	-	16	-	1,580	2,670	-	395	89.2	97.6	4.47
			BH104	Normal	ES2008731	-	-	-	<1	-	<1	727	-	-	103	-	182	-	16	-	1,580	2,700	-	393	89.2	98.9	5.11
		23-Apr-20	BH104	Normal	ES2013858	-	-	-	-	-	<1	1,090	-	-	159	-	321	-	22	-	2,320	3,980	-	586	136	146	3.69
		19-May-20	BH104	Normal	ES2017191	-	-	-	-	-	<1	1,010	-	-	178	-	381	-	23	-	2,710	4,620	-	675	159	164	1.81
		30-Jul-20	BH104	Normal	ES2026408	-	*6,030*	**52**	-	-	<1	821	-	-	114	-	231	-	16	-	1,740	3,040	-	436	101	111	4.92
		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
		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
			BH104	Normal	ES2032115	-	*7,380*	**6**	-	-	<1	1,000	1,550	-	141	-	292	-	20	-	2,270	3,650	-	477	130	133	0.97
		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
		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
		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
			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
			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
			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
			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
			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
			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
			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
			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
			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
			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

Appendix B
Table B3
Groundwater Analytical Results for Baseline Monitoring Period (April 2019 to July 2022)

						Inorganics			Acidity & Alkalinity					Major Ions													
						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
						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	%
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
ADWG 2011 Health (v3.7 updated 2022)																							500[#1]	500[#1]			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)						**200**		**6**																			
ANZECC 2000 - Stock Watering							*5000*[#5]							*1000*	*1000*								*1000*	*1000*			
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	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
			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
			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
			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
		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
		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
		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
		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
	BH107	18-Jul-19	BH107	Normal	ES1922601	-	-	-	<1	-	<1	1,520	-	-	148	-	240	-	36	-	2,200	2,400	-	460	124	108	6.96
		20-Aug-19	BH107	Normal	ES1926460	-	-	-	<1	-	<1	1,350	-	-	115	-	322	-	34	-	1,820	1,980	-	437	112	91.9	9.96
		24-Sep-19	BH107	Normal	ES1930997	-	-	-	<1	-	<1	1,490	-	-	102	-	312	-	34	-	1,800	2,780	-	500	110	119	3.79
		22-Oct-19	BH107	Normal	ES1934707	-	-	-	<1	-	<1	1,610	-	-	114	-	325	-	34	-	1,900	2,690	-	411	116	117	0.28
		07-Nov-19	BH107	Normal	ES1936840	-	-	-	<1	-	<1	1,480	-	-	128	-	316	-	34	-	1,850	2,790	-	513	114	119	2.24
		12-Dec-19	BH107	Normal	ES1941279	-	-	-	<1	-	<1	1,430	-	-	125	-	333	-	37	-	1,900	2,800	-	498	117	118	0.29
		20-Feb-20	BH107	Normal	ES2005947	-	-	-	<1	-	<1	1,440	-	-	110	-	309	-	33	-	1,820	2,610	-	470	111	112	0.56
		23-Apr-20	BH107	Normal	ES2013858	-	-	-	-	-	<1	1,710	-	-	134	-	319	-	34	-	1,810	2,680	-	450	112	119	2.84
		21-May-20	BH107	Normal	ES2017665	-	-	-	-	-	<1	1,620	-	-	123	-	338	-	34	-	1,950	2,980	-	496	120	127	2.88
		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
		11-Aug-20	BH107	Normal	ES2027951	-	*5,860*	**46**	-	-	<1	1,440	-	-	114	-	301	-	31	-	1,730	2,470	-	504	106	109	1.13
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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

						Inorganics			Acidity & Alkalinity					Major Ions													
						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
						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	%
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
ADWG 2011 Health (v3.7 updated 2022)																							500[#1]	500[#1]			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)						**200**		**6**																			
ANZECC 2000 - Stock Watering							*5000*[#5]							*1000*	*1000*								*1000*	*1000*			
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	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
		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
		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
		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
			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
		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
		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
	BH112	18-Jul-19	BH112	Normal	ES1922601	-	-	-	<1	-	<1	1,200	-	-	159	-	253	-	37	-	2,310	3,440	-	553	130	132	0.89
		20-Aug-19	BH112	Normal	ES1926460	-	-	-	<1	-	<1	1,150	-	-	169	-	280	-	41	-	2,390	3,360	-	457	136	127	3.49
		25-Sep-19	BH112	Normal	ES1931244	-	-	-	<1	-	<1	1,240	-	-	179	-	294	-	40	-	2,420	3,720	-	548	139	141	0.61
		22-Oct-19	BH112	Normal	ES1934707	-	-	-	<1	-	<1	1,620	-	-	174	-	324	-	42	-	2,570	3,580	-	488	148	144	1.61
		07-Nov-19	BH112	Normal	ES1936840	-	-	-	<1	-	<1	1,520	-	-	192	-	327	-	43	-	2,560	3,650	-	599	149	146	1.07
		12-Dec-19	BH112	Normal	ES1941279	-	-	-	<1	-	<1	1,330	-	-	204	-	338	-	44	-	2,660	4,100	-	647	155	156	0.28
		20-Feb-20	BH112	Normal	ES2005947	-	-	-	<1	-	<1	1,390	-	-	169	-	319	-	40	-	2,460	3,640	-	610	143	143	0.15
		21-Apr-20	BH112	Normal	ES2013464	-	-	-	-	-	<1	1,510	-	-	177	-	321	-	40	-	2,540	3,720	-	623	147	148	0.45
		21-May-20	BH112	Normal	ES2017665	-	-	-	-	-	<1	1,520	-	-	186	-	338	-	41	-	2,640	4,080	-	631	153	158	1.8
		30-Jul-20	BH112	Normal	ES2026408	-	*8,470*	**581**	-	-	<1	1,540	-	-	188	-	318	-	39	-	2,470	4,120	-	615	144	160	5.2
		13-Aug-20	BH112	Normal	ES2028325	-	*8,120*	**238**	-	-	<1	1,450	-	-	173	-	317	-	40	-	2,490	3,780	-	663	144	149	1.82
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
		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
			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

	Inorganics			Acidity & Alkalinity					Major Ions													
	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
	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	%
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
ADWG 2011 Health (v3.7 updated 2022)																		500[#1]	500[#1]			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)	**200**		**6**																			
ANZECC 2000 - Stock Watering		*5000*[#5]							*1000*	*1000*								*1000*	*1000*			
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	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
		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
		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
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
		17-Jul-19	BH145	Normal	ES1922407	-	-	-	<1	-	<1	854	-	-	44	-	20	-	9	-	1,840	2,370	-	153	84.1	87.1	1.75
		21-Aug-19	BH145	Normal	ES1926628	-	-	-	<1	-	<1	785	-	-	62	-	24	-	10	-	1,980	2,370	-	168	91.4	86	3.05
		26-Sep-19	BH145	Normal	ES1931491	-	-	-	<1	-	<1	865	-	-	67	-	30	-	11	-	2,180	2,800	-	215	101	101	0.09
		23-Oct-19	BH145	Normal	ES1934911	-	-	-	<1	-	<1	849	-	-	77	-	34	-	11	-	2,260	3,000	-	212	105	106	0.37
		12-Dec-19	BH145	Normal	ES1941279	-	-	-	<1	-	<1	908	-	-	85	-	39	-	13	-	2,500	3,320	-	212	116	116	0.14
		21-May-20	BH145	Normal	ES2017665	-	-	-	-	-	<1	670	-	-	22	-	11	-	6	-	1,240	1,460	-	105	56.1	56.8	0.59
		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
		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
		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
		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
		11-Nov-20	BH145	Normal	ES2040330	-	1,610	**428**	-	-	<1	385	65	-	13	-	8	-	3	-	530	604	-	124	24.4	27.3	5.56
		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
		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
		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
		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
		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
		08-Jun-21	BH145	Normal	ES2121745	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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
		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
		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
		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
		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
		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
		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
		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
			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
			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
			GWDUP1	Field_D	ES2225656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Inorganics			Acidity & Alkalinity					Major Ions													
	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
	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	%
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
ADWG 2011 Health (v3.7 updated 2022)																		500[#1]	500[#1]			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)	**200**		**6**																			
ANZECC 2000 - Stock Watering		*5000*[#5]							*1000*	*1000*								*1000*	*1000*			
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	1	91	91	87	56	129	129	82	1	128	1	128	1	128	1	128	130	2	128	128	128	128
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
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
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
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
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
Average Concentration		5815	981	0.55	989	0.57	1099	1082		118		228		24		1877	2850		417	107	111	3.3
Geometric Average		5063	165	0.51	893	0.51	1019	694		91		137		20		1697	2393		345	94	98	2.2
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
Standard Deviation		2759	2831	0.48	377	0.84	368	794		71		163		12		728	1503		210	47	49	2.6
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
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
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
% 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
% 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
% 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
% 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

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

Appendix B
Table B3
Groundwater Analytical Results for Baseline Monitoring Period (April 2019 to July 2022)

						Minor Ions		Nutrients									Metals								
						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)	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Iron (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)
						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	mg/L
EQL						1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.01	0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001
ADWG 2011 Health (v3.7 updated 2022)									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)								**0.01165[#4]**			**0.04**	**0.35**		**0.008**		**0.025**									
ANZECC 2000 - Stock Watering									*90[#6]*	*9.1[#7]*							*0.5*	*0.01*	*1*	*1[#8]*		*0.1*		*0.002*	*1*
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
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	914	-	**0.09**	0.09	<0.01	**0.09**	**0.6**	0.5	<0.01	-	**0.22**	<0.001	0.0002	<0.001	0.018	-	0.001	-	<0.0001	0.06
		20-Aug-19	BH104	Normal	ES1926460	932	-	**0.05**	0.07	0.04	**0.11**	<0.2[#1]	<0.2[#1]	<0.01	-	<0.02[#1]	<0.001	<0.0001	<0.001	0.015	-	0.001	-	<0.0001	0.074
		24-Sep-19	BH104	Normal	ES1930997	973	-	**0.02**	0.04	0.01	**0.05**	**0.4**	0.3	<0.01	-	**0.05**	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.117
		22-Oct-19	BH104	Normal	ES1934707	1,030	-	**0.1**	0.03	<0.01	0.03	<0.2[#1]	<0.2[#1]	<0.01	-	0.02	<0.001	<0.0001	<0.001	0.009	-	<0.001	-	<0.0001	0.062
		07-Nov-19	BH104	Normal	ES1936840	1,180	-	**0.28**	0.02	<0.01	0.02	**0.6**	0.6	<0.01	-	**0.16**	<0.001	<0.0001	<0.001	0.004	-	<0.001	-	<0.0001	0.078
		12-Dec-19	BH104	Normal	ES1941279	1,030	-	**0.15**	0.09	0.02	**0.11**	<0.2[#1]	<0.2[#1]	<0.01	-	**0.03**	<0.001	<0.0001	0.001	0.016	-	0.001	-	<0.0001	0.107
		16-Jan-20	BH104	Normal	ES2001376	1,080	-	**0.11**	0.1	<0.01	**0.1**	<0.5[#1]	<0.5[#1]	<0.01	-	**0.27**	0.002	<0.0001	0.001	0.081	-	0.005	-	<0.0001	0.109
		18-Feb-20	BH104	Normal	ES2005577	603	-	**0.24**	1.17	<0.05[#1]	**1.17**	**2.4**	1.2	<0.02[#1]	-	**0.07**	0.001	<0.0001	<0.001	0.039	-	0.001	-	<0.0001	0.06
		12-Mar-20	SD01	Interlab_D	707829	810	-	**0.11**	1.6	0.03	**1.6**	**2.6**	1	<0.01	0.06	-	<0.001	<0.0002	<0.001	0.02	-	<0.001	-	<0.0001	0.053
		12-Mar-20	BD01	Field_D	ES2008731	704	-	**0.03**	1.09	0.04	**1.13**	**1.9**	0.8	<0.01	-	**0.04**	<0.001	<0.0001	<0.001	0.012	-	<0.001	-	<0.0001	0.042
			BH104	Normal	ES2008731	727	-	<0.01	1.09	0.04	**1.13**	**2.1**	1	<0.01	-	**0.05**	<0.001	<0.0001	<0.001	0.012	-	<0.001	-	<0.0001	0.046
		23-Apr-20	BH104	Normal	ES2013858	1,090	<1	**0.02**	0.12	<0.01	**0.12**	**0.4**	0.3	<0.01	-	<0.02[#1]	<0.001	<0.0001	<0.001	0.046	-	0.001	-	<0.0001	0.091
		19-May-20	BH104	Normal	ES2017191	1,010	<1	<0.1[#1]	0.13	<0.01	**0.13**	<0.2[#1]	<0.2[#1]	<0.01	-	<0.02[#1]	<0.001	<0.0001	<0.001	0.026	-	<0.001	-	<0.0001	0.027
		30-Jul-20	BH104	Normal	ES2026408	821	<1	**0.25**	0.02	<0.01	0.02	**0.8**	0.8	-	-	**0.08**	<0.001	<0.0001	<0.001	0.015	0.19	<0.001	0.247	<0.0001	0.066
		11-Aug-20	BH104	Normal	ES2027951	690	<1	<0.01	0.03	<0.01	0.03	**0.5**	0.5	-	-	0.02	<0.001	0.0001	<0.001	0.105	0.15	0.002	0.266	<0.0001	0.076
		10-Sep-20	BD01	Field_D	ES2032115	1,030	<1	**0.08**	0.07	<0.01	**0.07**	**0.4**	0.3	-	-	**0.03**	<0.001	<0.0001	<0.001	0.003	0.72	<0.001	0.339	<0.0001	0.023
			BH104	Normal	ES2032115	1,000	<1	**0.09**	0.05	<0.01	**0.05**	**0.4**	0.3	-	-	0.02	<0.001	<0.0001	<0.001	0.002	0.24	<0.001	0.347	<0.0001	0.022
		09-Oct-20	BD01	Field_D	ES2035519	-	-	-	-	-	-	-	-	-	-	-	<0.001	0.0001	<0.001	0.074	-	0.002	-	<0.0001	0.087
			BH104	Normal	ES2035519	1,200	<1	**0.09**	0.09	<0.01	**0.09**	<0.2[#1]	<0.2[#1]	-	-	**0.04**	<0.001	<0.0001	<0.001	0.001	0.37	<0.001	0.584	<0.0001	0.031
		13-Nov-20	BH104	Normal	ES2040330	1,160	<1	<0.1[#1]	0.12	<0.01	**0.12**	0.3	0.2	-	-	0.02	<0.001	<0.0001	<0.001	<0.001	1.51	<0.001	0.609	<0.0001	0.137
		08-Dec-20	BH104	Normal	ES2043799	1,340	<1	**0.6**	0.01	<0.01	0.01	**1.5**	1.5	-	-	**0.08**	<0.001	<0.0001	0.002	<0.001	2.83	<0.001	0.93	<0.0001	0.105
			M12GW_DUP	Field_D	ES2043799	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	0.002	<0.001	-	<0.001	-	<0.0001	0.103
		14-Jan-21	BH104	Normal	ES2101242	1,430	<1	**0.32**	<0.01	<0.01	<0.01	**1**	1	-	-	**0.06**	<0.001	<0.0001	<0.001	<0.001	3.12	<0.001	1.33	<0.0001	0.175
			M12GWDUP	Field_D	ES2101242	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.181
		11-Feb-21	BH104	Normal	ES2104999	1,130	<1	**0.59**	0.05	<0.01	**0.05**	**1.2**	1.2	-	-	**0.14**	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.896	<0.0001	0.081
			M12GWDUP	Field_D	ES2104999	-	-	-	-	-	-	-	-	-	-	-	0.002	<0.0001	0.002	<0.001	-	<0.001	-	<0.0001	0.206
		10-Mar-21	BH104	Normal	ES2108508	1,290	<1	**0.31**	0.04	<0.01	**0.04**	**0.4**	0.4	-	-	**0.04**	0.001	<0.0001	<0.001	0.002	2.15	<0.001	1.02	<0.0001	0.057
			M12GWDUP	Field_D	ES2108508	-	-	-	-	-	-	-	-	-	-	-	0.001	<0.0001	<0.001	0.067	-	0.002	-	<0.0001	0.064
		07-Apr-21	BH104	Normal	ES2112804	-	-	**0.19**	0.06	<0.01	**0.06**	**0.7**	0.6	-	-	**0.04**	<0.001	<0.0001	<0.001	0.002	0.41	<0.001	0.39	<0.0001	0.04
			M12GWDUP	Field_D	ES2112804	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	0.001	0.003	-	<0.001	-	<0.0001	0.039
		04-May-21	BH104	Normal	ES2116634	-	-	**0.06**	0.08	<0.01	**0.08**	**0.7**	0.6	-	-	**0.06**	<0.001	<0.0001	<0.001	0.002	0.16	<0.001	0.274	<0.0001	0.108
			M12GWDUP	Field_D	ES2116634	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	0.002	-	<0.001	-	<0.0001	0.113
		08-Jun-21	BH104	Normal	ES2121745	-	-	**0.26**	0.04	<0.01	**0.04**	**0.5**	0.5	-	-	**0.04**	<0.001	<0.0001	<0.001	0.002	0.77	<0.001	0.313	<0.0001	0.081
			M12GWDUP	Field_D	ES2121745	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.074
		07-Jul-21	BH104	Normal	ES2125048	-	-	**0.36**	0.01	<0.01	0.01	**0.6**	0.6	-	-	**0.06**	<0.001	<0.0001	<0.001	<0.001	1.09	<0.001	0.323	<0.0001	0.011
			M12GWDUP	Field_D	ES2125048	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.012
		13-Aug-21	BH104	Normal	ES2129596	-	-	**0.13**	0.04	<0.01	**0.04**	<0.2[#1]	<0.2[#1]	-	-	<0.02[#1]	0.001	<0.0001	<0.001	<0.001	0.69	<0.001	0.308	<0.0001	0.057
			M12GWDUP	Field_D	ES2129596	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.054
		01-Sep-21	BH104	Normal	ES2131753	-	-	**0.21**	0.01	<0.01	0.01	0.3	0.3	-	-	**0.03**	<0.001	<0.0001	<0.001	<0.001	0.34	<0.001	0.305	<0.0001	0.033
			M12GWDUP	Field_D	ES2131753	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.039
		15-Oct-21	BH104	Normal	ES2137338	-	-	**0.38**	0.02	<0.01	0.02	**0.7**	0.7	-	-	**0.14**	<0.001	<0.0001	0.002	0.002	0.82	<0.001	0.542	<0.0001	0.043

Appendix B
Table B3
Groundwater Analytical Results for Baseline Monitoring Period (April 2019 to July 2022)

						Minor Ions		Nutrients									Metals								
						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)	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Iron (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)
						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	mg/L
EQL						1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.01	0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001
ADWG 2011 Health (v3.7 updated 2022)									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)								**0.01165[#4]**			**0.04**	**0.35**		**0.008**		**0.025**									
ANZECC 2000 - Stock Watering									*90[#6]*	*9.1[#7]*							*0.5*	*0.01*	*1*	*1[#8]*		*0.1*		*0.002*	*1*
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
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	15-Oct-21	GWDUP1	Field_D	ES2137338	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.037
		08-Nov-21	BH104	Normal	ES2140334	-	-	**0.17**	0.37	0.01	**0.38**	**0.8**	0.4	-	-	**0.04**	<0.001	<0.0001	<0.001	0.002	0.24	<0.001	0.299	<0.0001	0.035
			GWDUP1	Field_D	ES2140334	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	0.001	-	<0.001	-	<0.0001	0.033
		08-Dec-21	BH104	Normal	ES2144782	-	-	**0.25**	0.06	<0.01	**0.06**	**0.9**	0.8	-	-	**0.08**	0.001	<0.0001	<0.001	0.004	0.35	<0.001	0.834	<0.0001	0.023
			GWDUP1	Field_D	ES2144782	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	0.003	-	<0.001	-	<0.0001	0.024
		13-Jan-22	BH104	Normal	ES2201179	-	-	**0.39**	0.06	<0.01	**0.06**	**1**	0.9	<0.01	-	**0.1**	0.002	<0.0001	<0.001	0.009	<0.05	<0.001	0.53	<0.0001	0.035
			GWDUP1	Field_D	ES2201179	-	-	-	-	-	-	-	-	-	-	-	0.002	<0.0001	<0.001	0.004	-	<0.001	-	<0.0001	0.05
		10-Feb-22	GWDUP2	Interlab_D	863166	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.051
		10-Feb-22	BH104	Normal	ES2204606	-	-	**0.56**	0.01	<0.01	0.01	**1.2**	1.2	<0.01	-	**0.14**	<0.001	<0.0001	<0.001	<0.001	0.99	<0.001	0.421	<0.0001	0.06
		18-Mar-22	BH104	Normal	ES2209694	-	-	**0.52**	<0.01	<0.01	<0.01	**1.8**	1.8	<0.01	-	**0.14**	0.001	<0.0001	<0.001	0.008	1.03	<0.001	0.391	<0.0001	0.192
		25-May-22	BH104	Normal	ES2218210	-	-	**0.02**	1.94	<0.01	**1.94**	**2.8**	0.9	<0.01	-	**0.07**	<0.001	<0.0001	<0.001	0.034	<0.05	<0.001	0.096	<0.0001	0.003
		27-Jun-22	GWDUP2	Interlab_D	901087	-	-	-	-	-	-	-	-	-	-	-	<0.001	0.0002	<0.001	0.17	-	<0.001	-	<0.0001	0.024
		27-Jun-22	BH104	Normal	ES2222571	-	-	<0.1[#1]	4.13	<0.01	**4.13**	**4.1**	<0.5[#1]	<0.01	-	**0.1**	<0.001	<0.0001	<0.001	0.071	<0.05	<0.001	0.2	<0.0001	0.024
		20-Jul-22	GWDUP2	Interlab_D	907459	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	0.079	-	<0.001	-	<0.0001	0.009
		20-Jul-22	BH104	Normal	ES2225656	-	-	**0.09**	5.19	0.04	**5.23**	**6.2**	1	<0.01	-	**0.03**	0.002	0.0003	0.002	0.089	<0.05	<0.001	0.337	<0.0001	0.011
	BH107	18-Jul-19	BH107	Normal	ES1922601	1,520	-	**0.07**	0.07	<0.01	**0.07**	**0.7**	0.6	<0.01	-	**0.23**	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.018
		20-Aug-19	BH107	Normal	ES1926460	1,350	-	0.01	0.05	<0.01	**0.05**	**0.6**	0.5	<0.01	-	**0.25**	<0.001	<0.0001	<0.001	0.005	-	<0.001	-	<0.0001	0.033
		24-Sep-19	BH107	Normal	ES1930997	1,490	-	**0.05**	0.07	<0.01	**0.07**	**1.9**	1.8	<0.01	-	**0.19**	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.067
		22-Oct-19	BH107	Normal	ES1934707	1,610	-	**0.02**	<0.01	0.04	**0.04**	<0.1	<0.1	<0.01	-	<0.01	<0.001	<0.0001	<0.001	0.009	-	<0.001	-	<0.0001	0.057
		07-Nov-19	BH107	Normal	ES1936840	1,480	-	**0.04**	0.04	<0.01	**0.04**	0.2	0.2	<0.01	-	**0.09**	<0.001	<0.0001	<0.001	0.006	0.014	-	<0.001	-	<0.0001	0.055
		12-Dec-19	BH107	Normal	ES1941279	1,430	-	**0.11**	0.1	<0.01	**0.1**	<0.2[#1]	<0.2[#1]	<0.01	-	<0.02[#1]	<0.001	<0.0001	<0.001	0.036	-	0.002	-	<0.0001	0.046
		20-Feb-20	BH107	Normal	ES2005947	1,440	-	**0.1**	0.18	<0.01	**0.18**	**0.5**	0.3	<0.01	-	<0.02[#1]	<0.001	<0.0001	<0.001	0.013	-	<0.001	-	<0.0001	0.07
		23-Apr-20	BH107	Normal	ES2013858	1,710	<1	**0.05**	0.1	<0.01	**0.1**	<0.2[#1]	<0.2[#1]	<0.01	-	<0.02[#1]	<0.001	<0.0001	<0.001	0.016	-	<0.001	-	<0.0001	0.084
		21-May-20	BH107	Normal	ES2017665	1,620	<1	**0.04**	0.05	<0.01	**0.05**	<0.1	<0.1	<0.01	-	**0.03**	<0.001	<0.0001	<0.001	0.003	-	<0.001	-	<0.0001	0.037
		30-Jul-20	BH107	Normal	ES2026408	1,520	<1	**0.06**	0.15	<0.01	**0.15**	**0.4**	0.2	-	-	**0.08**	<0.001	0.0003	<0.001	0.079	0.14	0.004	0.471	<0.0001	0.045
		11-Aug-20	BH107	Normal	ES2027951	1,440	<1	**0.04**	0.06	<0.01	**0.06**	<0.2[#1]	<0.2[#1]	-	-	<0.02[#1]	<0.001	0.0001	<0.001	0.11	0.1	0.001	0.543	<0.0001	0.04
		10-Sep-20	BH107	Normal	ES2032115	1,420	<1	**0.07**	0.05	<0.01	**0.05**	<0.2[#1]	<0.2[#1]	-	-	0.02	<0.001	<0.0001	<0.001	0.084	0.23	0.002	0.645	<0.0001	0.023
		09-Oct-20	BH107	Normal	ES2035519	1,600	<1	**0.04**	0.11	<0.01	**0.11**	<0.2[#1]	<0.2[#1]	-	-	**0.05**	<0.001	0.0001	<0.001	0.074	0.09	0.003	0.59	<0.0001	0.055
		08-Dec-20	BH107	Normal	ES2043799	1,750	<1	**0.06**	0.04	<0.01	**0.04**	0.2	0.2	-	-	<0.02[#1]	<0.001	<0.0001	<0.001	<0.001	0.15	<0.001	0.459	<0.0001	0.109
		14-Jan-21	BH107	Normal	ES2101242	1,590	<1	**0.06**	0.08	<0.01	**0.08**	**0.4**	0.3	-	-	**0.07**	<0.001	<0.0001	<0.001	0.001	0.17	<0.001	0.43	<0.0001	0.068
		11-Feb-21	BH107	Normal	ES2104999	1,610	<1	**0.06**	0.13	<0.01	**0.13**	0.2	0.1	-	-	0.02	<0.001	0.0006	<0.001	0.089	0.13	0.003	0.621	<0.0001	0.09
		10-Mar-21	BH107	Normal	ES2108508	1,580	<1	**0.06**	0.12	<0.01	**0.12**	<0.2[#1]	<0.2[#1]	-	-	<0.02[#1]	<0.001	0.0002	<0.001	0.119	0.15	0.002	0.522	<0.0001	0.056
		07-Apr-21	BH107	Normal	ES2112804	-	-	**0.03**	0.55	0.02	**0.57**	**0.7**	0.1	-	-	<0.01	<0.001	<0.0001	<0.001	0.008	<0.05	<0.001	0.389	<0.0001	0.041
		03-May-21	BH107	Normal	ES2116634	-	-	<0.01	2.86	<0.01	**2.86**	**3.5**	0.6	-	-	**0.1**	<0.001	<0.0001	<0.001	0.016	0.06	<0.001	0.052	<0.0001	0.011
		08-Jun-21	BH107	Normal	ES2121745	-	-	**0.06**	2.34	0.01	**2.35**	**2.8**	0.5	-	-	**0.13**	<0.001	<0.0001	<0.001	0.002	0.14	<0.001	0.443	<0.0001	0.096
		07-Jul-21	BH107	Normal	ES2125048	-	-	**0.02**	2.91	0.02	**2.93**	**3.2**	0.3	-	-	**0.04**	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.34	<0.0001	0.004
		13-Aug-21	BH107	Normal	ES2129596	-	-	**0.03**	2.73	0.01	**2.74**	**3**	0.3	-	-	**0.03**	<0.001	<0.0001	<0.001	<0.001	0.06	<0.001	0.408	<0.0001	0.021
		01-Sep-21	BH107	Normal	ES2131753	-	-	**0.21**	0.14	<0.01	**0.14**	**1.1**	1	-	-	**0.42**	<0.001	<0.0001	<0.001	0.002	0.24	<0.001	0.344	<0.0001	0.05
		15-Oct-21	GWDUP2	Interlab_D	833147	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.051
		15-Oct-21	BH107	Normal	ES2137338	-	-	**0.21**	0.31	<0.01	**0.31**	**2.3**	2	-	-	**1**	<0.001	<0.0001	<0.001	<0.001	0.31	<0.001	0.29	<0.0001	0.05
		08-Nov-21	BH107	Normal	ES2140334	-	-	**0.02**	2.52	0.06	**2.58**	**3.1**	0.5	-	-	0.02	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.201	<0.0001	0.024

Appendix B
Table B3
Groundwater Analytical Results for Baseline Monitoring Period (April 2019 to July 2022)

						Minor Ions		Nutrients									Metals								
						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)	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Iron (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)
						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	mg/L
EQL						1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.01	0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001
ADWG 2011 Health (v3.7 updated 2022)									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)								**0.01165[#4]**			**0.04**	**0.35**		**0.008**		**0.025**									
ANZECC 2000 - Stock Watering									*90[#6]*	*9.1[#7]*							*0.5*	*0.01*	*1*	*1[#8]*		*0.1*		*0.002*	*1*
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
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	08-Dec-21	GWDUP2	Interlab_D	849475	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	0.003	-	<0.001	-	<0.0001	0.008
		08-Dec-21	BH107	Normal	ES2144782	-	-	**0.03**	2.23	0.06	**2.29**	**2.9**	0.6	-	-	0.02	<0.001	<0.0001	<0.001	<0.001	0.09	<0.001	0.308	<0.0001	0.009
		13-Jan-22	BH107	Normal	ES2201179	-	-	**0.05**	0.87	0.02	**0.89**	**2.9**	2	<0.01	-	**0.45**	<0.001	<0.0001	<0.001	0.009	<0.05	<0.001	0.264	<0.0001	0.07
		10-Feb-22	BH107	Normal	ES2204606	-	-	<0.01	0.93	0.02	**0.95**	**1.2**	0.3	<0.01	-	**0.03**	<0.001	<0.0001	<0.001	<0.001	0.05	<0.001	0.353	<0.0001	0.073
		18-Mar-22	BH107	Normal	ES2209694	-	-	**0.13**	1.71	0.02	**1.73**	**3.3**	1.6	<0.01	-	**0.24**	<0.001	<0.0001	<0.001	0.006	0.13	<0.001	0.236	<0.0001	0.061
			GWDUP1	Field_D	ES2209694	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	0.006	-	<0.001	-	<0.0001	0.069
		25-May-22	BH107	Normal	ES2218210	-	-	<0.01	11.2	<0.01	**11.2**	**13.8**	2.6	**0.01**	-	**0.08**	<0.001	<0.0001	<0.001	0.018	<0.05	<0.001	0.002	<0.0001	0.001
		27-Jun-22	BH107	Normal	ES2222571	-	-	0.01	11.5	<0.01	**11.5**	**14**	2.5	<0.01	-	**0.32**	<0.001	<0.0001	<0.001	0.003	0.62	<0.001	0.446	<0.0001	0.002
		20-Jul-22	BH107	Normal	ES2225656	-	-	**0.22**	8.95	<0.01	**8.95**	**11.2**	2.2	<0.01	-	**0.08**	<0.001	<0.0001	<0.001	0.008	<0.05	<0.001	0.001	<0.0001	<0.001
	BH112	18-Jul-19	BH112	Normal	ES1922601	1,200	-	**1.45**	0.32	0.1	**0.42**	**5.2**	4.8	<0.01	-	**1.92**	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.004
		20-Aug-19	BH112	Normal	ES1926460	1,150	-	**1.43**	0.06	<0.01	**0.06**	**4.6**	4.5	<0.01	-	**1.5**	<0.001	<0.0001	<0.001	0.032	-	0.002	-	<0.0001	0.051
		25-Sep-19	BH112	Normal	ES1931244	1,240	-	**2.08**	0.06	0.06	**0.12**	**2.4**	2.3	<0.01	-	**0.19**	<0.001	<0.0001	<0.001	0.001	-	<0.001	-	<0.0001	0.804
		22-Oct-19	BH112	Normal	ES1934707	1,620	-	**2.12**	0.07	<0.01	**0.07**	**2.8**	2.7	<0.01	-	**0.4**	0.001	<0.0001	<0.001	0.015	-	0.001	-	<0.0001	0.19
		07-Nov-19	BH112	Normal	ES1936840	1,520	-	**2.16**	0.08	<0.01	**0.08**	**3**	2.9	<0.01	-	**0.44**	<0.001	<0.0001	<0.001	0.014	-	<0.001	-	<0.0001	0.095
		12-Dec-19	BH112	Normal	ES1941279	1,330	-	**2.03**	0.1	<0.01	**0.1**	**2.3**	2.2	<0.01	-	<0.02[#1]	<0.001	<0.0001	<0.001	0.027	-	0.002	-	<0.0001	0.087
		20-Feb-20	BH112	Normal	ES2005947	1,390	-	**2.17**	0.06	<0.01	**0.06**	**2.6**	2.5	**0.24**	-	**0.33**	<0.001	<0.0001	<0.001	0.011	-	<0.001	-	<0.0001	0.179
		21-Apr-20	BH112	Normal	ES2013464	1,510	<1	**2.07**	0.13	<0.01	**0.13**	**2.7**	2.6	<0.01	-	<0.05[#1]	<0.001	<0.0001	<0.001	0.05	-	0.001	-	<0.0001	0.09
		21-May-20	BH112	Normal	ES2017665	1,520	<1	**1.73**	0.45	0.01	**0.46**	**2.5**	2	<0.01	-	**0.44**	<0.001	<0.0001	<0.001	0.002	-	<0.001	-	<0.0001	0.025
		30-Jul-20	BH112	Normal	ES2026408	1,540	<1	**1.93**	1.65	0.03	**1.68**	**4.3**	2.6	-	-	**0.18**	<0.001	0.0007	<0.001	0.138	0.24	0.007	0.267	<0.0001	0.06
		13-Aug-20	BH112	Normal	ES2028325	1,450	<1	**1.99**	0.27	0.04	**0.31**	**2.3**	2	-	-	**0.14**	<0.001	<0.0001	<0.001	0.033	0.06	<0.001	0.276	<0.0001	0.068
		10-Sep-20	BH112	Normal	ES2032115	1,560	<1	**1.74**	0.48	<0.01	**0.48**	**3.2**	2.7	-	-	**0.09**	<0.001	<0.0001	<0.001	0.08	0.15	0.001	0.284	<0.0001	0.08
		09-Oct-20	BH112	Normal	ES2035519	1,360	<1	**1.31**	0.94	<0.01	**0.94**	**3**	2.1	-	-	**0.13**	<0.001	0.0002	<0.001	0.11	0.07	0.003	0.281	<0.0001	0.062
		08-Dec-20	BH112	Normal	ES2043799	1,630	<1	**1.82**	0.43	<0.01	**0.43**	**2.3**	1.9	-	-	<0.02[#1]	<0.001	<0.0001	<0.001	0.004	0.09	<0.001	0.264	<0.0001	0.101
		14-Jan-21	BH112	Normal	ES2101242	1,450	<1	**1.83**	0.2	<0.01	**0.2**	**2.3**	2.1	-	-	**0.21**	<0.001	<0.0001	<0.001	0.007	0.06	<0.001	0.223	<0.0001	0.12
		11-Feb-21	BH112	Normal	ES2104999	1,310	<1	**1.58**	0.59	0.01	**0.6**	**2.4**	1.8	-	-	**0.17**	<0.001	<0.0001	<0.001	0.001	<0.05	<0.001	0.222	<0.0001	0.048
		10-Mar-21	BH112	Normal	ES2108508	1,370	<1	**1.7**	0.37	0.01	**0.38**	**2.1**	1.7	-	-	**0.13**	<0.001	<0.0001	<0.001	0.186	0.12	0.002	0.225	<0.0001	0.04
		07-Apr-21	BH112	Normal	ES2112804	-	-	**0.31**	1.59	0.07	**1.66**	**2.3**	0.6	-	-	**0.03**	<0.001	<0.0001	<0.001	0.011	<0.05	<0.001	0.139	<0.0001	0.036
		04-May-21	BH112	Normal	ES2116634	-	-	**0.69**	2.02	0.05	**2.07**	**3.6**	1.5	-	-	**0.32**	<0.001	<0.0001	<0.001	0.004	0.19	<0.001	0.206	<0.0001	0.182
		08-Jun-21	BH112	Normal	ES2121745	-	-	**0.76**	2.78	0.02	**2.8**	**4.2**	1.4	-	-	**0.15**	<0.001	<0.0001	<0.001	0.001	0.37	<0.001	0.174	<0.0001	0.056
		07-Jul-21	BH112	Normal	ES2125048	-	-	**1.23**	1.53	<0.01	**1.53**	**4.1**	2.6	-	-	**0.7**	<0.001	<0.0001	<0.001	0.002	0.27	<0.001	0.172	<0.0001	0.01
		13-Aug-21	BH112	Normal	ES2129596	-	-	**1.19**	1.95	<0.01	**1.95**	**3.4**	1.5	-	-	**0.06**	<0.001	<0.0001	<0.001	0.002	0.17	<0.001	0.162	<0.0001	0.043
		01-Sep-21	BH112	Normal	ES2131753	-	-	**0.94**	1.81	<0.01	**1.81**	**3**	1.2	-	-	**0.04**	<0.001	<0.0001	<0.001	0.002	0.1	<0.001	0.142	<0.0001	0.038
		15-Oct-21	BH112	Normal	ES2137338	-	-	**0.03**	0.13	<0.01	**0.13**	<0.5[#1]	<0.5[#1]	-	-	<0.05[#1]	<0.001	<0.0001	0.003	0.086	1.24	0.004	0.792	<0.0001	0.071
		08-Nov-21	BH112	Normal	ES2140334	-	-	**0.76**	2.15	<0.01	**2.15**	**3.4**	1.2	-	-	**0.11**	<0.001	<0.0001	<0.001	0.003	<0.05	<0.001	0.19	<0.0001	0.033
		08-Dec-21	BH112	Normal	ES2144782	-	-	**1.03**	1.97	0.01	**1.98**	**3.6**	1.6	-	-	**0.15**	<0.001	<0.0001	<0.001	0.002	0.12	<0.001	0.164	<0.0001	0.05
		13-Jan-22	GWDUP2	Interlab_D	856978	-	-	-	-	-	-	-	-	-	-	-	0.001	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.11
		13-Jan-22	BH112	Normal	ES2201179	-	-	**1.01**	2.07	<0.01	**2.07**	**3.9**	1.8	<0.01	-	**0.24**	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.247	<0.0001	0.065
		10-Feb-22	BH112	Normal	ES2204606	-	-	**0.55**	4.4	<0.01	**4.4**	**5.3**	0.9	<0.01	-	**0.05**	<0.001	<0.0001	<0.001	0.001	<0.05	<0.001	0.164	<0.0001	0.141
			GWPDUP1	Field_D	ES2204606	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	0.002	-	<0.001	-	<0.0001	0.152
		18-Mar-22	GWDUP2	Interlab_D	874238	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	0.001	-	<0.001	-	<0.0001	0.12
		18-Mar-22	BH112	Normal	ES2209694	-	-	**0.1**	0.2	<0.01	**0.2**	**2.6**	2.4	<0.01	-	**1.35**	<0.001	<0.0001	<0.001	<0.001	0.06	<0.001	0.02	<0.0001	0.13

Appendix B
Table B3
Groundwater Analytical Results for Baseline Monitoring Period (April 2019 to July 2022)

							Minor Ions		Nutrients										Metals								
							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)	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Iron (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)
							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	mg/L
EQL							1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.01	0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001
ADWG 2011 Health (v3.7 updated 2022)										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)									**0.01165[#4]**			**0.04**	**0.35**		**0.008**		**0.025**									
ANZECC 2000 - Stock Watering										*90[#6]*	*9.1[#7]*							*0.5*	*0.01*	*1*	*1[#8]*		*0.1*		*0.002*	*1*
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
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	25-May-22	BH112	Normal	ES2218210	-	-	**0.1**	0.23	<0.01	**0.23**	**3.6**	3.4	<0.01	-	**2.3**	<0.001	<0.0001	<0.001	0.003	<0.05	<0.001	0.002	<0.0001	0.007
		27-Jun-22	BH112	Normal	ES2222571	-	-	**0.04**	0.33	<0.01	**0.33**	**0.5**	0.2	<0.01	-	**0.26**	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.001	<0.0001	<0.001
		20-Jul-22	BH112	Normal	ES2225656	-	-	**0.03**	0.51	<0.01	**0.51**	**0.8**	0.3	<0.01	-	**0.13**	<0.001	<0.0001	<0.001	0.004	<0.05	<0.001	0.001	<0.0001	<0.001
M12 - Central	BH145	13-Jun-19	BH145	Normal	ES1918214	841	-	**2.86**	13.4	4.49	**17.9**	**24.2**	6.3	<0.01	-	**0.31**	<0.001	<0.0001	<0.001	0.091	-	<0.001	-	<0.0001	0.213
		17-Jul-19	BH145	Normal	ES1922407	854	-	**2.84**	8.24	4.86	**13.1**	**17.1**	4	<0.01	-	**0.41**	<0.001	<0.0001	<0.001	0.047	-	<0.001	-	<0.0001	0.034
		21-Aug-19	BH145	Normal	ES1926628	785	-	**3**	17.1	5.66	**22.8**	**29.2**	6.4	**0.01**	-	**0.19**	<0.001	<0.0001	<0.001	0.038	-	<0.001	-	<0.0001	0.019
		26-Sep-19	BH145	Normal	ES1931491	865	-	**3.34**	43.7	6.28	**50**	**54**	4	<0.01	-	**0.18**	<0.001	<0.0001	<0.001	0.008	-	<0.001	-	<0.0001	0.008
		23-Oct-19	BH145	Normal	ES1934911	849	-	**3.55**	35.3	*10.5*	**45.8**	**55.1**	9.3	<0.01	-	**2.35**	<0.001	0.0002	<0.001	0.086	-	0.002	-	<0.0001	0.072
		12-Dec-19	BH145	Normal	ES1941279	908	-	**2.69**	47.3	6.68	**54**	**68**	14	<0.01	-	**4.65**	<0.001	0.0001	<0.001	0.059	-	<0.001	-	<0.0001	0.026
		21-May-20	BH145	Normal	ES2017665	670	<1	**0.72**	28.3	8	**36.3**	**38**	1.7	<0.01	-	**0.1**	<0.001	<0.0001	<0.001	0.009	-	<0.001	-	<0.0001	0.033
		30-Jul-20	BD01	Field_D	ES2026408	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	0.017	-	<0.001	-	<0.0001	0.047
			BH145	Normal	ES2026408	494	<1	**1.81**	16.8	1.79	**18.6**	**24.8**	6.2	-	-	**0.31**	<0.001	0.0001	<0.001	0.034	<0.05	<0.001	0.566	<0.0001	0.056
		13-Aug-20	BH145	Normal	ES2028325	782	<1	**2.83**	19.3	0.28	**19.6**	**25.2**	5.6	-	-	**0.32**	<0.001	0.0002	<0.001	0.082	22.2	<0.001	1.51	<0.0001	0.121
		26-Aug-20	BH145	Normal	740880	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Sep-20	BH145	Normal	ES2032115	1,230	<1	**3.06**	3.82	0.49	**4.31**	**9.6**	5.3	-	-	**1.16**	<0.001	0.0001	<0.001	0.153	35.3	0.002	1.64	<0.0001	0.129
		08-Oct-20	BH145	Normal	ES2035519	1,250	<1	**2.88**	6.44	3.76	**10.2**	**31**	20.8	-	-	**10.8**	<0.001	<0.0001	<0.001	0.008	<0.05	<0.001	1.5	<0.0001	0.02
		11-Nov-20	BH145	Normal	ES2040330	385	<1	**1.11**	8.71	0.06	**8.77**	**11.5**	2.7	-	-	**0.14**	<0.001	<0.0001	<0.001	0.004	32.3	<0.001	1.48	<0.0001	0.043
		12-Nov-20	BD01	Field_D	ES2040667	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	0.004	-	<0.001	-	<0.0001	0.046
		09-Dec-20	BH145	Normal	ES2043799	645	<1	**0.22**	0.23	0.25	**0.48**	**2.5**	2	-	-	**0.13**	<0.001	<0.0001	<0.001	<0.001	31.7	<0.001	1	<0.0001	0.082
		12-Jan-21	BH145	Normal	ES2101242	850	<1	**1.49**	11.6	0.06	**11.7**	**15.7**	4	-	-	**0.69**	<0.001	<0.0001	0.004	0.042	19	0.014	0.935	<0.0001	0.011
		09-Feb-21	BH145	Normal	ES2104999	721	<1	**1.24**	25.5	0.32	**25.8**	**32.6**	6.8	-	-	**0.22**	<0.001	<0.0001	<0.001	0.017	5.16	<0.001	0.83	<0.0001	0.008
		10-Mar-21	BH145	Normal	ES2108508	761	<1	**2.84**	22	0.51	**22.5**	**28.7**	6.2	-	-	**0.88**	<0.001	<0.0001	<0.001	0.062	2.1	<0.001	0.78	<0.0001	0.068
		07-Apr-21	BH145	Normal	ES2112804	-	-	**0.73**	21	0.45	**21.5**	**24.4**	2.9	-	-	**0.43**	<0.001	<0.0001	<0.001	0.007	1.91	<0.001	0.809	<0.0001	0.013
		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	-	-	**1.34**	*133*	*9.19*	**142**	**156**	14	-	-	**1.24**	<0.001	0.0004	<0.001	0.004	<0.05	<0.001	2.84	<0.0001	0.046
		15-Oct-21	BH145	Normal	ES2137338	-	-	<0.01	0.26	<0.01	**0.26**	0.3	<0.1	-	-	**0.1**	<0.001	<0.0001	<0.001	<0.001	0.75	<0.001	0.004	<0.0001	<0.001
		08-Nov-21	GWDUP2	Interlab_D	839397	-	-	-	-	-	-	-	-	-	-	-	0.001	0.0006	<0.001	0.025	-	<0.001	-	<0.0001	0.028
		08-Nov-21	BH145	Normal	ES2140334	-	-	**1.2**	*127*	8.18	**135**	**155**	19.8	-	-	**0.65**	<0.001	0.0002	<0.001	0.015	<0.05	<0.001	3.28	<0.0001	0.028
		08-Dec-21	BH145	Normal	ES2144782	-	-	**1.59**	*130*	4.93	**135**	**158**	22.7	-	-	**4.22**	0.035	0.0005	<0.001	<0.001	<0.05	<0.001	0.483	<0.0001	0.014
		13-Jan-22	BH145	Normal	ES2201179	-	-	**1.12**	*118*	1.92	**120**	**125**	5	<0.01	-	**0.68**	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	2.29	<0.0001	0.008
		10-Feb-22	BH145	Normal	ES2204606	-	-	**0.71**	*91.7*	3.13	**94.8**	**103**	7.8	<0.01	-	**0.72**	<0.001	0.0001	<0.001	0.002	0.06	<0.001	1.89	<0.0001	0.006
		18-Mar-22	BH145	Normal	ES2209694	-	-	**0.54**	*94.2*	1.74	**95.9**	**106**	10.6	<0.01	-	**0.34**	<0.001	0.0001	<0.001	0.005	<0.05	<0.001	1.89	<0.0001	0.006
		25-May-22	GWDUP2	Interlab_D	892529	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.004
		25-May-22	BH145	Normal	ES2218210	-	-	**1.01**	75	3.38	**78.4**	**91.4**	13	<0.01	-	**0.08**	<0.001	<0.0001	<0.001	0.006	<0.05	<0.001	1.18	<0.0001	0.004
			GWDUP1	Field_D	ES2218210	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	0.004	-	<0.001	-	<0.0001	0.003
		27-Jun-22	BH145	Normal	ES2222571	-	-	**1.03**	53.4	2.52	**55.9**	**66.2**	10.3	<0.01	-	**0.85**	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.935	<0.0001	0.002
			GWDUP1	Field_D	ES2222571	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	0.004	-	<0.001	-	<0.0001	0.002
		20-Jul-22	BH145	Normal	ES2225656	-	-	**0.31**	28.4	0.54	**28.9**	**30.6**	1.7	<0.01	-	**0.12**	<0.001	<0.0001	<0.001	0.002	0.06	<0.001	0.633	<0.0001	0.003
			GWDUP1	Field_D	ES2225656	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.002

	Minor Ions		Nutrients									Metals								
	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)	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Iron (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)
	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	mg/L
EQL	1	1	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.01	0.001	0.0001	0.001	0.001	0.05	0.001	0.001	0.0001	0.001
ADWG 2011 Health (v3.7 updated 2022)				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)			**0.01165[#4]**			**0.04**	**0.35**		**0.008**		**0.025**									
ANZECC 2000 - Stock Watering				*90[#6]*	*9.1[#7]*							*0.5*	*0.01*	*1*	*1[#8]*		*0.1*		*0.002*	*1*
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
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																				
2-4m																				
4-8m																				
>8m																				

Statistical Summary

Number of Results	73	42	130	130	130	130	130	130	62	1	129	160	160	160	160	91	160	91	160	160
Number of Detects	73	0	121	127	56	128	114	112	3	1	113	15	23	11	125	63	28	91	0	156
Minimum Concentration	385	<1	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.01	0.06	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.001	<0.0001	<0.001
Minimum Detect	385	ND	0.01	0.01	0.01	0.01	0.2	0.1	0.01	0.06	0.02	0.001	0.0001	0.001	0.001	0.05	0.001	0.001	ND	0.001
Maximum Concentration	1750	<1	3.55	133	10.5	142	158	22.7	0.24	0.06	10.8	0.035	0.0007	0.006	0.186	35.3	0.014	3.28	<0.0001	0.804
Maximum Detect	1750	ND	3.55	133	10.5	142	158	22.7	0.24	0.06	10.8	0.035	0.0007	0.006	0.186	35.3	0.014	3.28	ND	0.804
Average Concentration	1183	0.5	0.75	10	0.75	11	14	2.6	0.009		0.42	0.00079	0.000081	0.00063	0.022	1.9	0.00088	0.57	0.00005	0.061
Geometric Average	1127	0.5	0.24	0.58	0.024	0.62	2.2	1	0.0055		0.11	0.00056	0.0063	0.00055	0.0052	0.17	0.00064	0.29	0.0052	0.035
Median Concentration	1230	0.5	0.25	0.35	0.005	0.4	2.4	1.2	0.005	0.06	0.1	0.0005	0.00005	0.0005	0.004	0.13	0.0005	0.347	0.00005	0.049
Standard Deviation	341	0	0.92	27	2	28	31	4.1	0.03		1.2	0.0027	0.000098	0.0006	0.036	6.6	0.0014	0.59	0	0.075
Geometric Standard Deviation	1.4		6.1	14	11	14	7.1	4.3	1.7		4.8	1.5	1.7	1.5	6.1	6.7	1.8	5.1		3.7
Number of Guideline Exceedances	0	0	122	37	18	119	110	0	62	0	107	1	14	11	117	0	5	33	0	134
Number of Guideline Exceedances(Detects Only)	0	0	119	37	18	119	108	0	3	0	105	1	14	11	117	0	5	33	0	134
% of Results at or above the Detect Limit	100	0	93	98	43	98	88	86	5	100	88	9	14	7	78	69	18	100	0	98
% of Results below the Detect Limit	0	100	7	2	57	2	12	14	95	0	12	91	86	93	22	31	83	0	100	3
% of Detects at or above Guidelines	0	0	92	28	14	92	83	0	5	0	81	1	9	7	73	0	3	36	0	84
% of Results Below Guidelines or Non-Detect	100	100	8	72	86	8	17	100	95	100	19	99	91	93	27	100	97	64	100	16

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

											BTEXN									TRH - NEPM 2013							TRH - NEPM 1999							
											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	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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											0.005	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)												1	800	300			600																	0.01	
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																			
ANZECC 2000 - Stock Watering											*20*																								
ANZG (2018) - FW - 95% (updated 26 July 2021)											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	0.109	<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	0.033	<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	0.021	<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	0.051	<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	0.057	<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	0.163	<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	0.172	<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	0.114	<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	0.1	<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	0.067	<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	0.077	<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	0.17	<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	0.042	<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	0.041	<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	0.368	<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	0.077	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
			BH104	Normal	ES2032115	0.061	<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	0.125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH104	Normal	ES2035519	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	0.025	<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	0.093	<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	0.089	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		14-Jan-21	BH104	Normal	ES2101242	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	0.023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		11-Feb-21	BH104	Normal	ES2104999	<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	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Mar-21	BH104	Normal	ES2108508	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	0.105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Apr-21	BH104	Normal	ES2112804	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	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		04-May-21	BH104	Normal	ES2116634	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	0.039	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Jun-21	BH104	Normal	ES2121745	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	0.067	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07-Jul-21	BH104	Normal	ES2125048	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	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Aug-21	BH104	Normal	ES2129596	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	0.086	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01-Sep-21	BH104	Normal	ES2131753	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	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH104	Normal	ES2137338	0.039	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-

								BTEXN								TRH - NEPM 2013							TRH - NEPM 1999												
								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	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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								0.005	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)									1	800	300			600																			0.01	
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																		
ANZECC 2000 - Stock Watering								*20*																										
ANZG (2018) - FW - 95% (updated 26 July 2021)								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	15-Oct-21	GWDUP1	Field_D	ES2137338	0.078	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH104	Normal	ES2140334	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	0.018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH104	Normal	ES2144782	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	0.154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH104	Normal	ES2201179	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	0.098	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	GWDUP2	Interlab_D	863166	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10-Feb-22	BH104	Normal	ES2204606	<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	0.008	<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	0.008	<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	0.011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH104	Normal	ES2222571	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	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH104	Normal	ES2225656	0.011	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
	BH107	18-Jul-19	BH107	Normal	ES1922601	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	0.026	<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	0.016	<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	0.029	<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	0.089	<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	0.049	<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	0.036	<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	0.077	<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	0.028	<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	0.17	<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	0.182	<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	0.085	<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	0.122	<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	0.034	<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	0.017	<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	0.168	<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	0.084	<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	0.017	<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	0.046	<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	0.028	<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	0.008	<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	0.012	<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	0.009	<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	0.072	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15-Oct-21	BH107	Normal	ES2137338	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	<0.005	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-

							BTEXN								TRH - NEPM 2013							TRH - NEPM 1999												
							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	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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							0.005	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)								1	800	300			600																			0.01	
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																		
ANZECC 2000 - Stock Watering							*20*																											
ANZG (2018) - FW - 95% (updated 26 July 2021)							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	08-Dec-21	GWDUP2	Interlab_D	849475	0.68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Dec-21	BH107	Normal	ES2144782	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	0.078	<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	0.005	<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	0.022	<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	0.021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH107	Normal	ES2218210	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	0.006	<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	0.006	<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	<0.005	<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	0.07	<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	0.038	<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	0.051	<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	0.076	<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	0.13	<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	0.078	<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	0.274	<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	0.012	<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	0.441	<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	0.204	<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	0.104	<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	0.146	<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	0.149	<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	0.035	<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	0.011	<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	0.086	<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	0.009	<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	0.058	<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	0.034	<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	0.007	<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	0.029	<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	0.01	<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	0.118	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	-	-	-	-	-	-
		08-Nov-21	BH112	Normal	ES2140334	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	0.655	<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	0.033	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		13-Jan-22	BH112	Normal	ES2201179	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	0.013	<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	0.014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	GWDUP2	Interlab_D	874238	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18-Mar-22	BH112	Normal	ES2209694	<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

									BTEXN								TRH - NEPM 2013							TRH - NEPM 1999											
									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	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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									0.005	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)										1	800	300			600																		0.01	
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																																		
ANZECC 2000 - Stock Watering									*20*																									
ANZG (2018) - FW - 95% (updated 26 July 2021)									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	25-May-22	BH112	Normal	ES2218210	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	<0.005	<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	0.005	<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	0.064	<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	0.006	<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	0.007	<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	<0.005	<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	0.15	<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	0.015	<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	0.106	<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	27.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			BH145	Normal	ES2026408	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	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	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	0.643	<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	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	11.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		09-Dec-20	BH145	Normal	ES2043799	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	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	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	0.297	<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	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	0.694	<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	<0.005	<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	0.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		08-Nov-21	BH145	Normal	ES2140334	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	0.568	<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	0.824	<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	0.498	<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	0.567	<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	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25-May-22	BH145	Normal	ES2218210	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	0.206	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		27-Jun-22	BH145	Normal	ES2222571	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	0.151	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20-Jul-22	BH145	Normal	ES2225656	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	0.119	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

		BTEXN								TRH - NEPM 2013							TRH - NEPM 1999											
	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	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.005	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)		1	800	300			600																			0.01	
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																											
ANZECC 2000 - Stock Watering	*20*																										
ANZG (2018) - FW - 95% (updated 26 July 2021)	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	131	131	131	131	131	131	130	131	131	131	131	131	131	131	131	131	131	131	131	131	50	50	50	50	50	50
Number of Detects	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	<0.005	<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	0.005	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	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	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	0.91	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	0.054	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	0.054	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	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	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	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)	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	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	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	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	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-Haloc					
	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
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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
ADWG 2011 Health (v3.7 updated 2022)											0.01	0.01		300	200		20			10								
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
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	-
		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	-
		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	-
		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	-
		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	-
		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	-
		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	-
		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	-
		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	<3	<6	<3	<30
		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	-
			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	-
		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	-
		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	-
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix B
Table B3
Groundwater Analytical Results for Baseline Monitoring Period (April 2019 to July 2022)

						PAHs - standard 16												Phenols - Halogenated									Phenols - Non-Haloc					
						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
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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
ADWG 2011 Health (v3.7 updated 2022)																0.01	0.01		300	200		20			10								
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
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	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	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	-
		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	-
		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	-
		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	-
		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	-
		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	-
		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	-
		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	-
		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	-
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

					PAHs - standard 16													Phenols - Halogenated									Phenols - Non-Haloc					
					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
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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
ADWG 2011 Health (v3.7 updated 2022)															0.01	0.01		300	200		20			10								
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
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	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	-
		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	-
		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	-
		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	-
		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	-
		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	-
		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	-
		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	-
		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	-
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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	<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	<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	<2	-	-	<1	<1	<1	<2	<1	-

	PAHs - standard 16													Phenols - Halogenated									Phenols - Non-Haloc					
	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
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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
ADWG 2011 Health (v3.7 updated 2022)											0.01	0.01		300	200		20			10								
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
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	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	<2	-	-	<1	<1	<1	<2	<1	-
		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	<2	-	-	<1	<1	<1	<2	<1	-
		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	<2	-	-	<1	<1	<1	<2	<1	-
		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	<2	-	-	<1	<1	<1	<2	<1	-
		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	<2	-	-	<1	<1	<1	<2	<1	-
		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	<2	-	-	<1	<1	<1	<2	<1	-
		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	<2	-	-	<1	<1	<1	<2	<1	-
		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	<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	<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	<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-Haloc					
	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
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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
ADWG 2011 Health (v3.7 updated 2022)											0.01	0.01		300	200		20			10								
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
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
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
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
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
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
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
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	
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	
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
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	
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
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
% 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
% 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
% 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
% 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

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

						enated				OC Pesticides																			
						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	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
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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						30	100	30	100	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
ADWG 2011 Health (v3.7 updated 2022)															0.3		2					9			20				
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																													
ANZECC 2000 - Stock Watering																													
ANZG (2018) - FW - 95% (updated 26 July 2021)																	0.08					0.01			0.2				
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	-	-	-	-	-	-	<0.01	<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
		20-Aug-19	BH104	Normal	ES1926460	-	-	-	-	-	-	<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
		24-Sep-19	BH104	Normal	ES1930997	-	-	-	-	-	-	<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
		22-Oct-19	BH104	Normal	ES1934707	-	-	-	-	-	-	<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
		07-Nov-19	BH104	Normal	ES1936840	-	-	-	-	-	-	<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
		12-Dec-19	BH104	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	<0.01	<0.01
		16-Jan-20	BH104	Normal	ES2001376	-	-	-	-	-	-	<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
		18-Feb-20	BH104	Normal	ES2005577	-	-	-	-	-	-	<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
		12-Mar-20	SD01	Interlab_D	707829	<30	<100	<30	<100	<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
		12-Mar-20	BD01	Field_D	ES2008731	-	-	-	-	-	-	<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
			BH104	Normal	ES2008731	-	-	-	-	-	-	<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
		23-Apr-20	BH104	Normal	ES2013858	-	-	-	-	-	-	<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
		19-May-20	BH104	Normal	ES2017191	-	-	-	-	-	-	<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
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

						enated				OC Pesticides																			
						4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexylphenol	4-Nitrophenol	Phenols (Total Non Halogenated)	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	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
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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						30	100	30	100	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
ADWG 2011 Health (v3.7 updated 2022)															0.3		2					9			20				
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																													
ANZECC 2000 - Stock Watering																													
ANZG (2018) - FW - 95% (updated 26 July 2021)																	0.08					0.01			0.2				
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	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH107	18-Jul-19	BH107	Normal	ES1922601	-	-	-	-	-	-	<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
		20-Aug-19	BH107	Normal	ES1926460	-	-	-	-	-	-	<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
		24-Sep-19	BH107	Normal	ES1930997	-	-	-	-	-	-	<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
		22-Oct-19	BH107	Normal	ES1934707	-	-	-	-	-	-	<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
		07-Nov-19	BH107	Normal	ES1936840	-	-	-	-	-	-	<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
		12-Dec-19	BH107	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	<0.01	<0.01
		20-Feb-20	BH107	Normal	ES2005947	-	-	-	-	-	-	<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
		23-Apr-20	BH107	Normal	ES2013858	-	-	-	-	-	-	<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
		21-May-20	BH107	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	<0.01	<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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

						enated				OC Pesticides																	
						4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexylphenol	4-Nitrophenol	Phenols (Total Non Halogenated)	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	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
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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						30	100	30	100	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
ADWG 2011 Health (v3.7 updated 2022)															0.3		2				9			20			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																											
ANZECC 2000 - Stock Watering																											
ANZG (2018) - FW - 95% (updated 26 July 2021)																	0.08				0.01			0.2			
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	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	-	-	-	-	-	-	<0.01	<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
		20-Aug-19	BH112	Normal	ES1926460	-	-	-	-	-	-	<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
		25-Sep-19	BH112	Normal	ES1931244	-	-	-	-	-	-	<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
		22-Oct-19	BH112	Normal	ES1934707	-	-	-	-	-	-	<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
		07-Nov-19	BH112	Normal	ES1936840	-	-	-	-	-	-	<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
		12-Dec-19	BH112	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	<0.01	<0.01
		20-Feb-20	BH112	Normal	ES2005947	-	-	-	-	-	-	<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
		21-Apr-20	BH112	Normal	ES2013464	-	-	-	-	-	-	<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
		21-May-20	BH112	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	<0.01	<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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

						enated				OC Pesticides																			
						4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexylphenol	4-Nitrophenol	Phenols (Total Non Halogenated)	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4'-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	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
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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						30	100	30	100	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
ADWG 2011 Health (v3.7 updated 2022)															0.3		2					9			20				
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																													
ANZECC 2000 - Stock Watering																													
ANZG (2018) - FW - 95% (updated 26 July 2021)																	0.08					0.01			0.2				
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	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	<0.01	<0.01
		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	<0.01	<0.01
		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	<0.01	<0.01
		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	<0.01	<0.01
		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	<0.01	<0.01
		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	<0.01	<0.01
		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	<0.01	<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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	enated				OC Pesticides																		
	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	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
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	30	100	30	100	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
ADWG 2011 Health (v3.7 updated 2022)										0.3		2					9			20			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																							
ANZECC 2000 - Stock Watering																							
ANZG (2018) - FW - 95% (updated 26 July 2021)												0.08					0.01			0.2			
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	1	1	1	1	1	38	38	38	1	38	38	37	37	38	38	38	38	38	37	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
Minimum Concentration	<30	<100	<30	<100	<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
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
Maximum Concentration	<30	<100	<30	<100	<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
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
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	0.005
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	0.005
Median Concentration	15	50	15	50	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	0.005	0.005	0.005	0.005
Standard Deviation							0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0
Geometric Standard Deviation																							
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
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
% 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
% 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
% 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
% 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

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

	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
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.005	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
ADWG 2011 Health (v3.7 updated 2022)				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)	0.02			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	BH104	16-Jul-19	BH104	Normal	ES1922192	<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
		20-Aug-19	BH104	Normal	ES1926460	<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
		24-Sep-19	BH104	Normal	ES1930997	<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
		22-Oct-19	BH104	Normal	ES1934707	<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
		07-Nov-19	BH104	Normal	ES1936840	<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
		12-Dec-19	BH104	Normal	ES1941279	<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
		16-Jan-20	BH104	Normal	ES2001376	<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
		18-Feb-20	BH104	Normal	ES2005577	<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
		12-Mar-20	SD01	Interlab_D	707829	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	-	-	<1	<1	<1	-	-	-	<1	<10	<1	<10	<1
		12-Mar-20	BD01	Field_D	ES2008731	<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
			BH104	Normal	ES2008731	<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
		23-Apr-20	BH104	Normal	ES2013858	<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
		19-May-20	BH104	Normal	ES2017191	<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
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix B
Table B3
Groundwater Analytical Results for Baseline Monitoring Period (April 2019 to July 2022)

Package	Location Code	Sample Date	Field ID	Sample Type	Lab Report Number	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
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.005	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
ADWG 2011 Health (v3.7 updated 2022)									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)						0.02			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																												
M12 - West	BH104	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH107	18-Jul-19	BH107	Normal	ES1922601	<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
		20-Aug-19	BH107	Normal	ES1926460	<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
		24-Sep-19	BH107	Normal	ES1930997	<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
		22-Oct-19	BH107	Normal	ES1934707	<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
		07-Nov-19	BH107	Normal	ES1936840	<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
		12-Dec-19	BH107	Normal	ES1941279	<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
		20-Feb-20	BH107	Normal	ES2005947	<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
		23-Apr-20	BH107	Normal	ES2013858	<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
		21-May-20	BH107	Normal	ES2017665	<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
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	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
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.005	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
ADWG 2011 Health (v3.7 updated 2022)				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)	0.02			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	BH107	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	<0.01	<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
		20-Aug-19	BH112	Normal	ES1926460	<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
		25-Sep-19	BH112	Normal	ES1931244	<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
		22-Oct-19	BH112	Normal	ES1934707	<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
		07-Nov-19	BH112	Normal	ES1936840	<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
		12-Dec-19	BH112	Normal	ES1941279	<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
		20-Feb-20	BH112	Normal	ES2005947	<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
		21-Apr-20	BH112	Normal	ES2013464	<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
		21-May-20	BH112	Normal	ES2017665	<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
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix B
Table B3
Groundwater Analytical Results for Baseline Monitoring Period (April 2019 to July 2022)

	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
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.005	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
ADWG 2011 Health (v3.7 updated 2022)				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)	0.02			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	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	<0.005	<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
		17-Jul-19	BH145	Normal	ES1922407	<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
		21-Aug-19	BH145	Normal	ES1926628	<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
		26-Sep-19	BH145	Normal	ES1931491	<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
		23-Oct-19	BH145	Normal	ES1934911	<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
		12-Dec-19	BH145	Normal	ES1941279	<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
		21-May-20	BH145	Normal	ES2017665	<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
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	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
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.005	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
ADWG 2011 Health (v3.7 updated 2022)				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)	0.02			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	38	38	38	38	38	38	38	38	37	1	37	37	1	38	38	37	37	37	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
Minimum Concentration	<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
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
Maximum Concentration	<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
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
Average Concentration	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
Geometric Average	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
Median Concentration	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
Standard Deviation	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
Geometric Standard Deviation					1.1									1.9	1.6				1.9	2.7	1.3	3.1	1.9
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	38	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
% 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
% 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
% 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
% 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

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	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
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.02	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
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
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						
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	<0.02	<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
		20-Aug-19	BH104	Normal	ES1926460	<0.02	<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
		24-Sep-19	BH104	Normal	ES1930997	<0.02	<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
		22-Oct-19	BH104	Normal	ES1934707	<0.02	<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
		07-Nov-19	BH104	Normal	ES1936840	<0.02	<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
		12-Dec-19	BH104	Normal	ES1941279	<0.02	<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
		16-Jan-20	BH104	Normal	ES2001376	<0.02	<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
		18-Feb-20	BH104	Normal	ES2005577	<0.02	<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
		12-Mar-20	SD01	Interlab_D	707829	<10	-	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
		12-Mar-20	BD01	Field_D	ES2008731	<0.02	<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
			BH104	Normal	ES2008731	<0.02	<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
		23-Apr-20	BH104	Normal	ES2013858	<0.02	<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
		19-May-20	BH104	Normal	ES2017191	<0.02	<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
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

							OP Pesticides																
							Demeton-S	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
							µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.02	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
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
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							
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	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH107	18-Jul-19	BH107	Normal	ES1922601	<0.02	<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
		20-Aug-19	BH107	Normal	ES1926460	<0.02	<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
		24-Sep-19	BH107	Normal	ES1930997	<0.02	<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
		22-Oct-19	BH107	Normal	ES1934707	<0.02	<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
		07-Nov-19	BH107	Normal	ES1936840	<0.02	<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
		12-Dec-19	BH107	Normal	ES1941279	<0.02	<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
		20-Feb-20	BH107	Normal	ES2005947	<0.02	<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
		23-Apr-20	BH107	Normal	ES2013858	<0.02	<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
		21-May-20	BH107	Normal	ES2017665	<0.02	<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
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

						OP Pesticides																		
						Demeton-S	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
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.02	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
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
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						
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	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	<0.02	<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
		20-Aug-19	BH112	Normal	ES1926460	<0.02	<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
		25-Sep-19	BH112	Normal	ES1931244	<0.02	<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
		22-Oct-19	BH112	Normal	ES1934707	<0.02	<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
		07-Nov-19	BH112	Normal	ES1936840	<0.02	<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
		12-Dec-19	BH112	Normal	ES1941279	<0.02	<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
		20-Feb-20	BH112	Normal	ES2005947	<0.02	<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
		21-Apr-20	BH112	Normal	ES2013464	<0.02	<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
		21-May-20	BH112	Normal	ES2017665	<0.02	<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
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

									OP Pesticides															
									Demeton-S	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
									µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.02	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
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
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							
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	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	<0.02	<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
		17-Jul-19	BH145	Normal	ES1922407	<0.02	<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
		21-Aug-19	BH145	Normal	ES1926628	<0.02	<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
		26-Sep-19	BH145	Normal	ES1931491	<0.02	<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
		23-Oct-19	BH145	Normal	ES1934911	<0.02	<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
		12-Dec-19	BH145	Normal	ES1941279	<0.02	<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
		21-May-20	BH145	Normal	ES2017665	<0.02	<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
		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	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
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.02	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
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
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							
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																					
2-4m																					
4-8m																					
>8m																					

Statistical Summary

Number of Results	38	37	38	38	38	38	38	38	38	37	38	38	38	38	1	37	38	38	38	1	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
Minimum Concentration	<0.02	<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
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<10	<0.02	<1	<1	<1	<1	<1	<1	<1	<0.01	<2	<1	<1	<1	<1	<0.1	<1	<1	<1	<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
Average Concentration	0.14	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
Geometric Average	0.012	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
Median Concentration	0.01	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
Standard Deviation	0.81	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
Geometric Standard Deviation	2.7		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
Number of Guideline Exceedances	0	0	1	0	1	0	0	0	0	0	38	0	0	1	0	0	1	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
% 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
% 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
% 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
% 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

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	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		20-Aug-19	BH104	Normal	ES1926460	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		24-Sep-19	BH104	Normal	ES1930997	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		22-Oct-19	BH104	Normal	ES1934707	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		07-Nov-19	BH104	Normal	ES1936840	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		12-Dec-19	BH104	Normal	ES1941279	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		16-Jan-20	BH104	Normal	ES2001376	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		18-Feb-20	BH104	Normal	ES2005577	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		12-Mar-20	SD01	Interlab_D	707829	<1	<1	-	<10	-	-	<1	<1	-	<1	-	<1	<1	-	-	-	-	-	-	-	<100
		12-Mar-20	BD01	Field_D	ES2008731	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
			BH104	Normal	ES2008731	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		23-Apr-20	BH104	Normal	ES2013858	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		19-May-20	BH104	Normal	ES2017191	<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	<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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

															Pesticides						Fungicides	Herbicides
															Parathion	Phorate	Pirimphos-ethyl	Pirimiphos-methyl	Profenofos	Prothiofos	Pyrazophos	Ronnel
															µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL															0.2	0.1	0.01	0.01	0.01	0.1	0.1	10
ADWG 2011 Health (v3.7 updated 2022)															20		0.5	90	0.3		20	
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																						
ANZECC 2000 - Stock Watering																						
ANZG (2018) - FW - 95% (updated 26 July 2021)															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	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH107	18-Jul-19	BH107	Normal	ES1922601	<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	<0.5	<0.02	<20	<0.02
		20-Aug-19	BH107	Normal	ES1926460	<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	<0.5	<0.02	<20	<0.02
		24-Sep-19	BH107	Normal	ES1930997	<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	<0.5	<0.02	<20	<0.02
		22-Oct-19	BH107	Normal	ES1934707	<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	<0.5	<0.02	<20	<0.02
		07-Nov-19	BH107	Normal	ES1936840	<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	<0.5	<0.02	<20	<0.02
		12-Dec-19	BH107	Normal	ES1941279	<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	<0.5	<0.02	<20	<0.02
		20-Feb-20	BH107	Normal	ES2005947	<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	<0.5	<0.02	<20	<0.02
		23-Apr-20	BH107	Normal	ES2013858	<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	<0.5	<0.02	<20	<0.02
		21-May-20	BH107	Normal	ES2017665	<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	<0.5	<0.02	<20	<0.02
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

															Pesticides						Fungicides	Herbicides
															Sulfotepp	Terbufos	Thiometon	Trichloronate	Tetrachlorvinphos	Acephate	Demeton-O & Demeton-S	Formothion
															µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL															0.005	0.01	0.5	0.5	0.01	0.5	0.02	20
ADWG 2011 Health (v3.7 updated 2022)																0.9	4		100	8		50
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	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH107	18-Jul-19	BH107	Normal	ES1922601	<0.005	<0.01	<0.5	<0.5	<0.01	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-				
		20-Aug-19	BH107	Normal	ES1926460	<0.005	<0.01	<0.5	<0.5	<0.01	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-				
		24-Sep-19	BH107	Normal	ES1930997	<0.005	<0.01	<0.5	<0.5	<0.01	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-				
		22-Oct-19	BH107	Normal	ES1934707	<0.005	<0.01	<0.5	<0.5	<0.01	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-				
		07-Nov-19	BH107	Normal	ES1936840	<0.005	<0.01	<0.5	<0.5	<0.01	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-				
		12-Dec-19	BH107	Normal	ES1941279	<0.005	<0.01	<0.5	<0.5	<0.01	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-				
		20-Feb-20	BH107	Normal	ES2005947	<0.005	<0.01	<0.5	<0.5	<0.01	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-				
		23-Apr-20	BH107	Normal	ES2013858	<0.005	<0.01	<0.5	<0.5	<0.01	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-				
		21-May-20	BH107	Normal	ES2017665	<0.005	<0.01	<0.5	<0.5	<0.01	<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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

															Pesticides						Fungicides	Herbicides
															Temephos	Trichlorfon	Triazophos	Fosetyl-al	Dinoseb			
															µg/L	µg/L	µg/L	µg/L	µg/L			
EQL															0.02	0.02	0.005	10	100			
ADWG 2011 Health (v3.7 updated 2022)															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	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH107	18-Jul-19	BH107	Normal	ES1922601	<0.02	<0.02	<0.005	<10	-												
		20-Aug-19	BH107	Normal	ES1926460	<0.02	<0.02	<0.005	<10	-												
		24-Sep-19	BH107	Normal	ES1930997	<0.02	<0.02	<0.005	<10	-												
		22-Oct-19	BH107	Normal	ES1934707	<0.02	<0.02	<0.005	<10	-												
		07-Nov-19	BH107	Normal	ES1936840	<0.02	<0.02	<0.005	<10	-												
		12-Dec-19	BH107	Normal	ES1941279	<0.02	<0.02	<0.005	<10	-												
		20-Feb-20	BH107	Normal	ES2005947	<0.02	<0.02	<0.005	<10	-												
		23-Apr-20	BH107	Normal	ES2013858	<0.02	<0.02	<0.005	<10	-												
		21-May-20	BH107	Normal	ES2017665	<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	-	-	-	-	-												

															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	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	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		20-Aug-19	BH112	Normal	ES1926460	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		25-Sep-19	BH112	Normal	ES1931244	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		22-Oct-19	BH112	Normal	ES1934707	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		07-Nov-19	BH112	Normal	ES1936840	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		12-Dec-19	BH112	Normal	ES1941279	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		20-Feb-20	BH112	Normal	ES2005947	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		21-Apr-20	BH112	Normal	ES2013464	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		21-May-20	BH112	Normal	ES2017665	<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	<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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

															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	Parathion	Phorate	Pirimphos-ethyl	Pirimiphos-methyl	Profenofos	Prothiofos	Pyrazophos	Ronnel	Sulfotepp	Terbufos	Thiometon	Trichloronate	Tetrachlorvinphos	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	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
M12 - West	BH112	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	<0.2	<0.1	<0.01	<0.01	<0.01	<0.1	<0.1	<10	<0.005	<0.01	<0.5	<0.5	<0.01	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		17-Jul-19	BH145	Normal	ES1922407	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		21-Aug-19	BH145	Normal	ES1926628	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		26-Sep-19	BH145	Normal	ES1931491	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		23-Oct-19	BH145	Normal	ES1934911	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		12-Dec-19	BH145	Normal	ES1941279	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	-
		21-May-20	BH145	Normal	ES2017665	<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	<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
	Parathion	Phorate	Pirimphos-ethyl	Pirimiphos-methyl	Profenofos	Prothiofos	Pyrazophos	Ronnel	Sulfotepp	Terbufos	Thiometon	Trichloronate	Tetrachlorvinphos	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	µg/L	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	0.2	0.1	0.01	0.01	0.01	0.1	0.1	10	0.005	0.01	0.5	0.5	0.01	0.5	0.02	20	0.02	0.02	0.005	10	100
ADWG 2011 Health (v3.7 updated 2022)	20		0.5	90	0.3		20			0.9	4		100	8		50	400	7			
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																					
ANZECC 2000 - Stock Watering																					
ANZG (2018) - FW - 95% (updated 26 July 2021)	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	38	38	37	38	37	37	38	38	37	38	37	38	38	37	37	37	37	37	37	37	1
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<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	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	<100
Minimum Detect	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	<0.01	<10	<0.01	<0.1	<1	<10	<0.005	<1	<0.5	<1	<1	<0.5	<0.02	<20	<0.02	<0.02	<0.005	<10	<100
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	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	0.25	0.01	10	0.01	0.01	0.0025	5	
Geometric Average	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	0.25	0.01	10	0.01	0.01	0.0025	5	
Median Concentration	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	0.25	0.01	10	0.01	0.01	0.0025	5	50
Standard Deviation	0.065	0.073	0	0.81	0	0	0.073	0.73	0	0.08	0	0.041	0.08	0	0	0	0	0	0	0	
Geometric Standard Deviation	1.3	1.5		3.1			1.5	1.5		2.1		1.1	2.1								
Number of Guideline Exceedances	38	0	0	0	0	0	0	0	0	1	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
% 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
% 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
% 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
% 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

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

							Misc.	Inorganics		Acidity & Alkalinity			Major Ions										Minor Ions		Nutrients							
							Naphthalene (value used in F2 calc)	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	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							0.005	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**
ANZECC 2000 - Stock Watering								*5000[#5]*					*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**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																										
M12 - Central	BH144	15/11/2022	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[#1]**	**3.51**
	BH145	15/08/2022	BH145	Normal	ES2229015	<1	322	60	14	6	4	904	1100	71	40.6	38.9	2.1	322	<1	**0.52**	45.7	1.16	**46.9**	**48.4**	1.5	**<0.01**	**0.04**
		19/09/2022	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**
		20/10/2022	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	0.6	**72.6**	**96.4**	23.8	**<0.01**	**0.06**
		15/11/2022	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**
		14/12/2022	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	0.68	**50.7**	**57**	6.3	**<0.01**	**0.18**
		17/01/2023	BH145	Normal	ES2301690	-	3750	**12,800**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.35**	65.2	0.99	**66.2**	**71.7**	5.5	**<0.01**	**0.77**
		7/02/2023	BH145	Normal	ES2304063	-	-	-	<1	404	118	29	11	7	1390	1620	99	63	55.8	6.03	404	<1	**0.22**	88.8	0.75	**89.6**	**107**	17	**<0.01**	**1.28**
		2/03/2023	BH145	Normal	ES2307153	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH145R	5/04/2023	BH145R	Normal	ES2311426	<0.005	*5710*	**38**	<1	696	974	80	188	14	1740	3040	243	95.5	105	4.6	696	<1	**1.4**	0.01	0.01	0.02	**1.8**	1.8	**<0.01**	**0.07**
		2/05/2023	BH145R	Normal	ES2314383	<0.005	*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**
		6/06/2023	BH145R	Normal	ES2319027	<0.005	*7490*	**67**	<1	834	1580	125	308	14	2270	4270	269	131	143	4.4	834	<1	**1.82**	<0.01	<0.01	<0.01	**1.9**	1.9	**<0.01**	**0.05**
			GWDUP1	Field_D	ES2319027	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH145R	Normal	ES2322790	<0.005	*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**
		9/08/2023	BH145R	Normal	ES2326796	<0.005	*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**
		6/09/2023	BH145R	Normal	ES2330598	<0.005	*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**	2	**<0.01**	**0.06**
M12 - West	BH104	15/08/2022	BH104	Normal	ES2229015	-	*15,000*	**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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19/09/2022	BH104	Normal	ES2233729	-	*15,600*	**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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20/10/2022	BH104	Normal	ES2237811	-	*15,100*	**31**	<1	806	4020	291	801	32	3690	7660	754	242	248	1.25	806	<1	**0.12**	7.5	0.04	**7.54**	**8.5**	1	**<0.01**	**0.05**
		16/11/2022	BH104	Normal	ES2241428	-	*16,500*	**24**	<1	910	4320	333	847	30	3880	8520	781	256	275	3.56	910	<1	**<0.1[#1]**	7.61	0.04	**7.65**	**9.2**	1.6	**0.01**	**0.09**
			GWDUP1	Field_D	ES2241428	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH104R	16/12/2022	GWDUP2	Interlab_D	951385	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16/12/2022	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**
		18/01/2023	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**	**0.3**
			GWDUP2	Interlab_D	957071	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18/01/2023	GWDUP1	Field_D	ES2301690	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8/02/2023	BH104R	Normal	ES2304063	-	*5000*	**162**	<1	757	1060	121	183	18	1480	2420	147	85.9	86.4	0.3	757	<1	**1.46**	0.02	<0.01	0.02	**1.8**	1.8	**<0.01**	**0.18**
			GWDUP2	Interlab_D	962102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8/02/2023	GWDUP1	Field_D	ES2304063	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		3/03/2023	BH104R	Normal	ES2307153	<0.005	*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**
		3/03/2023	GWDUP1	Field_D	ES2307153	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/04/2023	BH104R	Normal	ES2311426	<0.005	*5260*	**366**	<1	877	1380	155	241	20	1440	2570	137	90.7	92.9	1.17	877	<1	**1.2**	0.02	<0.01	0.02	**1.7**	1.7	**<0.01**	**0.32**
			GWDUP1	Field_D	ES2311426	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2/05/2023	BH104R	Normal	ES2314383	<0.005	*5030*	**100**	<1	888	1180	155	193	17	1330	2640	125	81.9	94.8	7.3	888	<1	**1.35**	0.02	<0.01	0.02	**1.3**	1.3	**<0.01**	**0.1**
		2/05/2023	GWDUP1	Field_D	ES2314383	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/06/2023	GWDUP2	Interlab_D	997826	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/06/2023	BH104R	Normal	ES2319027	<0.005	*5250*	**83**	<1	802	1520	171	265	19	1430	2870	135	93	99.8	3.51	802	<1	**1.1**	0.06	<0.01	**0.06**	**1.3**	1.2	**<0.01**	**0.07**
		7/07/2023	GWDUP2	Interlab_D	1006932	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH104R	Normal	ES2322790	<0.005	*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**
		9/08/2023	BH104R	Normal	ES2326796	<0.005	*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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		5/09/2023	GWDUP2	Interlab_D	1024024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		5/09/2023	BH104R	Normal	ES2330598	<0.005	*5010*	**128**	<1	884	1190	163	191	18	1510	2500	171	90	91.7	0.96	884	<1	**1.46**	0.02	0.02	**0.04**	**1.7**	1.7	**<0.01**	**0.18**
	BH107	15/08/2022	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**	**0.1**
		19/09/2022	BH107	Normal	ES2233729	-	2980	**184**	<1	1470	485	36	96	24	959	627	205	52	51.3	0.68	1470	<1	<0.01	12.5	<0.01	**12.5**	**13.7**	1.2	**0.01**	**0.06**
		20/10/2022	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16/11/2022	GWDUP2	Interlab_D	941927	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16/11/2022	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**

						Misc.	Inorganics		Acidity & Alkalinity			Major Ions									Minor Ions		Nutrients							
						Naphthalene (value used in F2 calc)	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	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						0.005	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**
ANZECC 2000 - Stock Watering							*5000[#5]*					*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**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																									
	BH107R	16/12/2022	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8/02/2023	BH107R	Normal	ES2304063	-	2250	**258**	<1	1430	380	30	74	14	715	296	181	39	40.7	2.06	1430	<1	**0.23**	0.22	0.08	**0.3**	**1.1**	0.8	**<0.01**	**0.14**
		3/03/2023	BH107R	Normal	ES2307153	<0.005	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/04/2023	BH107R	Normal	ES2311426	<0.005	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**
		5/04/2023	GWDUP2	Interlab_D	979752	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2/05/2023	BH107R	Normal	ES2314383	<0.005	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH107R	Normal	ES2322790	<0.005	1840	**161**	<1	1360	447	29	91	12	622	183	156	36.3	35.6	1	1360	<1	**0.03**	3.23	<0.01	**3.23**	**4**	0.8	**<0.01**	**0.09**
			GWDUP1	Field_D	ES2322790	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		9/08/2023	GWDUP2	Interlab_D	1015966	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		9/08/2023	BH107R	Normal	ES2326796	<0.005	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**	**0.1**
		5/09/2023	BH107R	Normal	ES2330598	<0.005	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH112	15/08/2022	GWDUP2	Interlab_D	915049	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15/08/2022	BH112	Normal	ES2229015	-	1930	**2120**	<1	948	261	17	53	10	657	576	100	34	37.3	4.52	948	<1	<0.01	0.22	<0.01	**0.22**	0.2	<0.1	**<0.01**	**0.24**
		19/09/2022	GWDUP2	Interlab_D	925349	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19/09/2022	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**
		20/10/2022	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**
		20/10/2022	GWDUP1	Field_D	ES2237811	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16/11/2022	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**
	BH112R	9/08/2023	BH112R	Normal	ES2326796	<0.005	*10,200*	**566**	<1	1350	2630	280	468	46	3220	3930	*1700*	194	173	5.59	1350	<1	**2.32**	0.55	2	**2.55**	**5.4**	2.8	**0.35**	**1.04**
		5/09/2023	BH112R	Normal	ES2330598	<0.005	*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**

Statistical Summary

Number of Results	22	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	46	46	46	46	46	46	46	46	46
Number of Detects	0	45	45	0	45	45	45	45	45	45	45	45	45	45	45	45	45	0	40	40	19	40	46	45	7	46
Minimum Concentration	<0.005	1840	14	<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	<0.01	0.2	<0.1	<0.01	<0.01	0.04
Minimum Detect	ND	1840	14	ND	250	21	5	2	2	336	183	32	15.1	16.3	0.06	250	ND	0.01	0.01	0.01	0.02	0.2	0.3	0.01	0.04
Maximum Concentration	<0.005	16500	12800	<1	1500	4320	335	847	46	3880	8520	1880	256	275	13.1	1500	<1	2.39	88.8	2	89.6	107	23.8	0.36	3.51
Maximum Detect	ND	16500	12800	ND	1500	4320	335	847	46	3880	8520	1880	256	275	13.1	1500	ND	2.39	88.8	2	89.6	107	23.8	0.36	3.51
Average Concentration	0.0025	5306	1222	0.5	955	1141	106	213	17	1523	2355	293	90	92	3.4	955	0.5	0.73	11	0.22	12	15	3.2	0.022	0.39
Median Concentration	0.0025	3750	162	0.5	890	575	68	113	15	1320	1620	171	63	58.6	2.58	890	0.5	0.37	0.69	0.005	0.9	2.8	1.7	0.005	0.14
Standard Deviation	0	4007	2528	0	357	1159	95	227	9.2	965	2231	383	65	67	2.8	357	0	0.73	22	0.47	22	26	4.7	0.072	0.71

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				
						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)
						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
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
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)																																			
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													
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**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																														
M12 - Central	BH144	15/11/2022	BH144	Normal	ES2241428	<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	<20	<50	<100	<50	<50
	BH145	15/08/2022	BH145	Normal	ES2229015	<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	<20	<50	<100	<50	<50
		19/09/2022	BH145	Normal	ES2233729	<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	<50	<100	<50	<50
		20/10/2022	BH145	Normal	ES2237811	<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	<20	<50	<100	<50	<50
		15/11/2022	BH145	Normal	ES2241428	<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	<20	<50	<100	<50	<50
		14/12/2022	BH145	Normal	ES2245760	<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	<20	<50	<100	<50	<50
		17/01/2023	BH145	Normal	ES2301690	<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	<20	<50	<100	<50	<50
		7/02/2023	BH145	Normal	ES2304063	<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	<20	<50	<100	<50	<50
		2/03/2023	BH145	Normal	ES2307153	<0.001	<0.0001	<0.001	0.005	1.3	0.001	1.56	<0.0001	0.005	0.034	<1	<2	<2	<2	<2	<2	<1	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
	BH145R	5/04/2023	BH145R	Normal	ES2311426	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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		2/05/2023	BH145R	Normal	ES2314383	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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		6/06/2023	BH145R	Normal	ES2319027	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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2319027	0.01	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH145R	Normal	ES2322790	0.006	<0.0001	<0.001	0.002	4.4	<0.001	0.352	<0.0001	0.001	<0.005	<1	<2	<2	<2	<2	<2	<1	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		9/08/2023	BH145R	Normal	ES2326796	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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		6/09/2023	BH145R	Normal	ES2330598	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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
M12 - West	BH104	15/08/2022	BH104	Normal	ES2229015	<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	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2229015	<0.001	<0.0001	<0.001	0.084	-	<0.001	-	<0.0001	0.008	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19/09/2022	BH104	Normal	ES2233729	<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	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2233729	<0.001	<0.0001	<0.001	0.088	-	<0.001	-	<0.0001	0.073	0.016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20/10/2022	BH104	Normal	ES2237811	<0.001	<0.0001	<0.001	0.028	<0.05	<0.001	0.139	<0.0001	0.01	0.011	<1	<2	<2	<2	<2	<2	<1	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		16/11/2022	BH104	Normal	ES2241428	<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	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2241428	<0.001	<0.0001	<0.001	0.036	-	<0.001	-	<0.0001	0.008	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH104R	16/12/2022	GWDUP2	Interlab_D	951385	0.004	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16/12/2022	BH104R	Normal	ES2245760	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	<20	<50	<100	<50	<50
		18/01/2023	BH104R	Normal	ES2301690	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	<20	<50	<100	<50	<50
			GWDUP2	Interlab_D	957071	0.005	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18/01/2023	GWDUP1	Field_D	ES2301690	0.005	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8/02/2023	BH104R	Normal	ES2304063	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	<20	<50	<100	<50	<50
			GWDUP2	Interlab_D	962102	0.003	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8/02/2023	GWDUP1	Field_D	ES2304063	0.003	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		3/03/2023	BH104R	Normal	ES2307153	0.002	<0.0001	<0.001	<0.001	1.33	<0.001	0.25	<0.0001	0.001	0.067	<1	<2	<2	<2	<2	<2	<1	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		3/03/2023	GWDUP1	Field_D	ES2307153	0.003	<0.0001	<0.001	0.001	-	<0.001	-	<0.0001	<0.001	0.068	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/04/2023	BH104R	Normal	ES2311426	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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2311426	0.003	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.012	0.009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2/05/2023	BH104R	Normal	ES2314383	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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		2/05/2023	GWDUP1	Field_D	ES2314383	0.003	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.004	0.035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/06/2023	GWDUP2	Interlab_D	997826	0.002	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/06/2023	BH104R	Normal	ES2319027	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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		7/07/2023	GWDUP2	Interlab_D	1006932	0.002	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH104R	Normal	ES2322790	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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		9/08/2023	BH104R	Normal	ES2326796	<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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2326796	0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	0.014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		5/09/2023	GWDUP2	Interlab_D	1024024	0.002	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		5/09/2023	BH104R	Normal	ES2330598	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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
	BH107	15/08/2022	BH107	Normal	ES2229015	<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	<20	<50	<100	<50	<50
		19/09/2022	BH107	Normal	ES2233729	<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	<50	<100	<50	<50
		20/10/2022	BH107	Normal	ES2237811	<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	<20	<50	<100	<50	<50
			GWDUP2	Interlab_D	934854	<0.001	<0.0002	<0.001	0.002	-	<0.001	-	<0.0001	0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16/11/2022	GWDUP2	Interlab_D	941927	<0.001	<0.0002	<0.001	0.003	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16/11/2022	BH107	Normal	ES2241428	<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	<20	<50	<100	<50	<50

						Metals										BTEXN								TRH - NEPM 2013							TRH - NEPM 1999				
						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)
						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
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
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)																																				
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													
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**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																															
	BH107R	16/12/2022	BH107R	Normal	ES2245760	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	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2245760	0.003	<0.0001	<0.001	0.002	-	<0.001	-	<0.0001	0.002	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		8/02/2023	BH107R	Normal	ES2304063	<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	<20	<50	<100	<50	<50
		3/03/2023	BH107R	Normal	ES2307153	<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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP2	Interlab_D	969408	0.001	<0.0002	<0.001	0.005	-	<0.001	-	<0.0001	0.002	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/04/2023	BH107R	Normal	ES2311426	<0.001	<0.0001	<0.001	0.005	<0.05	<0.001	0.089	<0.0001	0.006	0.01	<1	<2	<2	<2	<2	<2	<1	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		5/04/2023	GWDUP2	Interlab_D	979752	0.001	<0.0002	<0.001	0.004	-	<0.001	-	<0.0001	0.005	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2/05/2023	BH107R	Normal	ES2314383	<0.001	<0.0001	<0.001	0.005	<0.05	<0.001	0.042	<0.0001	0.01	0.026	<1	<2	<2	<2	<2	<2	<1	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP2	Interlab_D	986190	<0.001	<0.0002	<0.001	0.006	-	<0.001	-	<0.0001	0.008	0.025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH107R	Normal	ES2322790	<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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2322790	<0.001	<0.0001	<0.001	0.005	-	<0.001	-	<0.0001	0.001	0.007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		9/08/2023	GWDUP2	Interlab_D	1015966	<0.001	<0.0001	<0.001	0.004	-	<0.001	-	<0.0001	0.002	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		9/08/2023	BH107R	Normal	ES2326796	<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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		5/09/2023	BH107R	Normal	ES2330598	<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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2330598	<0.001	<0.0001	<0.001	0.009	-	<0.001	-	<0.0001	0.002	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH112	15/08/2022	GWDUP2	Interlab_D	915049	<0.001	<0.0002	<0.001	0.003	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15/08/2022	BH112	Normal	ES2229015	<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	<20	<50	<100	<50	<50
		19/09/2022	GWDUP2	Interlab_D	925349	<0.001	<0.0002	0.003	0.003	-	<0.001	-	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		19/09/2022	BH112	Normal	ES2233729	<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	<20	<50	<100	<50	<50
		20/10/2022	BH112	Normal	ES2237811	<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	<20	<50	<100	<50	<50
		20/10/2022	GWDUP1	Field_D	ES2237811	0.001	<0.0001	<0.001	0.003	-	<0.001	-	<0.0001	0.006	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16/11/2022	BH112	Normal	ES2241428	<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	<20	<50	<100	<50	<50
	BH112R	9/08/2023	BH112R	Normal	ES2326796	0.018	<0.0001	<0.001	0.001	<0.05	<0.001	0.13	<0.0001	0.018	0.008	<1	<2	<2	<2	<2	<2	<1	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		5/09/2023	BH112R	Normal	ES2330598	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	-	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50

Statistical Summary

Number of Results	75	75	75	75	47	75	47	75	75	75	47	47	47	47	47	47	47	25	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Number of Detects	35	0	2	49	19	1	45	0	62	49	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	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	<20	<50	<100	<50	<50	<50	<100	<50	<50
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	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	1	3	<2	<2	<2	<2	4	<5	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<50	<100	<50	<50
Maximum Detect	0.018	ND	0.003	0.088	5.08	0.001	1.56	ND	0.073	0.125	1	3	ND	ND	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.0026	0.000059	0.00054	0.0083	0.81	0.00051	0.33	0.00005	0.0062	0.02	0.52	1.1	1	1	1	1	0.65	2.5	10	10	50	50	50	50	50	10	25	50	25	25	25	100	50	50
Median Concentration	0.0005	0.00005	0.0005	0.002	0.025	0.0005	0.178	0.00005	0.002	0.007	0.5	1	1	1	1	1	0.5	2.5	10	10	50	50	50	50	50	10	25	50	25	25	25	100	50	50
Standard Deviation	0.0039	0.00002	0.00029	0.019	1.4	0.000058	0.36	0	0.013	0.029	0.1	0.41	0	0	0	0	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

						Misc.	Inorganics		Acidity & Alkalinity			Major Ions										Minor Ions	
						Naphthalene (value used in F2 calc)	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
						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
EQL						0.005	10	5	1	1	1	1	1	1	1	1	1	0.01	0.01	0.01	1	1
ADWG 2011 Health (v3.7 updated 2022)																	500[#1]					
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)								**6**														
ANZECC 2000 - Stock Watering							*5000*[#5]					*1000*					*1000*					
ANZG (2018) - FW - 95% (updated 26 July 2021)																						
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																						
Package	**Location**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																	
M12 - Central	BH145R	5/04/2023	BH145R	Normal	ES2311426	<0.005	*5710*	**38**	<1	696	974	80	188	14	1740	3040	243	95.5	105	4.6	696	<1
		2/05/2023	BH145R	Normal	ES2314383	<0.005	*6230*	**79**	<1	818	1170	105	221	13	1870	3400	241	105	117	5.47	818	<1
		6/06/2023	BH145R	Normal	ES2319027	<0.005	*7490*	**67**	<1	834	1580	125	308	14	2270	4270	269	131	143	4.4	834	<1
			GWDUP1	Field_D	ES2319027	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH145R	Normal	ES2322790	<0.005	*8730*	**111**	<1	881	1830	126	368	15	2480	4220	271	145	142	0.89	881	<1
		9/08/2023	BH145R	Normal	ES2326796	<0.005	*9290*	**288**	<1	903	2380	197	458	19	2980	4410	318	178	149	8.74	903	<1
		6/09/2023	BH145R	Normal	ES2330598	<0.005	*9970*	**89**	<1	884	2090	181	398	15	2480	5020	334	150	166	5.12	884	<1
M12 - West	BH104R	4/04/2023	BH104R	Normal	ES2311426	<0.005	*5260*	**366**	<1	877	1380	155	241	20	1440	2570	137	90.7	92.9	1.17	877	<1
			GWDUP1	Field_D	ES2311426	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2/05/2023	BH104R	Normal	ES2314383	<0.005	*5030*	**100**	<1	888	1180	155	193	17	1330	2640	125	81.9	94.8	7.3	888	<1
		2/05/2023	GWDUP1	Field_D	ES2314383	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/06/2023	GWDUP2	Interlab_D	997826	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/06/2023	BH104R	Normal	ES2319027	<0.005	*5250*	**83**	<1	802	1520	171	265	19	1430	2870	135	93	99.8	3.51	802	<1
		7/07/2023	GWDUP2	Interlab_D	1006932	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH104R	Normal	ES2322790	<0.005	*5540*	**144**	<1	840	1360	143	243	18	1490	2710	120	92.4	95.7	1.76	840	<1
		9/08/2023	BH104R	Normal	ES2326796	<0.005	*5430*	**405**	<1	890	1570	194	264	20	1500	2550	123	97.2	92.3	2.58	890	<1
			GWDUP1	Field_D	ES2326796	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		5/09/2023	GWDUP2	Interlab_D	1024024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		5/09/2023	BH104R	Normal	ES2330598	<0.005	*5010*	**128**	<1	884	1190	163	191	18	1510	2500	171	90	91.7	0.96	884	<1
	BH107R	4/04/2023	BH107R	Normal	ES2311426	<0.005	2240	**248**	<1	1470	427	34	83	15	746	306	207	41.4	42.3	1.14	1470	<1
		5/04/2023	GWDUP2	Interlab_D	979752	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2/05/2023	BH107R	Normal	ES2314383	<0.005	2160	**155**	<1	1430	397	32	77	12	598	270	172	34.2	39.8	7.45	1430	<1
			GWDUP2	Interlab_D	986190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH107R	Normal	ES2322790	<0.005	1840	**161**	<1	1360	447	29	91	12	622	183	156	36.3	35.6	1	1360	<1
			GWDUP1	Field_D	ES2322790	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		9/08/2023	GWDUP2	Interlab_D	1015966	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		9/08/2023	BH107R	Normal	ES2326796	<0.005	2190	**315**	<1	1500	470	38	91	13	708	265	199	40.5	41.6	1.31	1500	<1
		5/09/2023	BH107R	Normal	ES2330598	<0.005	2120	**49**	<1	1420	503	40	98	14	685	264	209	40.2	40.2	0.06	1420	<1
			GWDUP1	Field_D	ES2330598	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH112R	9/08/2023	BH112R	Normal	ES2326796	<0.005	*10,200*	**566**	<1	1350	2630	280	468	46	3220	3930	*1700*	194	173	5.59	1350	<1
		5/09/2023	BH112R	Normal	ES2330598	<0.005	*9920*	**80**	<1	1290	2360	266	412	41	2830	4180	*1880*	171	183	3.25	1290	<1

	Misc.	Inorganics		Acidity & Alkalinity			Major Ions									Minor Ions	
	Naphthalene (value used in F2 calc)	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
	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
EQL	0.005	10	5	1	1	1	1	1	1	1	1	1	0.01	0.01	0.01	1	1
ADWG 2011 Health (v3.7 updated 2022)												500[#1]					
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)			**6**														
ANZECC 2000 - Stock Watering		*5000[#5]*					*1000*					*1000*					
ANZG (2018) - FW - 95% (updated 26 July 2021)																	
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																	
Statistical Summary																	
Number of Results	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Number of Detects	0	19	19	0	19	19	19	19	19	19	19	19	19	19	19	19	0
Minimum Concentration	<0.005	1840	38	<1	696	397	29	77	12	598	183	120	34.2	35.6	0.06	696	<1
Minimum Detect	ND	1840	38	ND	696	397	29	77	12	598	183	120	34.2	35.6	0.06	696	ND
Maximum Concentration	<0.005	10200	566	<1	1500	2630	280	468	46	3220	5020	1880	194	183	8.74	1500	<1
Maximum Detect	ND	10200	566	ND	1500	2630	280	468	46	3220	5020	1880	194	183	8.74	1500	ND
Average Concentration	0.0025	5769	183	0.5	1054	1340	132	245	19	1680	2610	369	100	102	3.5	1054	0.5
Median Concentration	0.0025	5430	128	0.5	888	1360	143	241	15	1500	2710	207	93	95.7	3.25	888	0.5
Standard Deviation	0	2865	144	0	281	704	76	129	9.2	833	1619	506	50	48	2.6	281	0

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.

						Nutrients								Metals									
						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	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL						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)							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)						**0.01652**[#4]			**0.04**	**0.35**		**0.008**	**0.025**										
ANZECC 2000 - Stock Watering							*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																							
Package	**Location**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																		
M12 - Central	BH145R	5/04/2023	BH145R	Normal	ES2311426	**1.4**	0.01	0.01	0.02	**1.8**	1.8	**<0.01**	**0.07**	0.016	<0.0001	<0.001	<0.001	3.66	<0.001	0.639	<0.0001	0.026	<0.005
		2/05/2023	BH145R	Normal	ES2314383	**1.67**	<0.01	<0.01	<0.01	**1.9**	1.9	**<0.01**	**0.09**	0.016	<0.0001	<0.001	<0.001	3.32	<0.001	0.494	<0.0001	0.005	0.006
		6/06/2023	BH145R	Normal	ES2319027	**1.82**	<0.01	<0.01	<0.01	**1.9**	1.9	**<0.01**	**0.05**	0.012	<0.0001	<0.001	<0.001	5.08	<0.001	0.508	<0.0001	0.002	<0.005
			GWDUP1	Field_D	ES2319027	-	-	-	-	-	-	-	-	0.01	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	<0.005
		7/07/2023	BH145R	Normal	ES2322790	**1.86**	<0.01	<0.01	<0.01	**1.9**	1.9	**<0.01**	**0.11**	0.006	<0.0001	<0.001	0.002	4.4	<0.001	0.352	<0.0001	0.001	<0.005
		9/08/2023	BH145R	Normal	ES2326796	**1.77**	<0.01	<0.01	<0.01	**2.2**	2.2	**<0.01**	**0.51**	0.008	<0.0001	<0.001	<0.001	4.82	<0.001	0.348	<0.0001	<0.001	<0.005
		6/09/2023	BH145R	Normal	ES2330598	**1.87**	<0.01	<0.01	<0.01	**2**	2	**<0.01**	**0.06**	0.005	<0.0001	<0.001	<0.001	4.42	<0.001	0.283	<0.0001	0.025	0.006
M12 - West	BH104R	4/04/2023	BH104R	Normal	ES2311426	**1.2**	0.02	<0.01	0.02	**1.7**	1.7	**<0.01**	**0.32**	0.003	<0.0001	<0.001	<0.001	1.27	<0.001	0.269	<0.0001	0.014	0.008
			GWDUP1	Field_D	ES2311426	-	-	-	-	-	-	-	-	0.003	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.012	0.009
		2/05/2023	BH104R	Normal	ES2314383	**1.35**	0.02	<0.01	0.02	**1.3**	1.3	**<0.01**	**0.1**	0.003	<0.0001	<0.001	<0.001	1.24	<0.001	0.194	<0.0001	0.004	0.036
		2/05/2023	GWDUP1	Field_D	ES2314383	-	-	-	-	-	-	-	-	0.003	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.004	0.035
		7/06/2023	GWDUP2	Interlab_D	997826	-	-	-	-	-	-	-	-	0.002	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	<0.005
		7/06/2023	BH104R	Normal	ES2319027	**1.1**	0.06	<0.01	**0.06**	**1.3**	1.2	**<0.01**	**0.07**	0.001	<0.0001	<0.001	0.002	0.48	<0.001	0.198	<0.0001	0.003	0.007
		7/07/2023	GWDUP2	Interlab_D	1006932	-	-	-	-	-	-	-	-	0.002	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005
		7/07/2023	BH104R	Normal	ES2322790	**1.06**	0.04	<0.01	**0.04**	**1.3**	1.3	**<0.01**	**0.14**	0.002	<0.0001	<0.001	<0.001	0.91	<0.001	0.178	<0.0001	0.003	<0.005
		9/08/2023	BH104R	Normal	ES2326796	**1.11**	0.04	0.02	**0.06**	**3.9**	3.8	**<0.01**	**0.38**	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.154	<0.0001	0.002	0.012
			GWDUP1	Field_D	ES2326796	-	-	-	-	-	-	-	-	0.001	<0.0001	<0.001	<0.001	-	<0.001	-	<0.0001	0.002	0.014
		5/09/2023	GWDUP2	Interlab_D	1024024	-	-	-	-	-	-	-	-	0.002	<0.0002	<0.001	<0.001	-	<0.001	-	<0.0001	0.001	<0.005
		5/09/2023	BH104R	Normal	ES2330598	**1.46**	0.02	0.02	**0.04**	**1.7**	1.7	**<0.01**	**0.18**	0.001	<0.0001	<0.001	<0.001	0.92	<0.001	0.178	<0.0001	0.001	0.005
	BH107R	4/04/2023	BH107R	Normal	ES2311426	**0.23**	0.83	<0.01	**0.83**	**1.4**	0.6	**<0.01**	**0.13**	<0.001	<0.0001	<0.001	0.005	<0.05	<0.001	0.089	<0.0001	0.006	0.01
		5/04/2023	GWDUP2	Interlab_D	979752	-	-	-	-	-	-	-	-	0.001	<0.0002	<0.001	0.004	-	<0.001	-	<0.0001	0.005	0.008
		2/05/2023	BH107R	Normal	ES2314383	**0.12**	2.08	<0.01	**2.08**	**2.7**	0.6	**<0.01**	**0.09**	<0.001	<0.0001	<0.001	0.005	<0.05	<0.001	0.042	<0.0001	0.01	0.026
			GWDUP2	Interlab_D	986190	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	0.006	-	<0.001	-	<0.0001	0.008	0.025
		7/07/2023	BH107R	Normal	ES2322790	**0.03**	3.23	<0.01	**3.23**	**4**	0.8	**<0.01**	**0.09**	<0.001	<0.0001	0.001	0.005	<0.05	<0.001	0.033	<0.0001	0.002	0.012
			GWDUP1	Field_D	ES2322790	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	0.005	-	<0.001	-	<0.0001	0.001	0.007
		9/08/2023	GWDUP2	Interlab_D	1015966	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	0.004	-	<0.001	-	<0.0001	0.002	0.006
		9/08/2023	BH107R	Normal	ES2326796	**0.12**	2.55	<0.01	**2.55**	**3.2**	0.6	**0.03**	**0.1**	<0.001	<0.0001	<0.001	0.002	<0.05	<0.001	0.033	<0.0001	0.002	0.006
		5/09/2023	BH107R	Normal	ES2330598	**0.02**	3.03	<0.01	**3.03**	**3.5**	0.5	**0.03**	**0.05**	<0.001	<0.0001	<0.001	0.009	<0.05	<0.001	0.018	<0.0001	0.002	0.009
			GWDUP1	Field_D	ES2330598	-	-	-	-	-	-	-	-	<0.001	<0.0001	<0.001	0.009	-	<0.001	-	<0.0001	0.002	0.01
	BH112R	9/08/2023	BH112R	Normal	ES2326796	**2.32**	0.55	2	**2.55**	**5.4**	2.8	**0.35**	**1.04**	0.018	<0.0001	<0.001	0.001	<0.05	<0.001	0.13	<0.0001	0.018	0.008
		5/09/2023	BH112R	Normal	ES2330598	**2.39**	1.39	1.34	**2.73**	**6.1**	3.4	**0.36**	**0.37**	0.014	<0.0001	<0.001	0.013	<0.05	<0.001	0.152	<0.0001	0.047	0.019

	Nutrients								Metals									
	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	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	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)		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)	**0.01652[#4]**			**0.04**	**0.35**		**0.008**	**0.025**										
ANZECC 2000 - Stock Watering		*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																		

Statistical Summary

Number of Results	19	19	19	19	19	19	19	19	31	31	31	31	19	31	19	31	31	31
Number of Detects	19	14	5	14	19	19	4	19	21	0	1	14	11	0	19	0	30	22
Minimum Concentration	0.02	<0.01	<0.01	<0.01	1.3	0.5	<0.01	0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.018	<0.0001	<0.001	<0.005
Minimum Detect	0.02	0.01	0.01	0.02	1.3	0.5	0.03	0.05	0.001	ND	0.001	0.001	0.48	ND	0.018	ND	0.001	0.005
Maximum Concentration	2.39	3.23	2	3.23	6.1	3.8	0.36	1.04	0.018	<0.0002	0.001	0.013	5.08	<0.001	0.639	<0.0001	0.047	0.036
Maximum Detect	2.39	3.23	2	3.23	6.1	3.8	0.36	1.04	0.018	ND	0.001	0.013	5.08	ND	0.639	ND	0.047	0.036
Average Concentration	1.2	0.73	0.18	0.91	2.6	1.7	0.044	0.21	0.0043	0.00006	0.00052	0.0026	1.6	0.0005	0.23	0.00005	0.007	0.0099
Median Concentration	1.35	0.04	0.005	0.04	1.9	1.7	0.005	0.1	0.002	0.00005	0.0005	0.0005	0.91	0.0005	0.178	0.00005	0.002	0.007
Standard Deviation	0.77	1.1	0.54	1.3	1.4	0.93	0.11	0.24	0.0054	0.00002	0.00009	0.0032	1.9	0	0.18	0	0.01	0.0092

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.

						BTEXN							TRH - NEPM 2013							TRH - NEPM 1999				
						Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	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)
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	2	2	2	2	2	1	20	20	100	100	100	100	100	20	50	100	50	50
ADWG 2011 Health (v3.7 updated 2022)						1	800	300			600													
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																								
ANZECC 2000 - Stock Watering																								
ANZG (2018) - FW - 95% (updated 26 July 2021)						950	180	80	350															
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																								
Package	**Location**	**Sample Date**	**Field ID**	**Sample Type**	**Lab Report Number**																			
M12 - Central	BH145R	5/04/2023	BH145R	Normal	ES2311426	1	3	<2	<2	<2	<2	4	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		2/05/2023	BH145R	Normal	ES2314383	1	3	<2	<2	<2	<2	4	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		6/06/2023	BH145R	Normal	ES2319027	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2319027	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH145R	Normal	ES2322790	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		9/08/2023	BH145R	Normal	ES2326796	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		6/09/2023	BH145R	Normal	ES2330598	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
M12 - West	BH104R	4/04/2023	BH104R	Normal	ES2311426	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2311426	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2/05/2023	BH104R	Normal	ES2314383	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		2/05/2023	GWDUP1	Field_D	ES2314383	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/06/2023	GWDUP2	Interlab_D	997826	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/06/2023	BH104R	Normal	ES2319027	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		7/07/2023	GWDUP2	Interlab_D	1006932	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH104R	Normal	ES2322790	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		9/08/2023	BH104R	Normal	ES2326796	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2326796	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		5/09/2023	GWDUP2	Interlab_D	1024024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		5/09/2023	BH104R	Normal	ES2330598	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
	BH107R	4/04/2023	BH107R	Normal	ES2311426	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		5/04/2023	GWDUP2	Interlab_D	979752	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2/05/2023	BH107R	Normal	ES2314383	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP2	Interlab_D	986190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		7/07/2023	BH107R	Normal	ES2322790	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2322790	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		9/08/2023	GWDUP2	Interlab_D	1015966	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		9/08/2023	BH107R	Normal	ES2326796	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		5/09/2023	BH107R	Normal	ES2330598	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
			GWDUP1	Field_D	ES2330598	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH112R	9/08/2023	BH112R	Normal	ES2326796	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
		5/09/2023	BH112R	Normal	ES2330598	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50

	BTEXN							TRH - NEPM 2013							TRH - NEPM 1999				
	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	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)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	2	2	2	2	2	1	20	20	100	100	100	100	100	20	50	100	50	50
ADWG 2011 Health (v3.7 updated 2022)	1	800	300			600													
ANZECC 2000 - Lowland Rivers (NSW coastal rivers)																			
ANZECC 2000 - Stock Watering																			
ANZG (2018) - FW - 95% (updated 26 July 2021)	950	180	80	350															
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																			

Statistical Summary

Number of Results	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Number of Detects	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<1	<2	<2	<2	<2	<2	<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
Minimum Detect	1	3	ND	ND	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	1	3	<2	<2	<2	<2	4	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50
Maximum Detect	1	3	ND	ND	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.55	1.2	1	1	1	1	0.87	10	10	50	50	50	50	50	10	25	50	25	25
Median Concentration	0.5	1	1	1	1	1	0.5	10	10	50	50	50	50	50	10	25	50	25	25
Standard Deviation	0.16	0.63	0	0	0	0	1.1	0	0	0	0	0	0	0	0	0	0	0	0

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.

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	10.8	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	10.77	Absent	19.5	6.8	21616	1.20	148.00	353	Clear, no odour/sheen
BH104	Event 43 - October 2022	20/10/2022	18.47	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	10.14	Absent	18.3	6.6	32098	0.52	152.10	357.1	Clear, no odour/sheen.
BH104R	Event 45 - December 2022	16/12/2022	8.31	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	9.3	Absent	19.5	6.79	6017.00	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	9.44	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	9.85	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	10.33	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	11.57	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.
BH107	Event 41 - August 2022	15/08/2022	9.53	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	10.01	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	6.87	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	7.06	Absent	19.4	7.18	2824.00	0.12	37.80	242.8	Grey, cloudy, no odour or sheen.
BH107R	Event 49 - April 2023	04/04/2023	7.11	Absent	19.4	7.66	2542	0.24	36.90	241.9	Clear, no odour/sheen.
BH107R	Event 50 - May 2023	02/05/2023	7.15	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	7.45	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	7.62	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.
BH112	Event 41 - August 2022	15/08/2022	13.56	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	13.46	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	13.3	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	14.18	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	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, 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
BH144	Event 44 - November 2022	15/11/2022	16.56	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	18.66	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	18.47	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	18.98	Absent	-	-	-	-	-	-	No parameters recorded due to low standing water level. All samples collected.
BH145	Event 46 - January 2023	17-01-2023	19.2	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.

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 48 - March 2023	02/03/2023	19.3	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	11.92	Absent	18.6	7.54	3815	0.17	-152.60	52.4	Clear, no odour/sheen.
BH145R	Event 50 - May 2023	02/05/2023	12.03	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	11.98	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	11.81	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

*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 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	9.44	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	9.85	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	10.33	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	11.57	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.
BH107R	Event 49 - April 2023	04/04/2023	7.11	Absent	19.4	7.66	2542	0.24	36.90	241.9	Clear, no odour/sheen.
BH107R	Event 50 - May 2023	02/05/2023	7.15	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	7.45	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	7.62	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.
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	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
BH145R	Event 49 - April 2023	05/04/2023	11.92	Absent	18.6	7.54	3815	0.17	-152.60	52.4	Clear, no odour/sheen.
BH145R	Event 50 - May 2023	02/05/2023	12.03	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	11.98	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	11.81	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

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

Appendix B
Table B9
Heavy metal concentrations and hardness-modified trigger values (HMTV)

Well ID	Phase	Date	Hardness mg/L	Cadmium µg/L		Chromium µg/L		Copper µg/L		Lead µg/L		Nickel µg/L		Zinc µg/L	
ANZECC (2000) Freshwater Trigger Value				*0.2*	***HMTV***	*1.0*	***HMTV***	*1.4*	***HMTV***	*3.4*	***HMTV***	*11*	***HMTV***	*8*	***HMTV***
BH104/ BH104R	Baseline	10/09/2020	1,550	<0.1	*6.7*	<1	*25.4*	2	*40*	<1	*510*	22	*315*	61	*229*
		9/10/2020	1,610	<0.1	*6.9*	<1	*26.2*	1	*41*	<1	*535*	31	*325*	25	*236*
		13/11/2020	2,020	<0.1	*8.5*	<1	*31.6*	<1	*50*	<1	*713*	137	*394*	25	*286*
		8/12/2020	2,090	<0.1	*8.7*	2	*32.5*	<1	*52*	<1	*745*	105	*405*	93	*295*
		14/01/2021	1,900	<0.1	*8.0*	<1	*30.0*	<1	*48*	<1	*660*	175	*374*	19	*272*
		11/02/2021	2,110	<0.1	*8.8*	<1	*32.7*	<1	*52*	<1	*754*	81	*409*	<5	*297*
		10/03/2021	2,190	<0.1	*9.1*	<1	*33.7*	2	*54*	<1	*790*	57	*422*	25	*307*
		7/04/2021	833	<0.1	*3.9*	<1	*15.3*	2	*24*	<1	*232*	40	*186*	8	*135*
		4/05/2021	1,490	<0.1	*6.5*	<1	*24.6*	2	*39*	<1	*485*	108	*304*	30	*221*
		8/06/2021	1,860	<0.1	*7.9*	<1	*29.5*	2	*47*	<1	*642*	81	*367*	62	*267*
		7/07/2021	1,860	<0.1	*7.9*	<1	*29.5*	<1	*47*	<1	*642*	11	*367*	7	*267*
		13/08/2021	1,910	<0.1	*8.1*	<1	*30.1*	<1	*48*	<1	*664*	57	*376*	92	*273*
		1/09/2021	1,590	<0.1	*6.8*	<1	*25.9*	<1	*41*	<1	*526*	33	*321*	7	*234*
		15/10/2021	1,860	<0.1	*7.9*	2	*29.5*	2	*47*	<1	*642*	43	*367*	39	*267*
		8/11/2021	1,680	<0.1	*7.2*	<1	*27.1*	2	*43*	<1	*565*	35	*337*	19	*245*
		8/12/2021	1,400	<0.1	*6.1*	<1	*23.4*	4	*37*	<1	*448*	23	*288*	149	*210*
		13/01/2022	1,470	<0.1	*6.4*	<1	*24.3*	9	*38*	<1	*476*	35	*301*	11	*219*
		10/02/2022	637	<0.1	*3.0*	<1	*12.3*	<1	*19*	<1	*165*	60	*148*	<5	*107*
		18/03/2022	645	<0.1	*3.1*	<1	*12.4*	8	*19*	<1	*167*	192	*149*	8	*109*
		25/05/2022	2,540	<0.1	*10.4*	<1	*38.1*	34	*61*	<1	*954*	3	*479*	8	*348*
		27/06/2022	3,730	<0.1	*14.6*	<1	*52.2*	71	*84*	<1	*1555*	24	*663*	8	*482*
		20/07/2022	3,540	0.3	*14.0*	2	*50.0*	89	*81*	<1	*1455*	11	*635*	11	*462*
	Construction	15/08/2022	3980	<0.1	*15.5*	<1	*55.0*	81	*89*	<1	*1688*	8	*701*	6	*510*
		19/09/2022	4140	<0.1	*16.1*	<1	*56.8*	87	*92*	<1	*1775*	71	*725*	16	*527*
		20/10/2022	4020	<0.1	*15.6*	<1	*55.5*	28	*90*	<1	*1710*	10	*707*	11	*514*
		16/11/2022	4320	<0.1	*16.7*	<1	*58.9*	36	*96*	<1	*1873*	8	*752*	7	*547*
		16/12/2022	823	<0.1	*3.8*	<1	*15.1*	<1	*23*	<1	*228*	1	*184*	6	*134*
		18/01/2023	1180	<0.1	*5.3*	<1	*20.3*	<1	*32*	<1	*360*	1	*249*	<5	*181*
		8/02/2023	1060	<0.1	*4.8*	<1	*18.6*	<1	*29*	<1	*315*	<1	*228*	<5	*166*
		3/03/2023	1300	<0.1	*5.7*	<1	*22.0*	<1	*34*	<1	*408*	1	*271*	67	*197*
		4/04/2023	1380	<0.1	*6.0*	<1	*23.1*	<1	*36*	<1	*440*	14	*285*	8	*207*
		2/05/2023	1180	<0.1	*5.3*	<1	*20.3*	<1	*32*	<1	*360*	4	*249*	36	*181*
		7/06/2023	1520	<0.1	*6.6*	<1	*25.0*	2	*39*	<1	*497*	3	*309*	7	*225*
		7/07/2023	1360	<0.1	*6.0*	<1	*22.8*	<1	*36*	<1	*432*	3	*281*	<5	*205*
		9/08/2023	1570	<0.1	*6.8*	<1	*25.7*	<1	*40*	<1	*518*	2	*318*	12	*231*
		5/09/2023	1190	<0.1	*5.3*	<1	*20.5*	<1	*32*	<1	*364*	1	*251*	5	*183*
BH107/ BH107R	Baseline	10/09/2020	1,650	<0.1	*7.1*	<1	*26.7*	84	*42*	2	*552*	23	*332*	85	*241*
		9/10/2020	1,530	0.1	*6.6*	<1	*25.1*	74	*40*	3	*501*	55	*311*	122	*226*
		8/12/2020	1,600	<0.1	*6.9*	<1	*26.1*	<1	*41*	<1	*531*	109	*323*	34	*235*
		14/01/2021	1,500	<0.1	*6.5*	<1	*24.7*	1	*39*	<1	*489*	68	*306*	17	*222*
		11/02/2021	1,650	0.6	*7.1*	<1	*26.7*	89	*42*	3	*552*	90	*332*	168	*241*
		10/03/2021	1,570	0.2	*6.8*	<1	*25.7*	119	*40*	2	*518*	56	*318*	84	*231*
		7/04/2021	997	<0.1	*4.5*	<1	*17.7*	8	*28*	<1	*291*	41	*216*	17	*157*
		3/05/2021	926	<0.1	*4.2*	<1	*16.6*	16	*26*	<1	*265*	11	*203*	46	*148*
		8/06/2021	1,280	<0.1	*5.6*	<1	*21.7*	2	*34*	<1	*400*	96	*267*	28	*194*
		7/07/2021	1,230	<0.1	*5.5*	<1	*21.0*	2	*33*	<1	*380*	4	*258*	8	*188*
		13/08/2021	1,400	<0.1	*6.1*	<1	*23.4*	<1	*37*	<1	*448*	21	*288*	12	*210*
		1/09/2021	1,260	<0.1	*5.6*	<1	*21.4*	2	*34*	<1	*392*	50	*264*	9	*192*
		15/10/2021	1,290	<0.1	*5.7*	<1	*21.8*	<1	*34*	<1	*404*	50	*269*	57	*196*
		8/11/2021	1,180	<0.1	*5.3*	<1	*20.3*	2	*32*	<1	*360*	24	*249*	<5	*181*
		8/12/2021	1,230	<0.1	*5.5*	<1	*21.0*	<1	*33*	<1	*380*	9	*258*	679	*188*
		13/01/2022	376	<0.1	*1.9*	<1	*8.0*	9	*12*	<1	*84*	70	*94*	78	*69*
		10/02/2022	806	<0.1	*3.7*	<1	*14.9*	<1	*23*	<1	*222*	73	*180*	5	*131*
		18/03/2022	131	<0.1	*0.7*	<1	*3.3*	6	*5*	<1	*22*	61	*39*	22	*28*
		25/05/2022	543	<0.1	*2.6*	<1	*10.7*	18	*16*	<1	*135*	1	*129*	6	*94*
		27/06/2022	569	<0.1	*2.7*	<1	*11.2*	3	*17*	<1	*143*	2	*134*	6	*98*
		20/07/2022	366	<0.1	*1.9*	<1	*7.8*	8	*12*	<1	*81*	<1	*92*	6	*67*
	Construction	15/08/2022	516	<0.1	*2.5*	<1	*10.3*	4	*16*	<1	*126*	<1	*123*	7	*90*
		19/09/2022	485	<0.1	*2.4*	<1	*9.8*	4	*15*	<1	*117*	<1	*117*	6	*85*
		20/10/2022	575	<0.1	*2.8*	<1	*11.3*	5	*17*	<1	*145*	1	*135*	<5	*98*
		16/11/2022	555	<0.1	*2.7*	<1	*10.9*	2	*17*	<1	*138*	<1	*131*	<5	*96*
		16/12/2022	360	<0.1	*1.8*	<1	*7.7*	3	*12*	<1	*80*	2	*91*	12	*66*
		8/02/2023	380	<0.1	*1.9*	<1	*8.0*	6	*12*	<1	*85*	1	*95*	7	*69*
		3/03/2023	437	<0.1	*2.2*	<1	*9.0*	4	*14*	<1	*102*	2	*107*	125	*78*
		4/04/2023	427	<0.1	*2.1*	<1	*8.8*	5	*13*	<1	*99*	6	*105*	10	*76*
		2/05/2023	397	<0.1	*2.0*	<1	*8.3*	5	*13*	<1	*90*	10	*99*	26	*72*
		7/07/2023	447	<0.1	*2.2*	1	*9.2*	5	*14*	<1	*105*	2	*109*	12	*79*
		9/08/2023	470	<0.1	*2.3*	<1	*9.5*	2	*15*	<1	*112*	2	*114*	6	*83*
		5/09/2023	503	<0.1	*2.5*	<1	*10.1*	9	*15*	<1	*122*	2	*121*	9	*88*
BH112/ BH112R	Pre-construction	10/09/2020	1,740	<0.1	*7.4*	<1	*27.9*	80	*44*	1	*590*	80	*347*	104	*252*
		9/10/2020	1,640	0.2	*7.0*	<1	*26.6*	110	*42*	3	*548*	62	*330*	146	*240*
		8/12/2020	1,700	<0.1	*7.3*	<1	*27.4*	4	*43*	<1	*573*	101	*340*	149	*247*
		14/01/2021	1,720	<0.1	*7.3*	<1	*27.7*	7	*44*	<1	*582*	120	*344*	35	*250*
		11/02/2021	1,700	<0.1	*7.3*	<1	*27.4*	1	*43*	<1	*573*	48	*340*	11	*247*
		10/03/2021	1,710	<0.1	*7.3*	<1	*27.5*	186	*44*	2	*577*	40	*342*	86	*249*
		7/04/2021	402	<0.1	*2.0*	<1	*8.4*	11	*13*	<1	*92*	36	*100*	9	*73*
		4/05/2021	792	<0.1	*3.7*	<1	*14.6*	4	*23*	<1	*217*	182	*178*	58	*129*
		8/06/2021	804	<0.1	*3.7*	<1	*14.8*	1	*23*	<1	*221*	56	*180*	34	*131*

Appendix B
Table B9
Heavy metal concentrations and hardness-modified trigger values (HMTV)

Well ID	Phase	Date	Hardness mg/L	Cadmium µg/L		Chromium µg/L		Copper µg/L		Lead µg/L		Nickel µg/L		Zinc µg/L	
ANZECC (2000) Freshwater Trigger Value				*0.2*	***HMTV***	*1.0*	***HMTV***	*1.4*	***HMTV***	*3.4*	***HMTV***	*11*	***HMTV***	*8*	***HMTV***
		7/07/2021	825	<0.1	*3.8*	<1	*15.1*	2	*23*	<1	*229*	10	*184*	7	*134*
		13/08/2021	972	<0.1	*4.4*	<1	*17.3*	2	*27*	<1	*282*	43	*212*	29	*154*
		1/09/2021	957	<0.1	*4.4*	<1	*17.1*	2	*27*	<1	*276*	38	*209*	10	*152*
		15/10/2021	1,690	<0.1	*7.2*	3	*27.3*	86	*43*	4	*569*	71	*338*	118	*246*
		8/11/2021	1,180	<0.1	*5.3*	<1	*20.3*	3	*32*	<1	*360*	33	*249*	7	*181*
		8/12/2021	1,210	<0.1	*5.4*	<1	*20.7*	2	*32*	<1	*372*	50	*255*	655	*185*
		13/01/2022	1,180	<0.1	*5.3*	<1	*20.3*	<1	*32*	<1	*360*	65	*249*	14	*181*
		10/02/2022	1,340	<0.1	*5.9*	<1	*22.5*	1	*35*	<1	*424*	141	*278*	13	*202*
		18/03/2022	364	<0.1	*1.8*	<1	*7.7*	<1	*12*	<1	*81*	130	*92*	<5	*67*
		25/05/2022	286	<0.1	*1.5*	<1	*6.4*	3	*10*	<1	*60*	7	*75*	22	*54*
		27/06/2022	264	<0.1	*1.4*	<1	*5.9*	<1	*9*	<1	*54*	<1	*70*	<5	*51*
		20/07/2022	251	<0.1	*1.3*	<1	*5.7*	4	*9*	<1	*50*	<1	*67*	5	*49*
	Construction	15/08/2022	261	<0.1	*1.4*	<1	*5.9*	3	*9*	<1	*53*	<1	*69*	<5	*50*
		19/09/2022	268	<0.1	*1.4*	<1	*6.0*	2	*9*	<1	*55*	<1	*71*	<5	*51*
		20/10/2022	283	<0.1	*1.5*	<1	*6.3*	6	*9*	<1	*59*	5	*74*	49	*54*
		16/11/2022	260	<0.1	*1.4*	<1	*5.9*	3	*9*	<1	*53*	1	*69*	<5	*50*
		9/08/2023	2630	<0.1	*10.7*	<1	*39.2*	1	*63*	<1	*997*	18	*493*	8	*359*
		5/09/2023	2360	<0.1	*9.7*	<1	*35.9*	13	*57*	<1	*869*	47	*450*	19	*327*
BH145/ BH145R	Baseline	9/09/2020	223	0.1	*1.2*	<1	*5.2*	153	*8*	2	*43*	129	*61*	2620	*44*
		8/10/2020	264	<0.1	*1.4*	<1	*5.9*	8	*9*	<1	*54*	20	*70*	643	*51*
		11/11/2020	65	<0.1	*0.4*	<1	*1.9*	4	*3*	<1	*9*	43	*21*	10700	*15*
		9/12/2020	65	<0.1	*0.4*	<1	*1.9*	<1	*3*	<1	*9*	82	*21*	1330	*15*
		12/01/2021	88	<0.1	*0.5*	4	*2.4*	42	*3*	14	*13*	11	*27*	1030	*20*
		9/02/2021	80	<0.1	*0.5*	<1	*2.2*	17	*3*	<1	*12*	8	*25*	1620	*18*
		10/03/2021	119	<0.1	*0.7*	<1	*3.1*	62	*5*	<1	*20*	68	*35*	297	*26*
		7/04/2021	65	<0.1	*0.4*	<1	*1.9*	7	*3*	<1	*9*	13	*21*	1380	*15*
		1/09/2021	211	0.4	*1.1*	<1	*5.0*	4	*7*	<1	*40*	46	*58*	694	*42*
		15/10/2021	86	<0.1	*0.5*	<1	*2.4*	<1	*3*	<1	*13*	<1	*27*	<5	*20*
		8/11/2021	234	0.2	*1.2*	<1	*5.4*	15	*8*	<1	*46*	28	*63*	556	*46*
		8/12/2021	228	0.5	*1.2*	<1	*5.3*	<1	*8*	<1	*45*	14	*62*	568	*45*
		13/01/2022	154	<0.1	*0.9*	<1	*3.8*	<1	*6*	<1	*27*	8	*44*	824	*32*
		10/02/2022	131	0.1	*0.7*	<1	*3.3*	2	*5*	<1	*22*	6	*39*	498	*28*
		18/03/2022	149	0.1	*0.8*	<1	*3.7*	5	*5*	<1	*26*	6	*43*	567	*31*
		25/05/2022	106	<0.1	*0.6*	<1	*2.8*	6	*4*	<1	*17*	4	*32*	210	*23*
		27/06/2022	113	<0.1	*0.7*	<1	*3.0*	2	*4*	<1	*18*	2	*34*	142	*25*
		20/07/2022	48	<0.1	*0.3*	<1	*1.5*	2	*2*	<1	*6*	3	*16*	138	*12*
	Construction	15/08/2022	60	<0.1	*0.4*	<1	*1.8*	1	*3*	<1	*8*	3	*20*	102	*14*
		19/09/2022	97	<0.1	*0.6*	<1	*2.6*	2	*4*	<1	*15*	2	*30*	75	*22*
		20/10/2022	215	<0.1	*1.2*	<1	*5.0*	7	*7*	<1	*41*	3	*59*	101	*43*
		15/11/2022	70	<0.1	*0.4*	<1	*2.0*	5	*3*	<1	*10*	2	*23*	68	*16*
		14/12/2022	94	<0.1	*0.6*	<1	*2.6*	4	*4*	<1	*15*	2	*29*	72	*21*
		7/02/2023	118	<0.1	*0.7*	<1	*3.1*	3	*4*	<1	*19*	3	*35*	61	*26*
		5/04/2023	974	<0.1	*4.4*	<1	*17.4*	<1	*27*	<1	*282*	26	*212*	<5	*154*
		2/05/2023	1170	<0.1	*5.2*	<1	*20.2*	<1	*32*	<1	*357*	5	*248*	6	*180*
		6/06/2023	1580	<0.1	*6.8*	<1	*25.8*	<1	*41*	<1	*522*	2	*320*	<5	*232*
		7/07/2023	1830	<0.1	*7.8*	<1	*29.1*	2	*46*	<1	*629*	1	*362*	<5	*263*
		9/08/2023	2380	<0.1	*9.8*	<1	*36.1*	1	*58*	<1	*879*	<1	*453*	<5	*329*
		6/09/2023	2090	<0.1	*8.7*	<1	*32.5*	1	*52*	<1	*745*	25	*405*	6	*295*

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
West	BH102	Event 49 - April 2023	No	4/04/2023	-	-	-	-	Well destroyed, not located. Scrapers have cleared the area.
West	BH104R	Event 49 - April 2023	Yes	4/04/2023	9.367	18.150	Yes	Yes	
West	BH104R	Event 50 - May 2023	Yes	2/05/2023	9.440	18.155	-	-	Monthly monitoring round
West	BH104R	Event 51 - June 2023	Yes	7/06/2023	9.850	18.150	Yes	Yes	
West	BH104R	Event 52 - July 2023	Yes	5/07/2023	10.330	18.170	-	-	Monthly monitoring round
West	BH104R	Event 53 - August 2023	Yes	9/08/2023	11.570	18.170	Yes	Yes	
West	BH104R	Event 54 - September 2023	Yes	5/09/2023	11.563	18.150	-	-	Monthly monitoring round
West	BH107R	Event 49 - April 2023	Yes	4/04/2023	7.110	14.500	Yes	Yes	
West	BH107R	Event 50 - May 2023	Yes	2/05/2023	7.150	14.490	-	-	Monthly monitoring round
West	BH107R	Event 51 - June 2023	No	7/06/2023	-	-	-	-	No access
West	BH107R	Event 52 - July 2023	Yes	5/07/2023	7.450	14.490	-	-	Monthly monitoring round
West	BH107R	Event 53 - August 2023	Yes	9/08/2023	7.620	14.515	Yes	Yes	Data logger switched with Solinst logger as existing HOBO data logger has extremely low battery warning.
West	BH107R	Event 54 - September 2023	Yes	5/09/2023	7.579	14.490	-	-	Monthly monitoring round
West	BH112R	Event 49 - April 2023	No access	4/04/2023	-	-	-	-	Well still inaccessible as per previous rounds.
West	BH112R	Event 50 - May 2023	No access	2/05/2023	-	-	-	-	Well still inaccessible as per previous rounds.
West	BH112R	Event 51 - June 2023	Yes	7/06/2023	-	-	-	-	Newly drilled replacement well, measured as dry.
West	BH112R	Event 52 - July 2023	Yes	5/07/2023	12.000	21.090	No	-	Well not developed
West	BH112R	Event 53 - August 2023	Yes	9/08/2023	12.425	21.115	No	-	Solinst logger set up and placed into monitoring well.
West	BH112R	Event 54 - September 2023	Yes	5/09/2023	12.407	21.100	-	-	Monthly monitoring round
Central	BH145	Event 49 - April 2023	Yes	5/04/2023	-	-	Yes	Yes	Logger removed and placed in BH145R.
Central	BH145R	Event 49 - April 2023	Yes	5/04/2023	11.920	19.950	-	-	Replacement well.
Central	BH145R	Event 50 - May 2023	Yes	2/05/2023	12.030	19.920	-	-	Monthly monitoring round
Central	BH145R	Event 51 - June 2023	Yes	6/06/2023	11.980	19.930			
Central	BH145R	Event 52 - July 2023	Yes	5/07/2023	11.810	19.950	-	-	Monthly monitoring round
Central	BH145R	Event 53 - August 2023	Yes	9/08/2023	11.906	19.978	Yes	Yes	
Central	BH145R	Event 54 - September 2023	Yes	6/09/2023	11.777	19.970	-	-	Monthly monitoring round
East	BH155	Event 49 - April 2023	Yes	4/04/2023	DRY	-	N	-	DRY
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
East	BH162	Event 49 - April 2023	Yes	4/04/2023	5.580	18.220	Yes	Yes	
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	BH170	Event 49 - April 2023	Attempt to locate	4/04/2023	-	-	-	-	Not located.
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	BH175	Event 49 - April 2023	Yes	4/04/2023	3.812	18.020	Yes	No	Data logger failed to be read by computer, same as in February round.
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.
Central	BH219	Event 49 - April 2023	Yes	5/04/2023	0.685	18.280	Yes	Yes	
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	

Appendix C

Field Parameter Graphs

Groundwater Quality Parameter Graphs

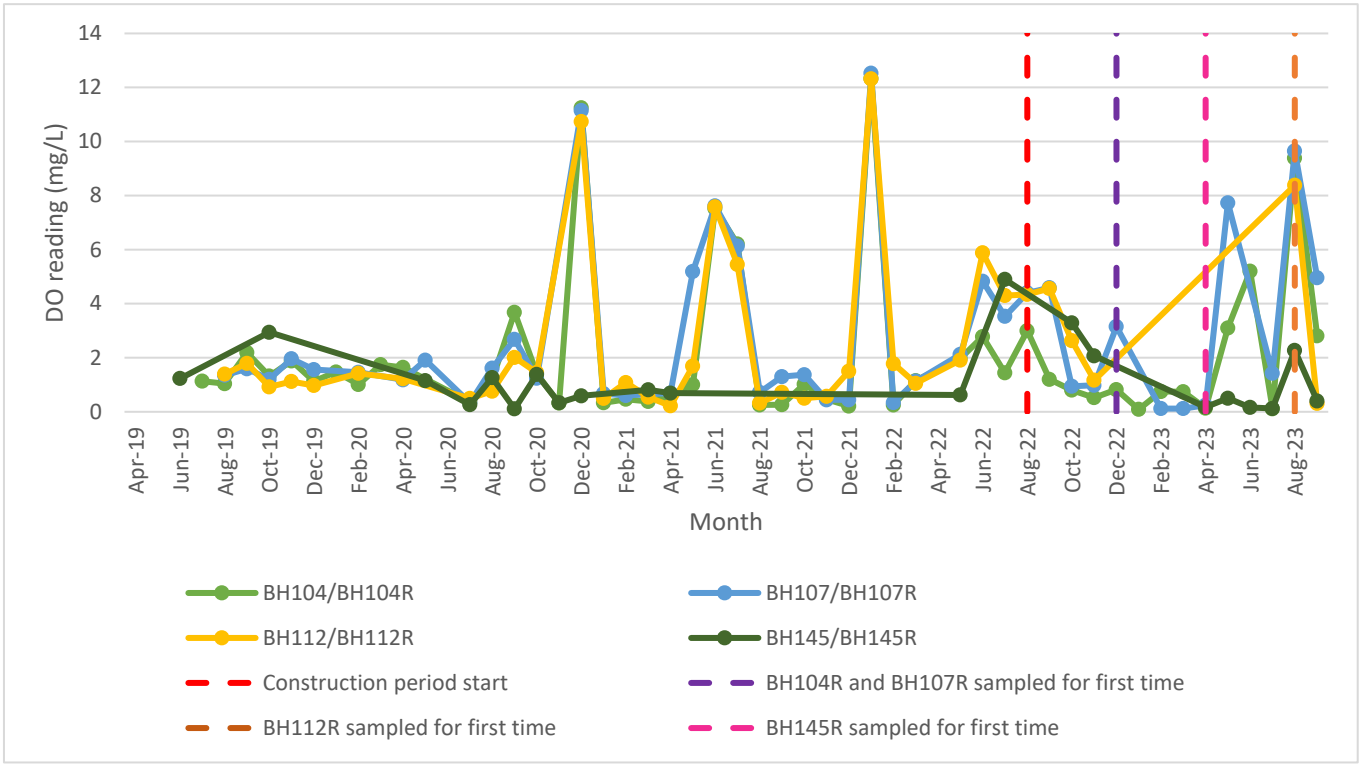


Figure 1 ***Dissolved oxygen in groundwater wells over time***

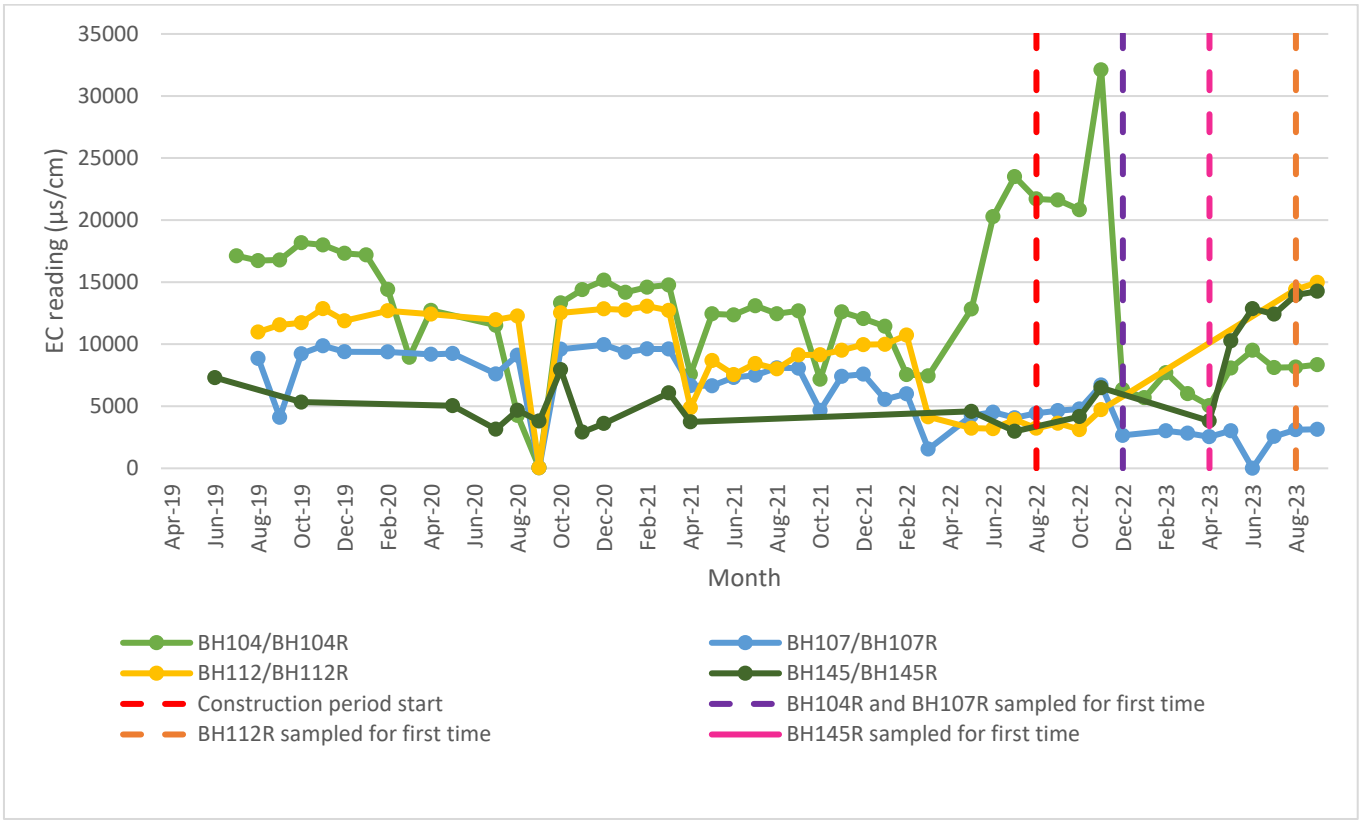


Figure 2 ***Electrical conductivity in groundwater wells over time***

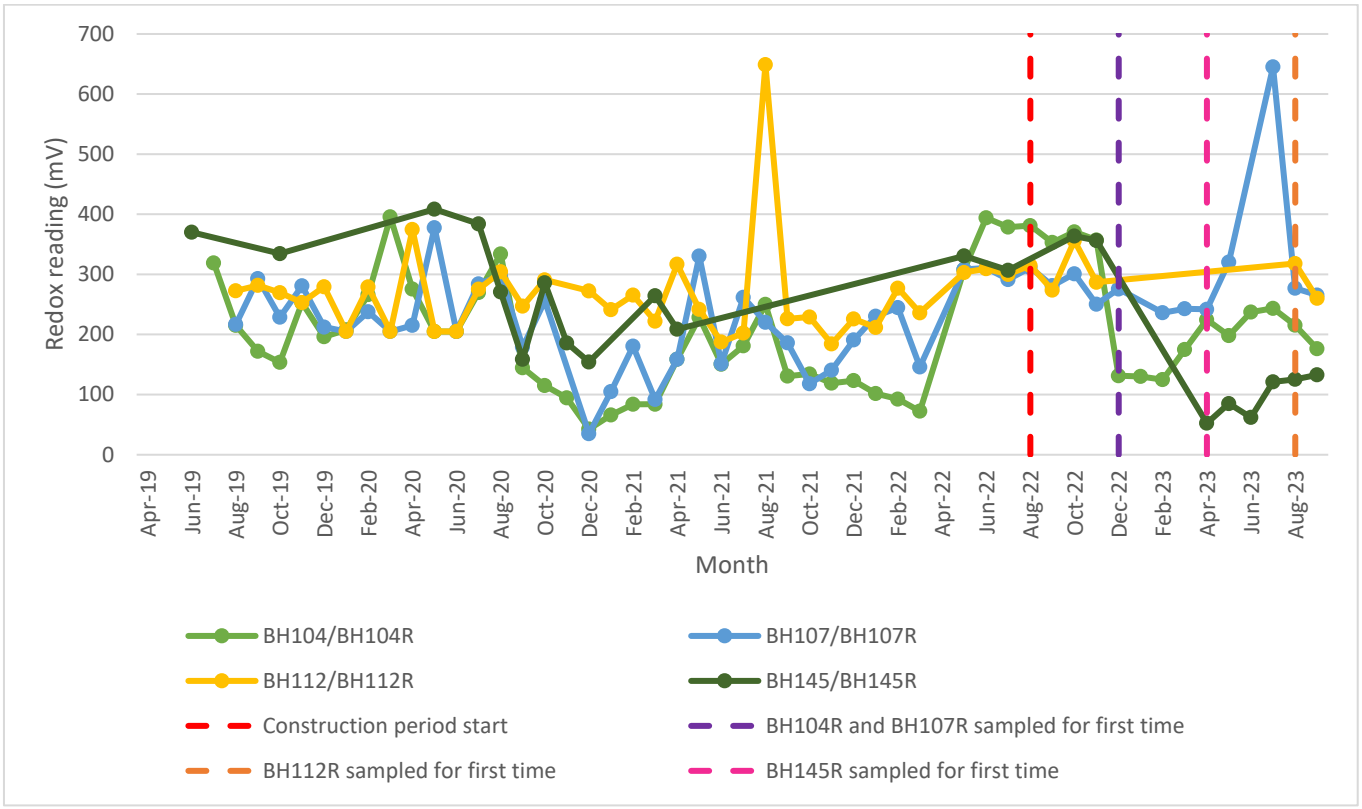


Figure 3 ***Redox in groundwater wells over time***

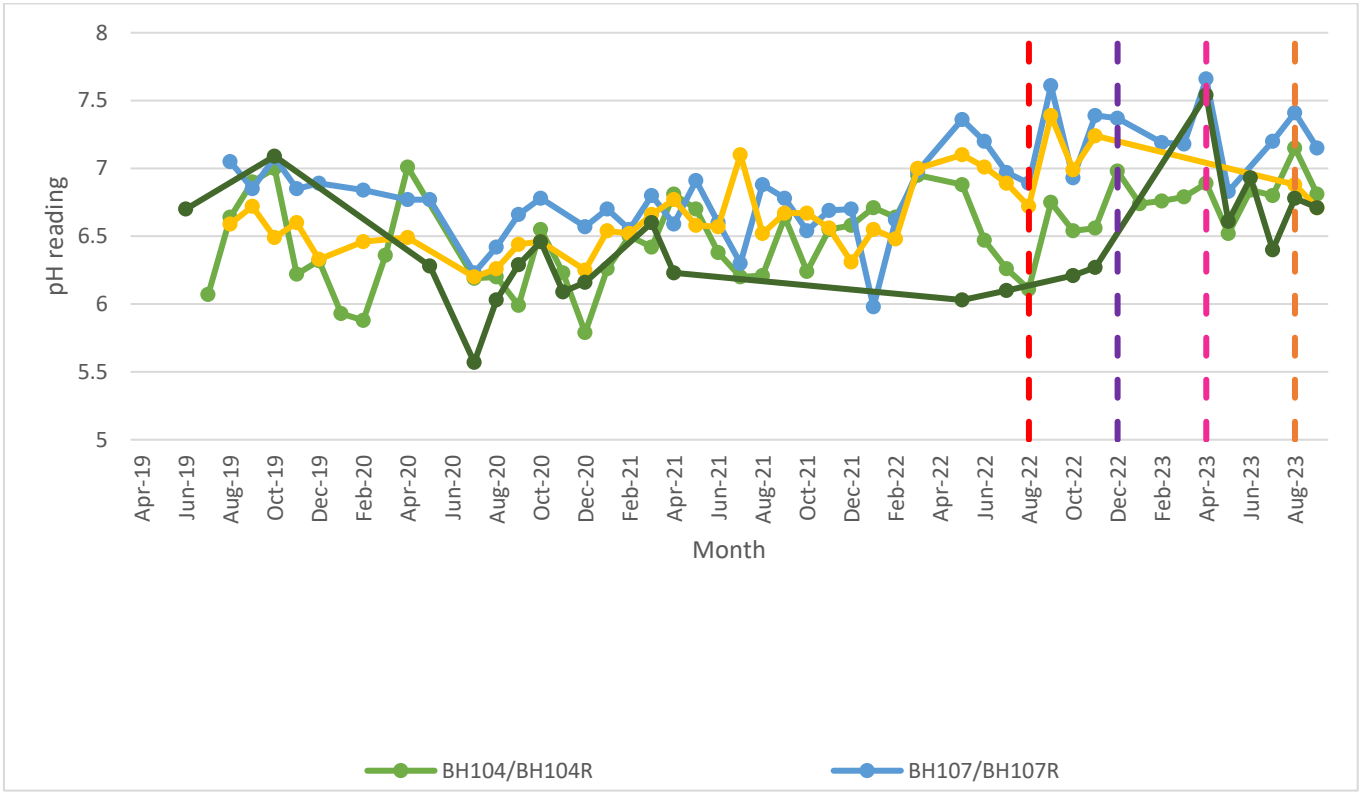


Figure 4 ***pH in groundwater wells over time***

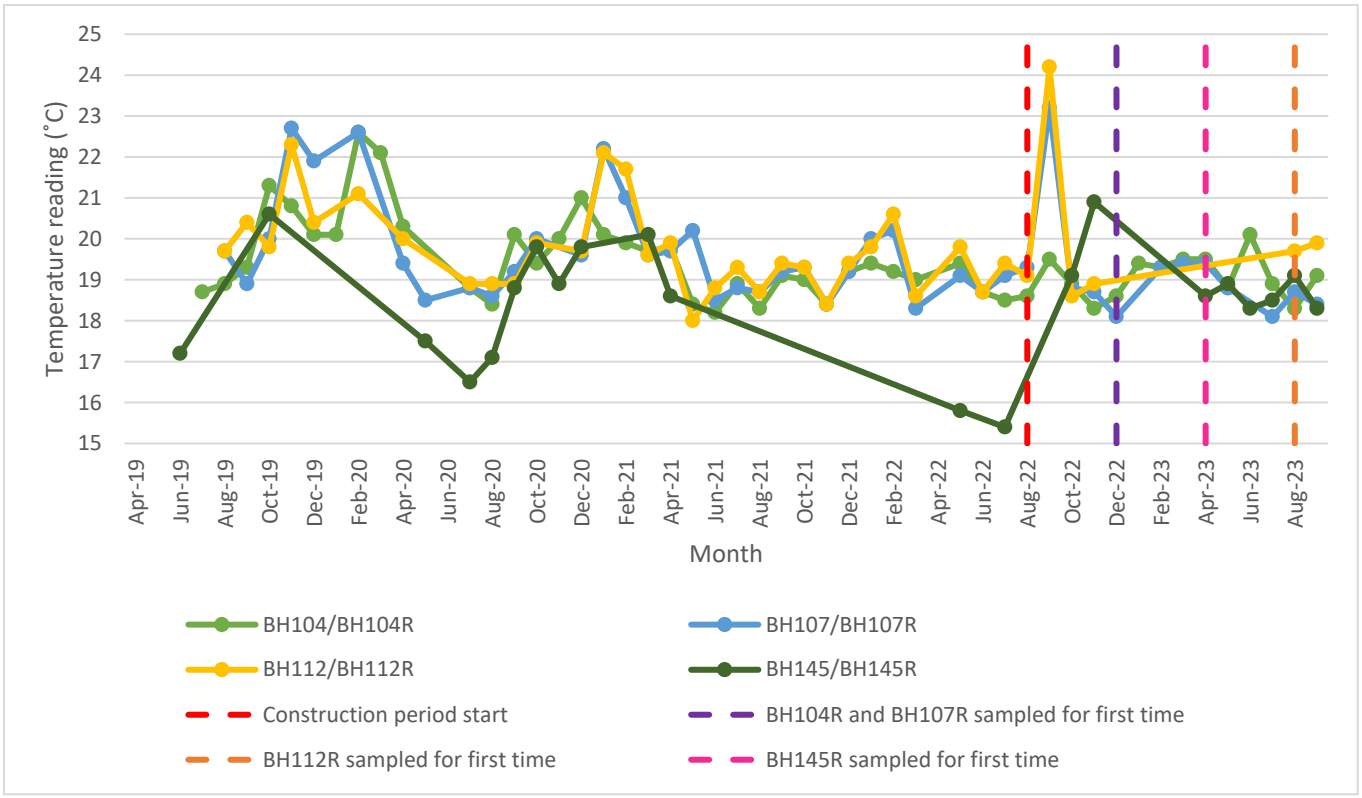


Figure 5 ***Temperature in groundwater wells over time***

Appendix D

Boxplot Graphs

Boxplot graphs for selected analytes

pH

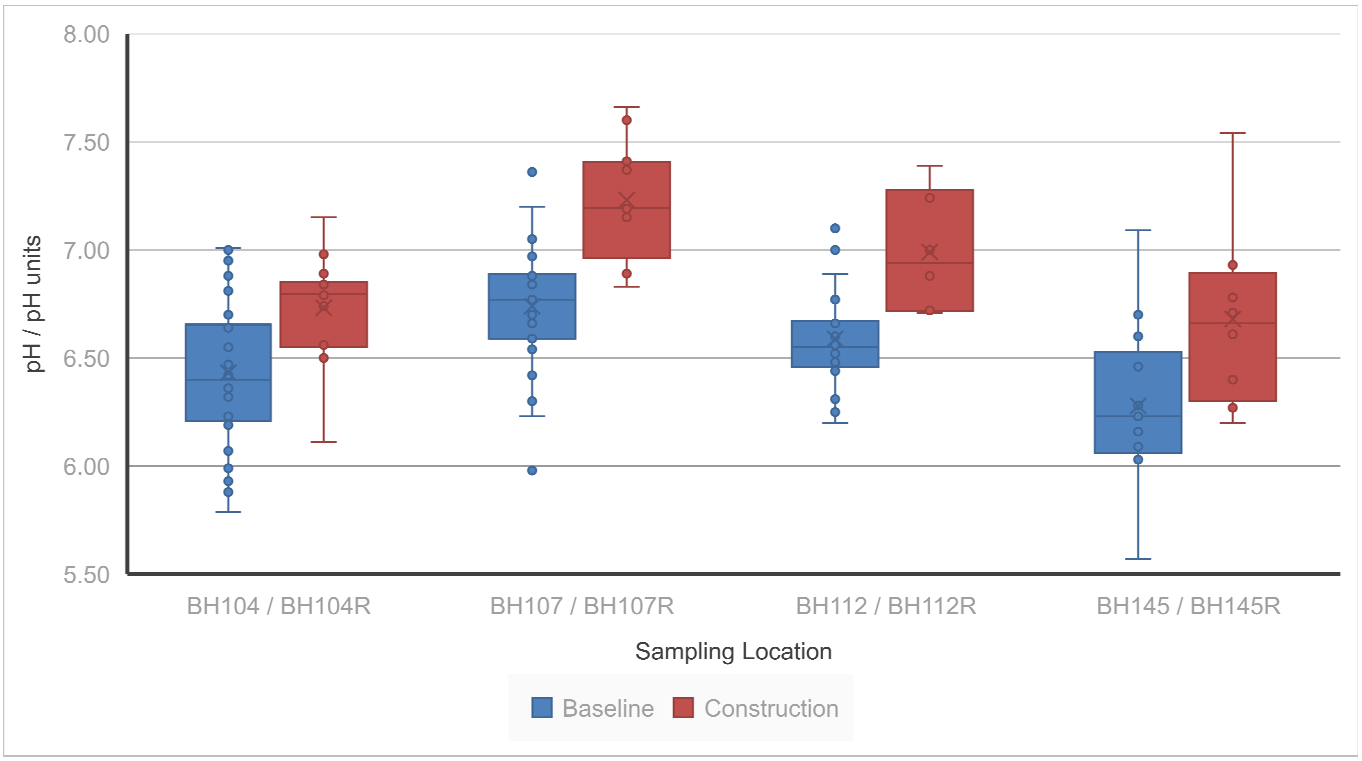


Figure 1 *Summary of field recorded pH for the baseline and construction phases to September 2023*

Electrical Conductivity

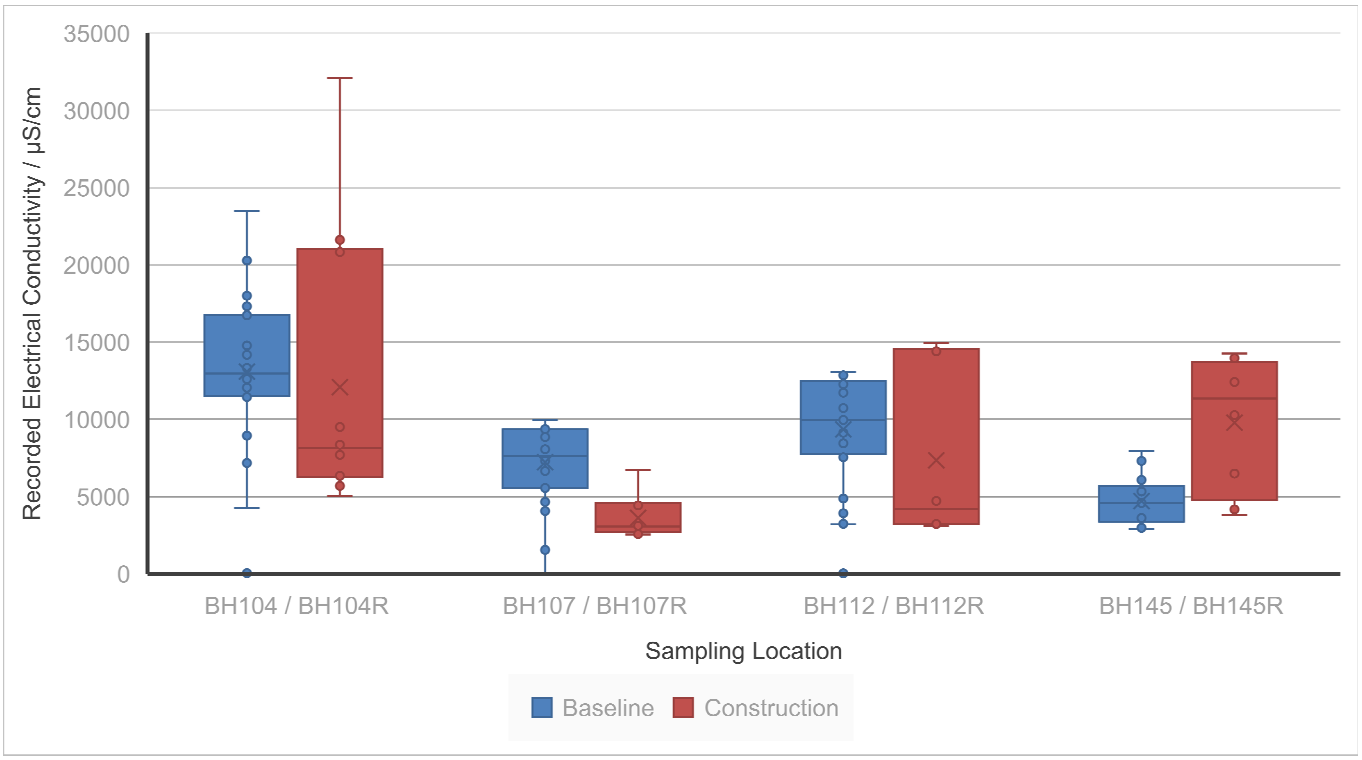
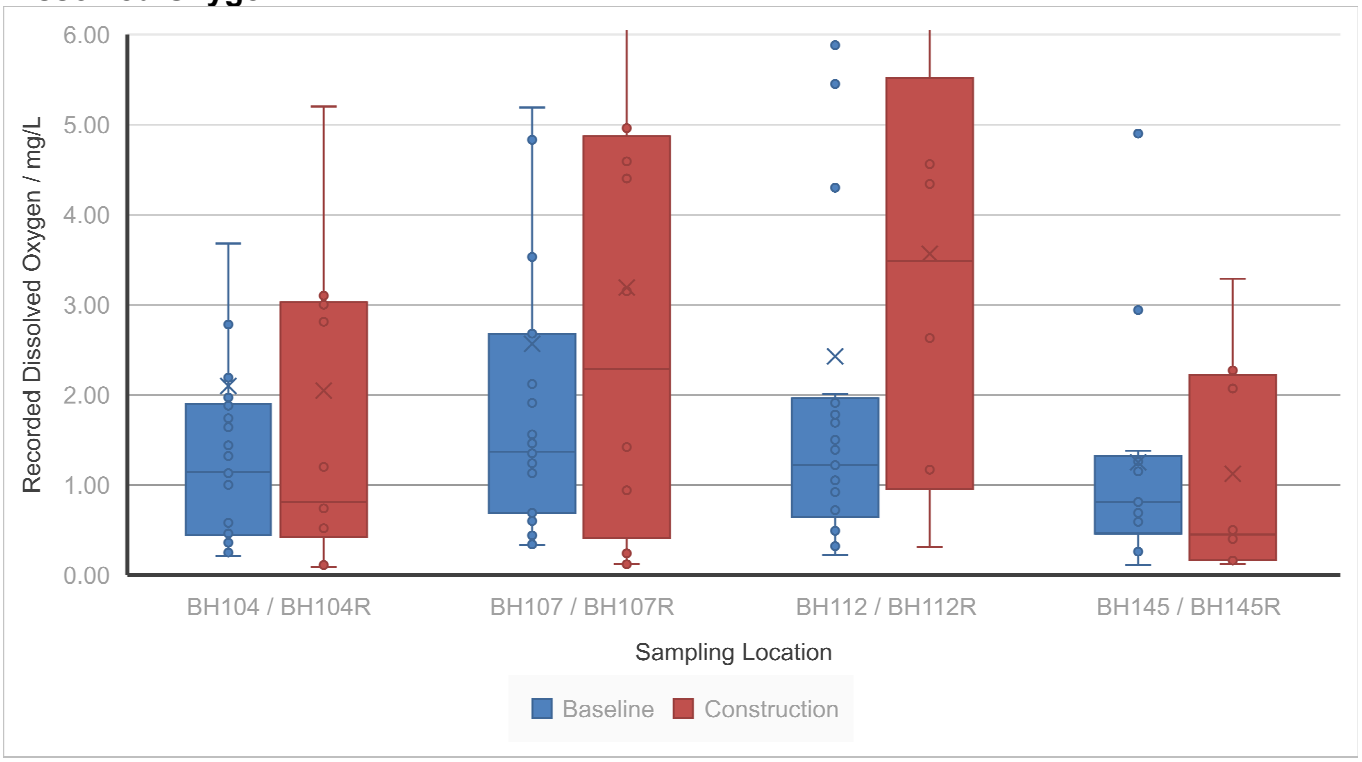


Figure 2 *Summary of field recorded electrical conductivity for the baseline and construction phases to September 2023*

Dissolved Oxygen



Note: Some outliers have been hidden

Figure 3 ***Summary of field recorded dissolved oxygen for the baseline and construction phases to September 2023***

Total Dissolved Solids

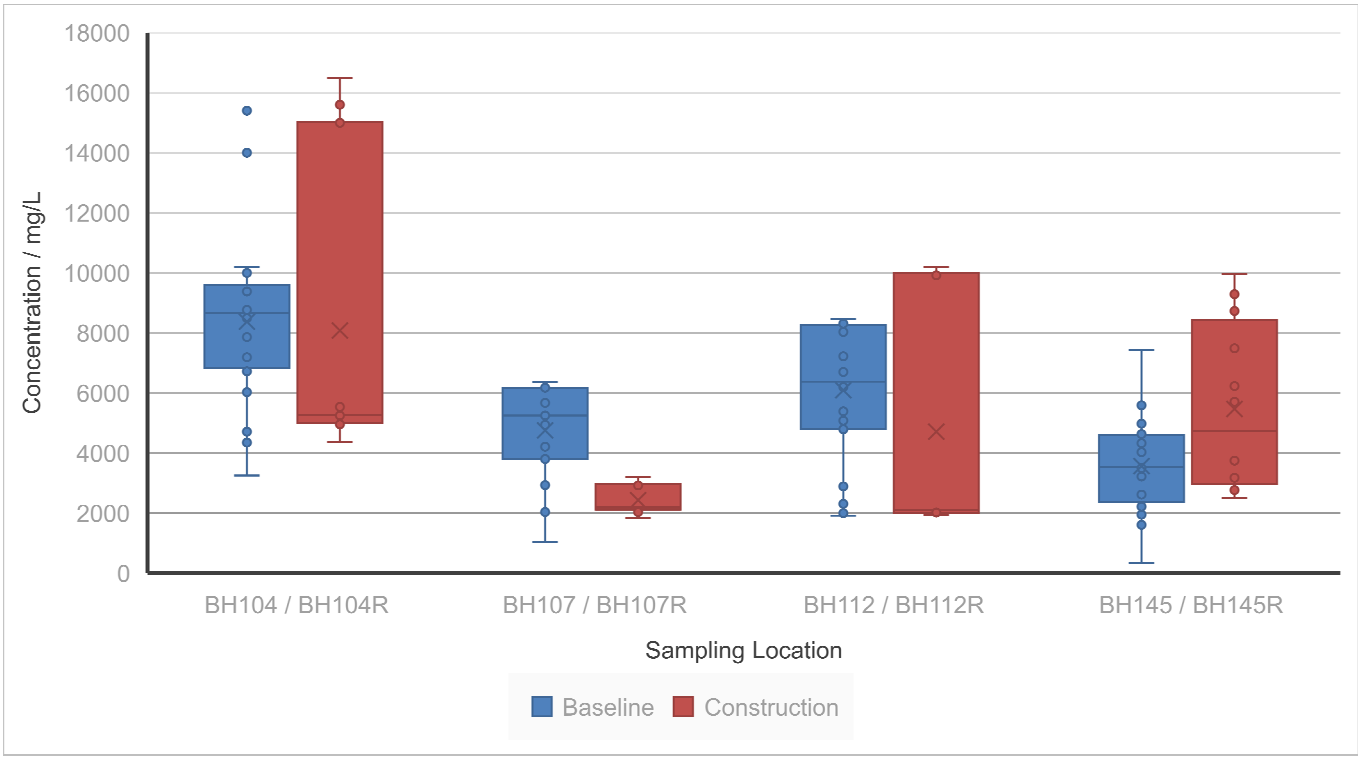
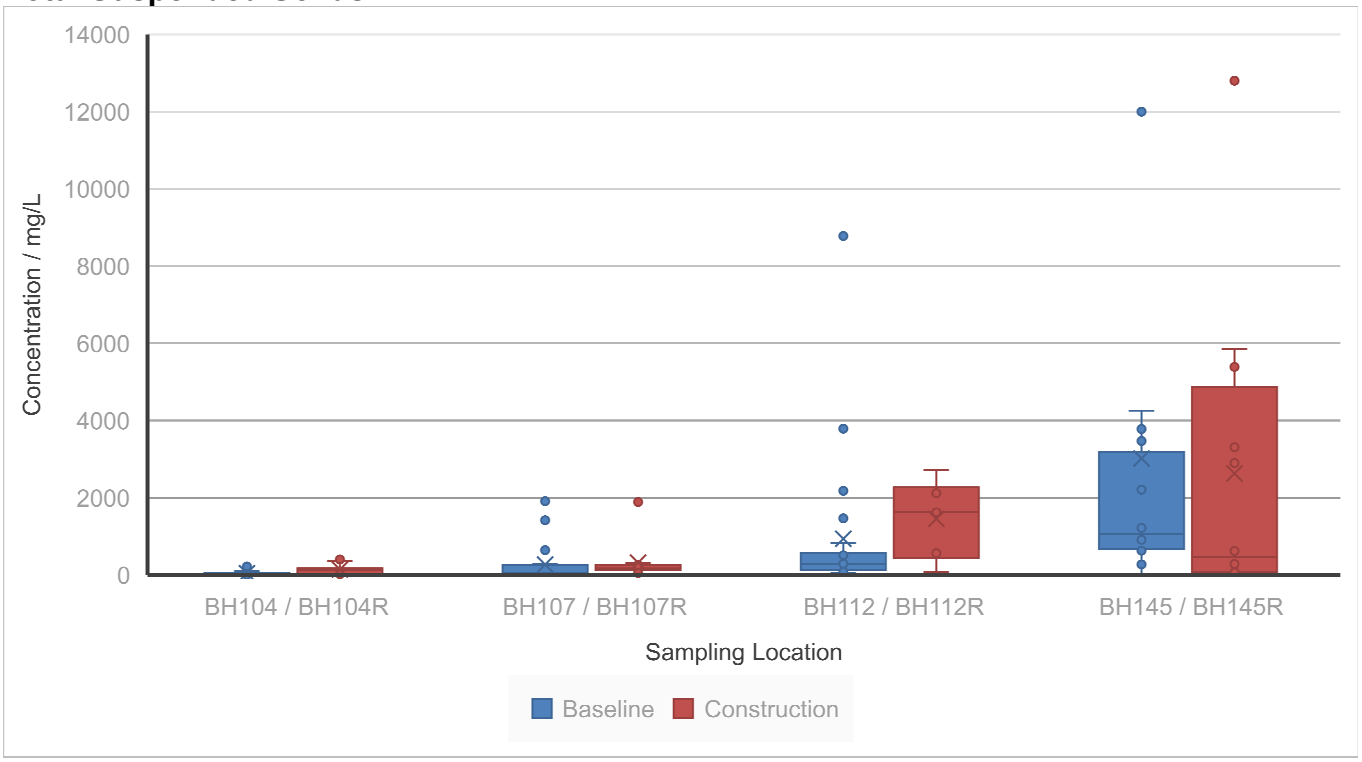


Figure 4 ***Summary of total dissolved solids concentrations for the baseline and construction phases to September 2023***

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 2023***

Ammonia

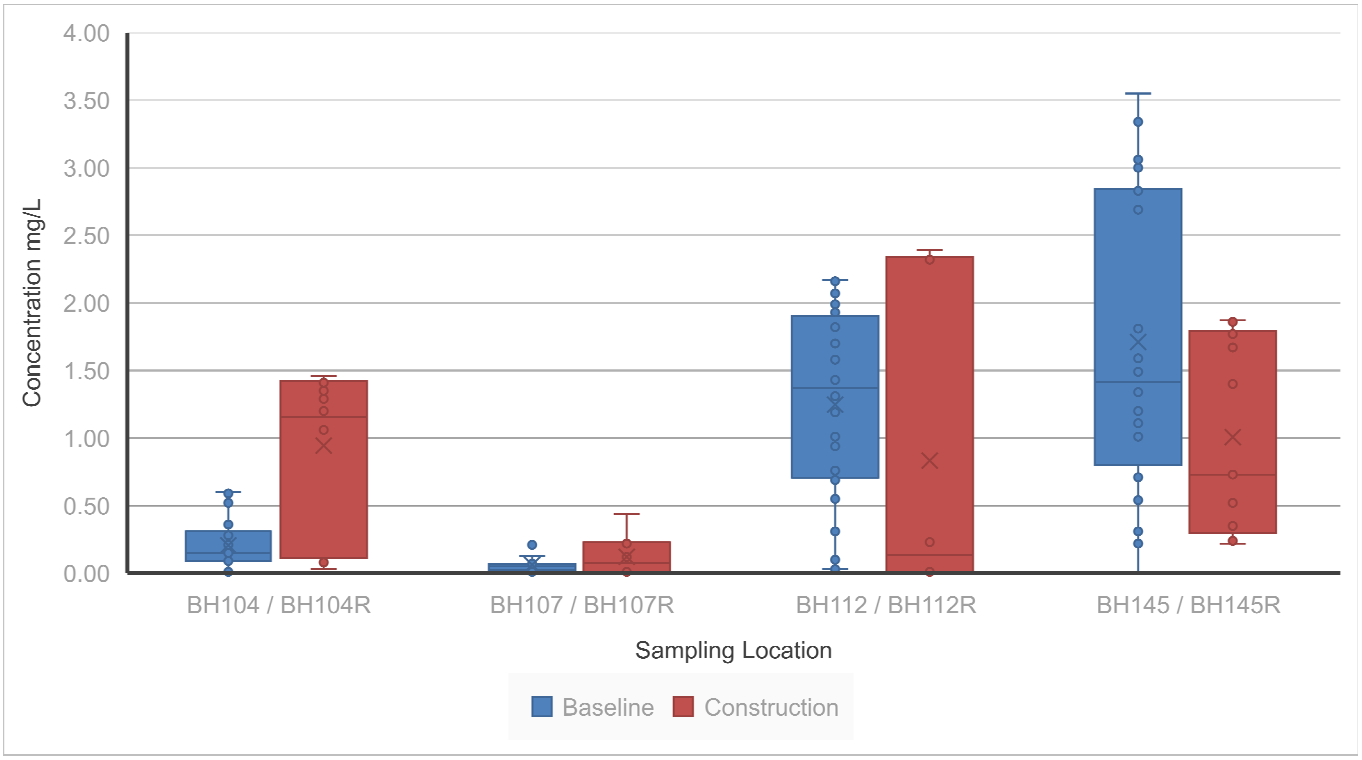


Figure 6 ***Summary of ammonia concentrations for the baseline and construction phases to September 2023***

Nitrate

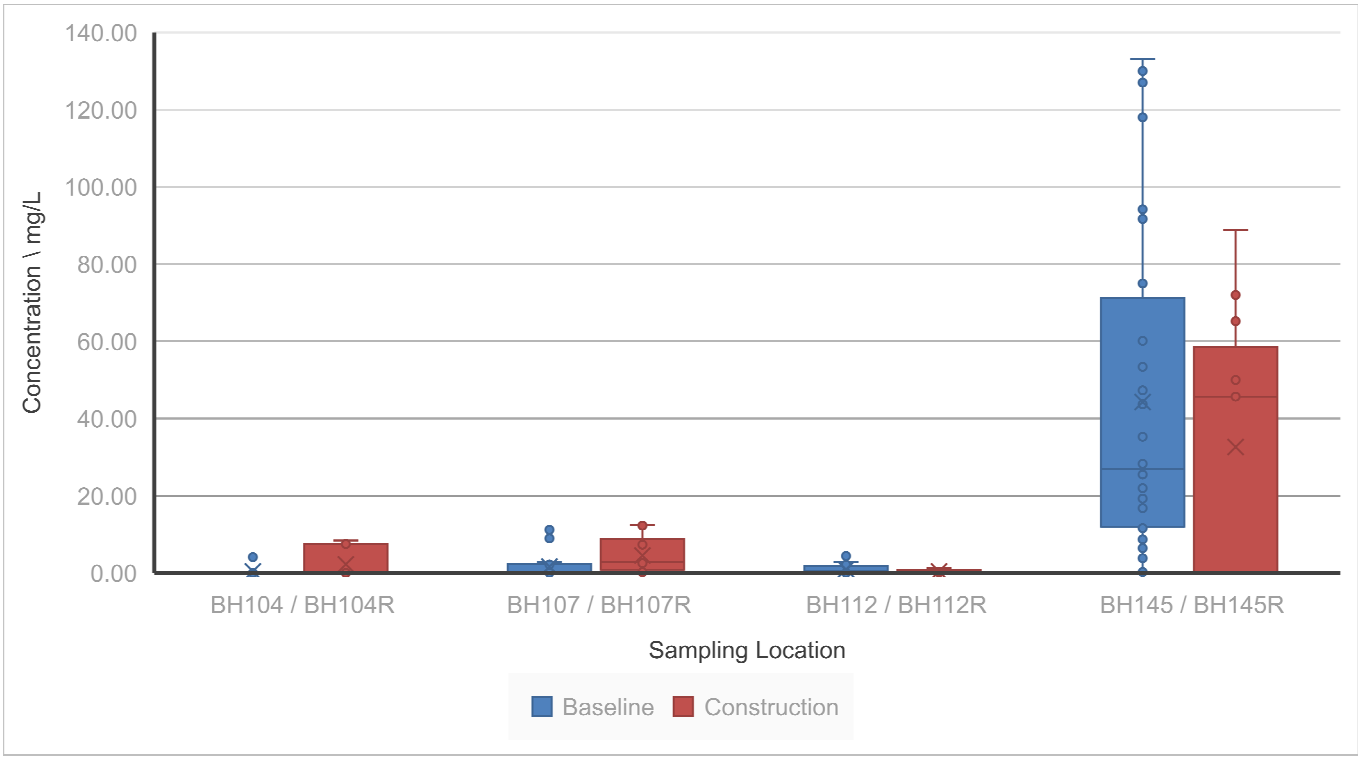


Figure 7 ***Summary of nitrate concentrations for the baseline and construction phases to September 2023***

Total Oxidised Nitrogen

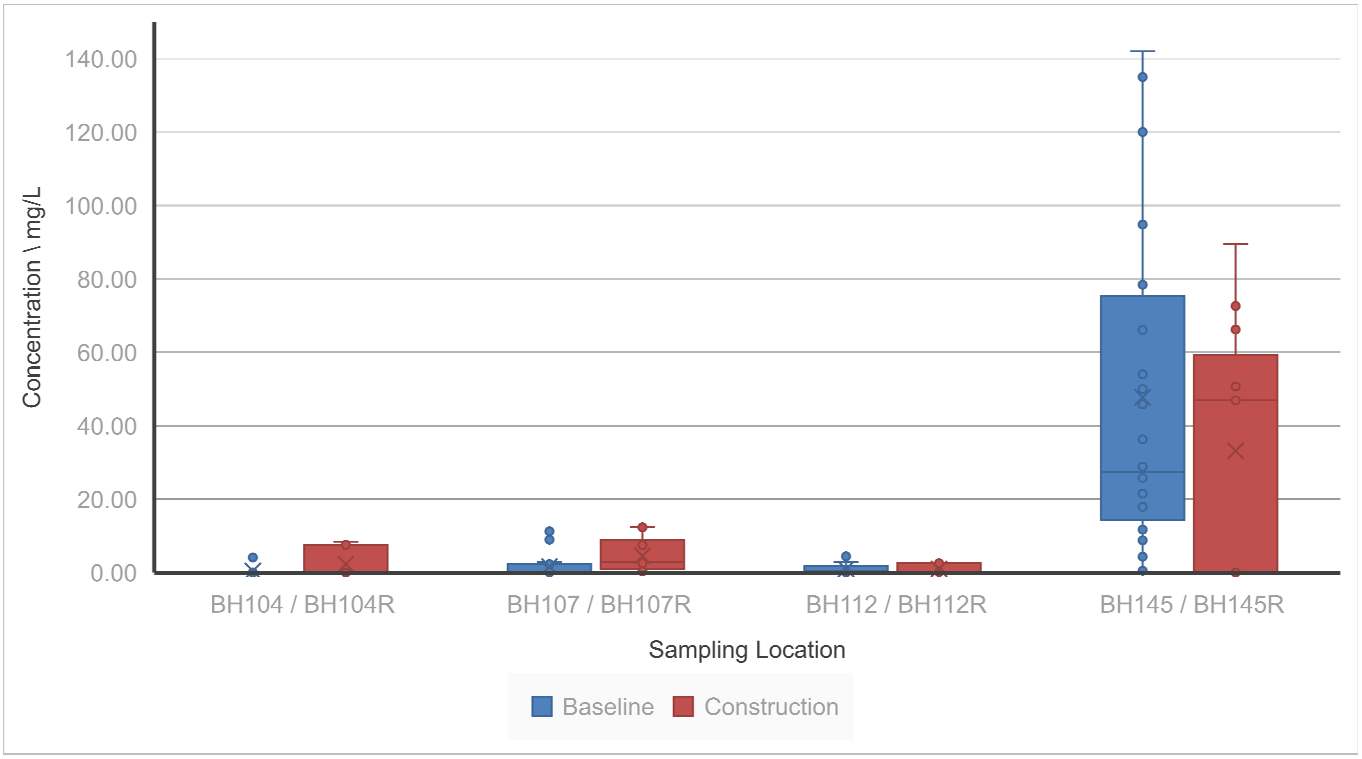


Figure 8 ***Summary of total oxidised nitrogen concentrations for the baseline and construction phases to September 2023***

Total Nitrogen

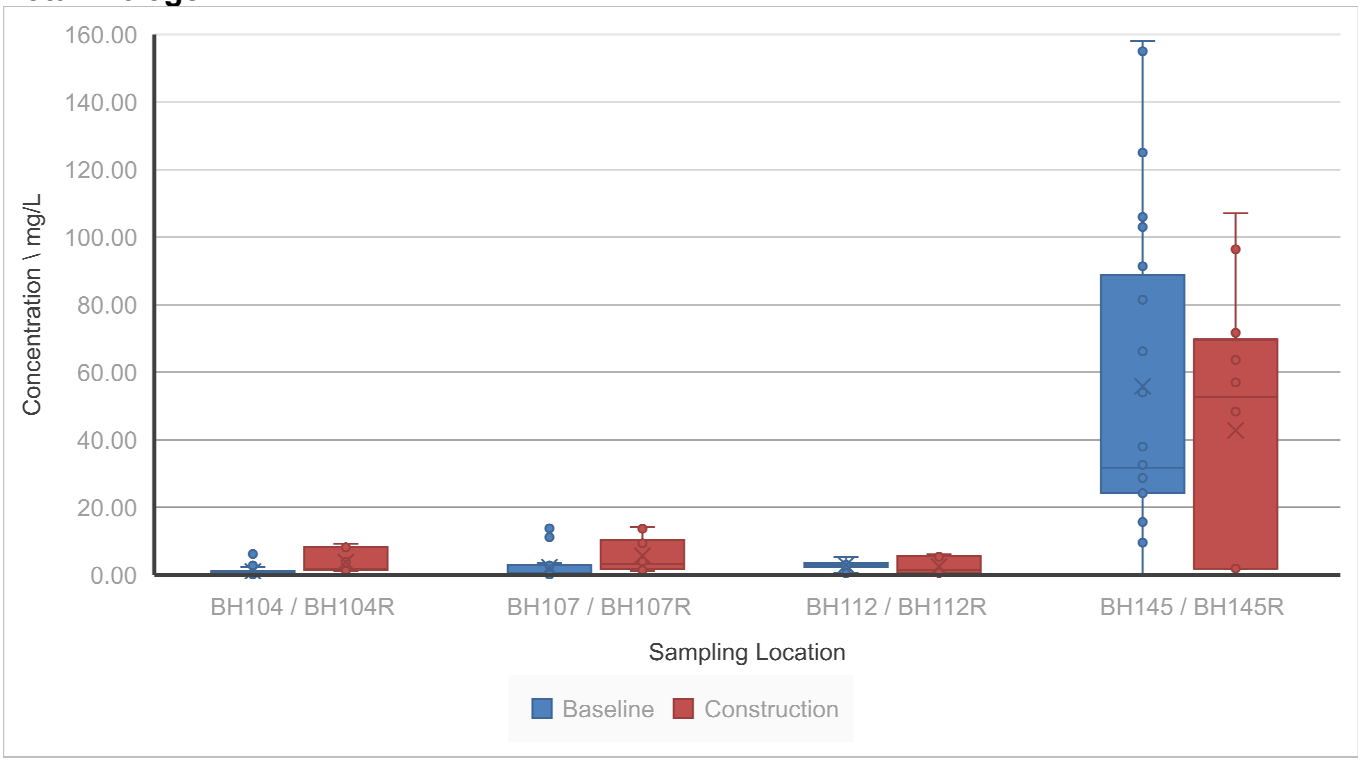
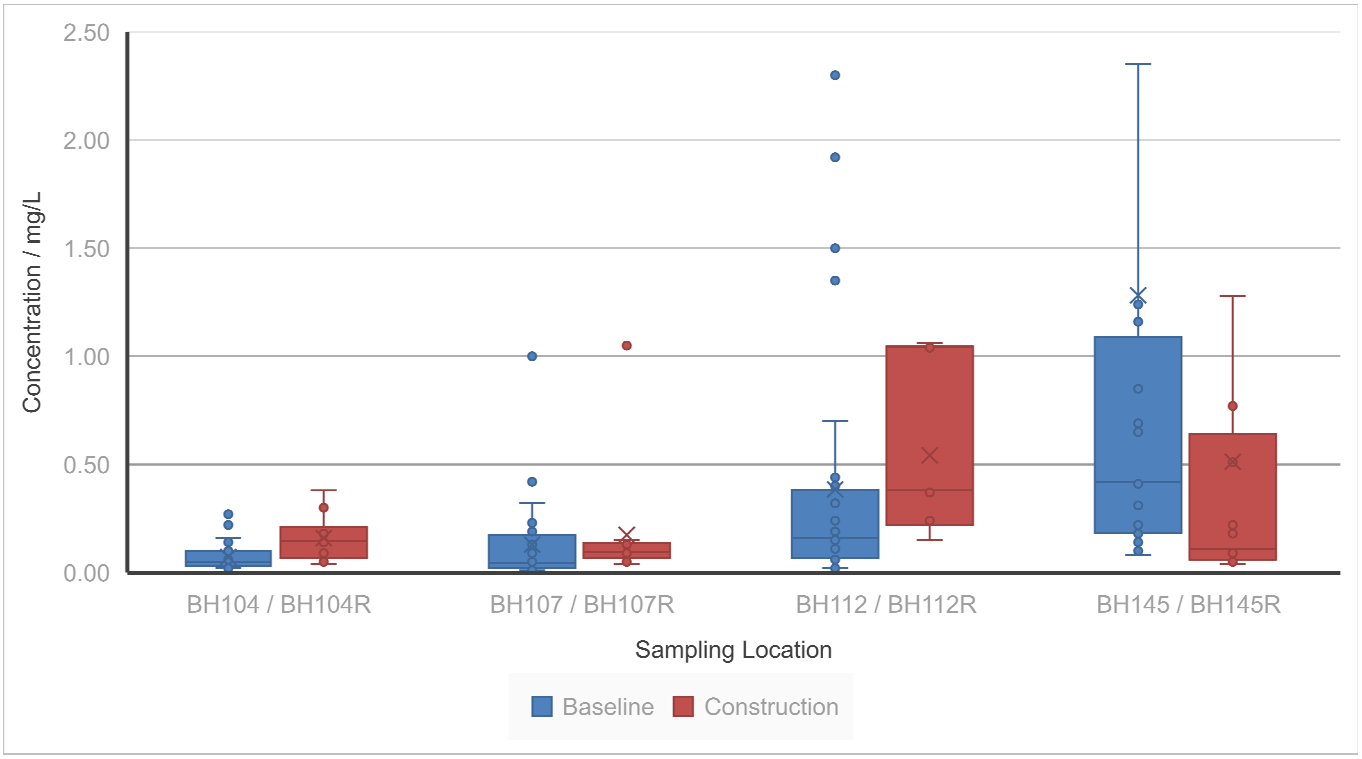


Figure 9 ***Summary of total nitrogen concentrations for the baseline and construction phases to September 2023***

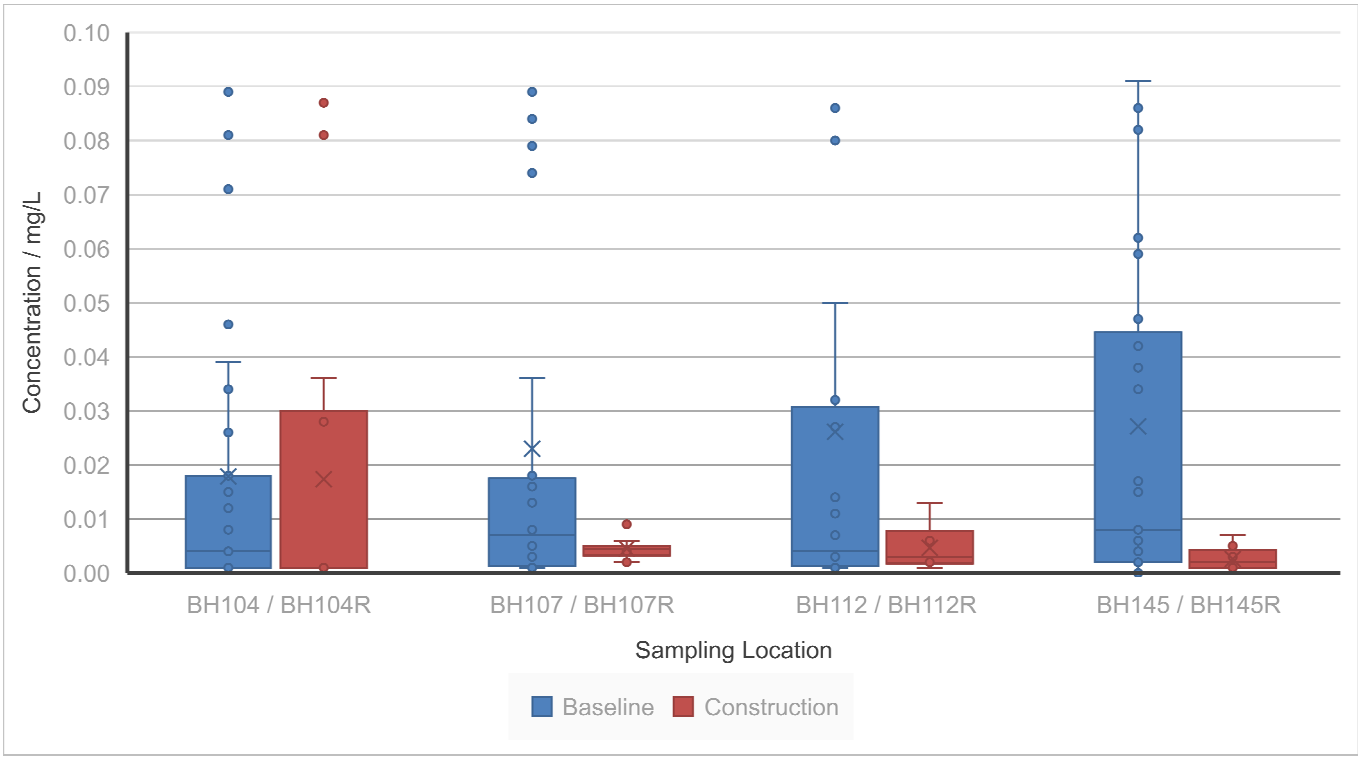
Phosphorus



Note: Some outliers have been hidden

Figure 10 ***Summary of phosphorus concentrations for the baseline and construction phases to September 2023***

Copper



Note: Some outliers have been hidden

Figure 11 ***Summary of copper concentrations for the baseline and construction phases to September 2023***

Manganese

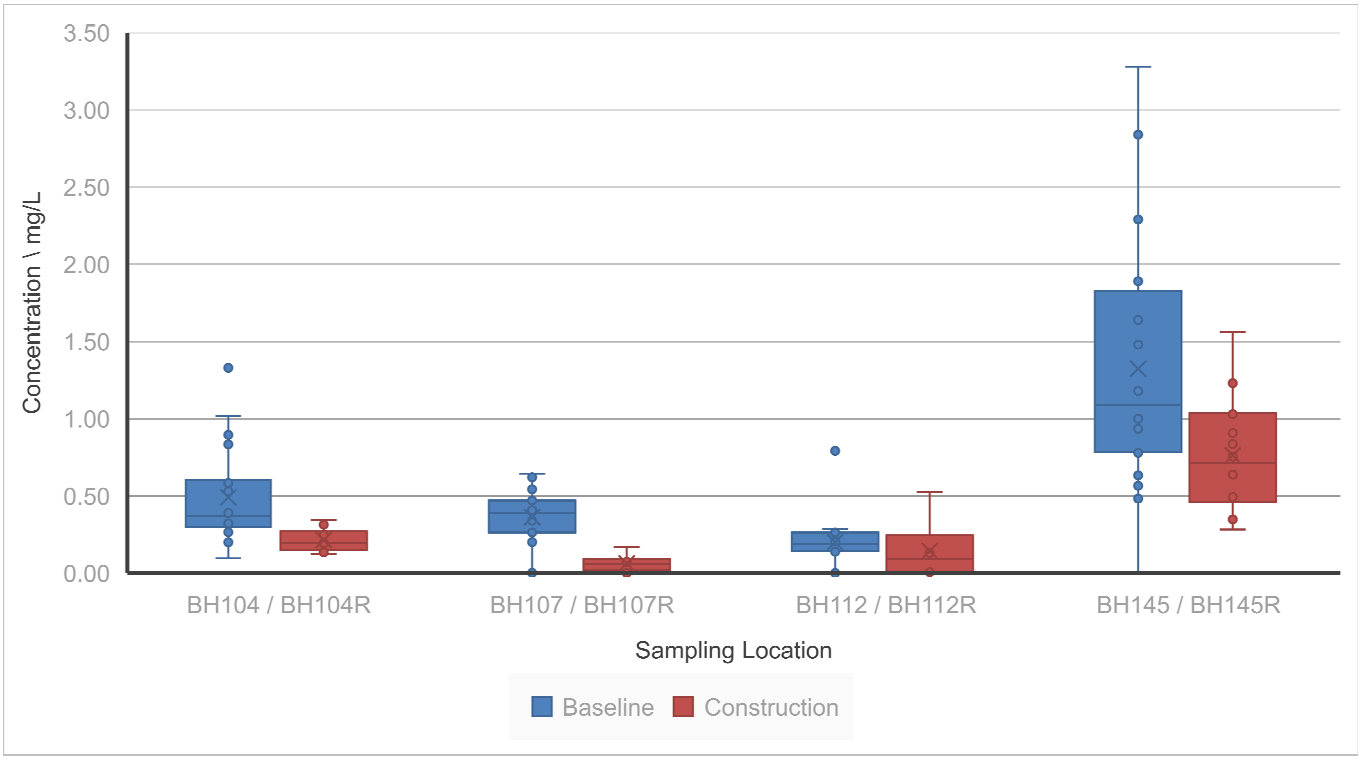


Figure 12 ***Summary of manganese concentrations for the baseline and construction phases to September 2023***

Appendix E

Calibration certificates

Oil / Water Interface Meter

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Instrument **Geotech Interface Meter (60M)**
Serial No. **3953**

Item	Test	Pass	Comments
Battery	Compartment	✓	Beeper noise is soft
	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: **Dom Ta**

Calibration date: **24/03/2023**

Next calibration due: **23/05/2023**

Oil / Water Interface Meter

Instrument: **Interface Meter (60M)**
Serial No: **483915**

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: **Dom Ta**

Calibration date: **21/04/2023**

Next calibration due: **20/06/2023**

Oil / Water Interface Meter

Instrument **Geotech Interface Meter (60m)**
Serial No. **3882**

airmet
Air Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
Tape Check Connectors	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: **Yu Jiang**

Calibration date: **03-May-23**

Next calibration due: **03-Jul-23**

Oil / Water Interface Meter

Instrument Geotech Interface Meter (60M)
Serial No. 3911

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity above 7.9v	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

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

Calibrated by: Guido Camera

Calibration date: 14/06/2023

Next calibration due: 13/08/2023

2/08/2023

Oil / Water Interface Meter

Instrument Geotech Interface Meter (60M)
Serial No. 5810

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: Guido Camera

Calibration date: 2/08/2023

Next calibration due: 1/10/2023

Oil / Water Interface Meter

Instrument Geotech Interface Meter (60m)
Serial No. 3961

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	8.84 V
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors			
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

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

Calibrated by: Guido Camera

Calibration date: 09-Aug-23

Next calibration due: 08-Oct-23

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, BH107, BH112 and BH145) 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 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 sample, 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 2023).

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)

Data quality indicator	Frequency	Data quality acceptance criteria
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
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 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-lavatory 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/BH104R – 4 April 2023
– GWDUP1/BH104R – 2 May 2023
– GWDUP1/BH145R – 9 June 2023
– GWDUP1/BH107R – 7 July 2023
– GWDUP1/BH104R – 9 August 2023
– GWDUP1/BH107R – 5 September 2023

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

– GWDUP2/BH107R – 5 April 203
– GWDUP2/BH107R – 2 May 2023
– GWDUP2/BH104R – 7 June 2023
– GWDUP2/BH104R – 7 July 2023
– GWDUP2/BH107R – 9 August 2023
– GWDUP2/BH104R – 5 September 2023

Nineteen primary samples were collected during the April 2023 to September 2023 monitoring period. It was considered that the number of duplicates collected was adequate (12/19 samples = 63%). 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 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 with the exception of the following:

– April 2023 event, BH145R was overdue by 4 days for nitrate and phosphorus.
– July 2023 event, BH104R and BH145R was overdue by 2 days for TDS and TSS

Due to a short holding time of 2 days, nitrate, phosphorus, TDS, and TSS samples were overdue from a delay in laboratory reporting. This delay is not expected to affect the usability of results due to the short delay period.

Matrix spikes

All matrix spike recovery results were reported within the laboratory limits (70% - 130%), with the exception of the following:

– May 2023 event for heavy metals in anonymous samples, 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 time the spike level. This occurred in the following events:

– April 2023 event for sulfate, chloride, and nitrite
– May 2023 event for sulfate and chloride
– June 2023 event for sulfate and chloride
– August 2023 event for chloride and phosphorus
– September 2023 event for sulfate, chloride, and nitrite

As all reported matrix recoveries were within laboratory limits during the monitoring period, or reported in anonymous samples, 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 (30%), with the exception of the following:

– Chromium during the April 2023 monitoring event

Frequency of quality control samples

A sufficient frequency of quality control samples was reported by the laboratory during the monitoring period with the exception of the following:

– TRH in April, May, June, July, August, and September 2023 events. Laboratory duplicate and matrix spike 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 duplicate 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.

Location Code			BH104R			BH107R			BH104R			BH107R			BH145R			BH104R		
Date			04 Apr 2023			04 Apr 2023	05 Apr 2023		02 May 2023			02 May 2023			06 Jun 2023			07 Jun 2023		
Field ID			BH104R	GWDUP1		BH107R	GWDUP2		BH104R	GWDUP1		BH107R	GWDUP2		BH145R	GWDUP1		BH104R	GWDUP2	
Sample Type			Normal	Field_D		Normal	Interlab_D		Normal	Field_D		Normal	Interlab_D		Normal	Field_D		Normal	Interlab_D	
Matrix Type			Water	Water		Water	Water		Water	Water		Water	Water		Water	Water		Water	Water	
Lab Report Number			ES2311426	ES2311426	RPD	ES2311426	979752	RPD	ES2314383	ES2314383	RPD	ES2314383	986190	RPD	ES2319027	ES2319027	RPD	ES2319027	997826	RPD
	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	0.012	0.010	18	0.001	0.002	67
Cadmium (filtered)	mg/L	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0002	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	<0.001	0	0.005	0.004	22	<0.001	<0.001	0	0.005	0.006	18	<0.001	<0.001	0	0.002	<0.001	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	0.014	0.012	15	0.006	0.005	18	0.004	0.004	0	0.010	0.008	22	0.002	0.002	0	0.003	0.002	40
Zinc (filtered)	mg/L	0.005	0.008	0.009	12	0.010	0.008	22	0.036	0.035	3	0.026	0.025	4	<0.005	<0.005	0	0.007	<0.005	33

Location Code			BH104R			BH107R			BH104R			BH107R			BH104R			BH107R		
Date			07 Jul 2023			07 Jul 2023			09 Aug 2023			09 Aug 2023			05 Sep 2023			05 Sep 2023		
Field ID			BH104R	GWDUP2		BH107R	GWDUP1		BH104R	GWDUP1		BH107R	GWDUP2		BH104R	GWDUP2		BH107R	GWDUP1	
Sample Type			Normal	Interlab_D		Normal	Field_D		Normal	Field_D		Normal	Interlab_D		Normal	Interlab_D		Normal	Field_D	
Matrix Type			Water	Water		Water	Water		Water	Water		Water	Water		Water	Water		Water	Water	
Lab Report Number			ES2322790	1006932	RPD	ES2322790	ES2322790	RPD	ES2326796	ES2326796	RPD	ES2326796	1015966	RPD	ES2330598	1024024	RPD	ES2330598	ES2330598	RPD
	Unit	EQL																		
Metals																				
Arsenic (filtered)	mg/L	0.001	0.002	0.002	0	<0.001	<0.001	0	<0.001	0.001	0	<0.001	<0.001	0	0.001	0.002	67	<0.001	<0.001	0
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	<0.0002	0	<0.0001	<0.0001	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	0.005	0.005	0	<0.001	<0.001	0	0.002	0.004	67	<0.001	<0.001	0	0.009	0.009	0
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	0.003	0.001	100	0.002	0.001	67	0.002	0.002	0	0.002	0.002	0	0.001	0.001	0	0.002	0.002	0
Zinc (filtered)	mg/L	0.005	<0.005	<0.005	0	0.012	0.007	53	0.012	0.014	15	0.006	0.006	0	0.005	<0.005	0	0.009	0.010	11

***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**

			TRIP BLANKS AND RINSATE BLANKS											
		Date	30 Mar 2023	05 Apr 2023	27 Apr 2023	02 May 2023	05 Jun 2023	07 Jun 2023	07 Jul 2023		01 Aug 2023	09 Aug 2023	04 Sep 2023	06 Sep 2023
		Field ID	Trip Blank	GWRB1	Trip blank	GWRB1	Trip Blank	GWRB1	GWRB1	Trip blank	Trip Blank	GWRB1	TRIP BLANK	GWRB1
		Sample Type	Trip_B	Rinsate	Trip_B	Rinsate	Trip_B	Rinsate	Rinsate	Trip_B	Trip_B	Rinsate	Trip_B	Rinsate
		Lab Report Number	ES2311426	ES2311426	ES2314383	ES2314383	ES2319027	ES2319027	ES2322790	ES2322790	ES2326796	ES2326796	ES2330598	ES2330598
	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	µg/L	1	<1	-	<1	-	<1	-	-	<1	<1	-	<1	-
Toluene	µg/L	2	<2	-	<2	-	<2	-	-	<2	<2	-	<2	-
Ethylbenzene	µg/L	2	<2	-	<2	-	<2	-	-	<2	<2	-	<2	-
Xylene (o)	µg/L	2	<2	-	<2	-	<2	-	-	<2	<2	-	<2	-
Xylene (m & p)	µg/L	2	<2	-	<2	-	<2	-	-	<2	<2	-	<2	-
Xylene Total	µg/L	2	<2	-	<2	-	<2	-	-	<2	<2	-	<2	-
BTEX (Sum of Total) - Lab Calc	µg/L	1	<1	-	<1	-	<1	-	-	<1	<1	-	<1	-
TRH - NEPM 2013														
F1 (C6-C10 minus BTEX)	µg/L	20	<20	-	-	-	<20	-	-	<20	-	-	<20	-
C6-C10 Fraction	µg/L	20	<20	-	-	-	<20	-	-	<20	-	-	<20	-
TRH - NEPM 1999														
C6-C9 Fraction	µg/L	20	<20	-	-	-	<20	-	-	<20	-	-	<20	-

Trip Spike Recoveries. User defined limits between 70% and 130% have been adopted for non-compliance.

	TRIP SPIKE RECOVERY (%S)					
	13 Apr 2023	04 May 2023	08 Jun 2023	12 Jul 2023	12 Aug 2023	08 Sep 2023
	Trip Spike	Trip Spike	Trip Spike	Trip Spike	Trip Spike	Trip Spike
	Trip_S	Trip_S	Trip_S	Trip_S	Trip_S	Trip_S
	ES2311426	ES2314383	ES2319027	ES2322790	ES2326796	ES2330598
Metals						
Arsenic	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-
Chromium (III+VI)	-	-	-	-	-	-
Copper	-	-	-	-	-	-
Lead	-	-	-	-	-	-
Mercury	-	-	-	-	-	-
Nickel	-	-	-	-	-	-
Zinc	-	-	-	-	-	-
BTEXN						
Benzene	75	85	80	90	70	85
Toluene	80	80	80	90	90	95
Ethylbenzene	80	85	75	85	80	90
Xylene (o)	85	90	85	90	95	100
Xylene (m & p)	80	85	75	85	85	105
Xylene Total	82.5	87.5	80	87.5	90	102.5
BTEX (Sum of Total) - Lab Calc	80	85	79	88	84	95
TRH - NEPM 2013						
F1 (C6-C10 minus BTEX)	-	-	-	-	-	-
C6-C10 Fraction	-	-	-	-	-	-
TRH - NEPM 1999						
C6-C9 Fraction	-	-	-	-	-	-

Trip Spike Recoveries. User defined limi

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):**	9.367 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / T. Nham	**Flow Cell:**	**Pump Depth:** 15 m	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	04-04-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	18.150 m	**Well Cap Secure?**	Yes
Round	April 2023	**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*	
10:00	2.0	20.3	6.89	5414.0	0.83	8.9	9.660	Yellow tinge, cloudy, no odour/sheen.
10:04	3.0	20.4	6.86	5407.0	0.41	4.6	9.780	
10:08	4.0	20.0	6.72	5280.0	0.27	7.9	9.830	
10:12	5.0	19.7	6.71	5190.0	0.18	15.3	10.020	" "
10:16	6.0	19.7	6.78	5157.0	0.16	20.4	10.080	
10:20	7.0	19.6	6.82	5130.0	0.15	19.6	10.150	
10:24	8.0	19.5	6.86	5095.0	0.14	19.5	10.230	
10:28	9.0	19.5	6.89	5049.0	0.13	19.5	10.240	" " Parameters stable, samples collected.

Field QA Checks:		Analyte	Collected	Analyte	Collected		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***No***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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

GWDUP1 collected (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):**	7.110 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / T. Nham	**Flow Cell:**	**Pump Depth:**	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	04-04-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	14.500 m	**Well Cap Secure?**	Yes
Round	April 2023	**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*	
11:20	1.0	19.9	6.88	2663.0	0.60	46.4	7.600	Brown, turbid, no odour/sheen.
11:23	2.0	19.5	7.39	2615.0	0.56	42.8	7.860	
11:26	3.0	19.6	7.55	2579.0	0.30	38.3	8.220	
11:29	4.0	19.4	7.56	2573.0	0.25	37.6	8.380	
11:32	5.0	19.3	7.57	2565.0	0.28	37.3	8.790	Clear, no odour/sheen.
11:35	6.0	19.3	7.61	2549.0	0.25	37.1	9.080	
11:38	7.0	19.4	7.66	2542.0	0.24	36.9	9.450	Parameters stable, samples collected.

Field QA Checks:		Analyte	Collected	Analyte	Collected		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***No***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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

GWDUP2 collected (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:**		**SWL(mbTOC):**	m	**Logic Check:**	
Project:	M12 Motorway	**Sample Method:**		**Screen: From**	**to**		**m**
Proj. No.:	12554717	**WQ Meter Type:**		**NAPL Check:**		**Stick Up:**	**m**
Sampler:	E. Smith / T. Nham	**Flow Cell:**	**Pump Depth:**	**Ref.datum:**	TOC	**Bore Diam.:**	**mm**
Date:	04-04-23	**WLevel Meter Type:**		**Bore Depth:**	m	**Well Cap Secure?**	
Round	April 2023	**Field Filtered?**					

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*	
								Well inaccessible as per previous rounds.

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*		*VOCs*		*Duplicate collected?*	
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*		*TRH*			
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*		*PFAS*		*# Bottles collected*	
COC updated?	Yes	*Dissolved metals*		*Total metals*			

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: BH145

Job Information		*Sampling Information*		*Bore Information*			
Client:	Transport for NSW	**Purge Method:**		**SWL(mbTOC):**	m	**Logic Check:**	
Project:	M12 Motorway	**Sample Method:**		**Screen: From**	**to**	m	
Proj. No.:	12554717	**WQ Meter Type:**		**NAPL Check:**		**Stick Up:**	m
Sampler:	E. Smith / T. Nham	**Flow Cell:**	**Pump Depth:**	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	05-04-23	**WLevel Meter Type:**		**Bore Depth:**	m	**Well Cap Secure?**	
Round	April 2023	**Field Filtered?**					

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*	
								This well is no longer used for sampling.
								Data logger removed from this well and placed into BH145R

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*		*VOCs*		*Duplicate collected?*	
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*		*TRH*			
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*		*PFAS*		*# Bottles collected*	
COC updated?	Yes	*Dissolved metals*		*Total metals*			

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

GWDUP1 collected (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):**	11.920 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / T. Nham	**Flow Cell:**	**Pump Depth:** 18.5 m	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	05-04-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	19.950 m	**Well Cap Secure?**	Yes
Round	April 2023	**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*	
10:21	1.0	19.1	6.79	3310.0	0.66	-128.8	11.980	Pale brown tinge, somewhat cloudy, no odour/sheen.
10:24	2.0	18.9	7.44	3460.0	0.35	-140.5	11.980	
10:27	3.0	18.6	7.50	3573.0	0.25	-146.0	11.980	Stable SWL. " "
10:30	4.0	18.6	7.51	3614.0	0.22	-147.9	12.000	
10:33	5.0	18.6	7.54	3682.0	0.21	-149.8	12.020	Clear, no odour/sheen.
10:36	6.0	18.6	7.53	3737.0	0.10	-151.2	12.040	
10:39	7.0	18.6	7.54	3815.0	0.17	-152.6	12.080	" ". Parameters stable, samples collected.
								Logger depth at 19 m
								Logger placed in well, SWL measured 11.966m at 11:29am

Field QA Checks:		Analyte	Collected	Analyte	Collected		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***No***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***No***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***6***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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

First time sampling newly drilled well as replacement to BH145. Data logger moved from BH145 on this date to BH145R

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: 04-04-2023 to 05-04-2023
Time:
Sampler: E. Smith / T. Nham

Well ID	Date	Accessible?	SWL (mbTOC)	BOC (mbTOC)	Data logger present?	Data logger brand type	Data logger downloaded?	Comment
BH102	04-04-23	No	-	-	-	-	-	Well destroyed, not located. Scrapers have cleared the area.
BH104R*	04-04-23	Yes	9.367	18.150	Y	HOBO	Y	
BH107R*	04-04-23	Yes	17.110	14.500	Y	HOBO	Y	
BH112R*	04-04-23	No	-	-	-	-	-	Well still inaccessible as per previous rounds.
BH145	05-04-23	Yes	-	-	Y	HOBO	Y	Logger removed and placed in BH145R.
BH145R	05-04-23	Yes	11.920	19.950	-	-	-	Replacement well.
BH155	04-04-23	Yes	DRY	-	N	-	-	DRY
BH162	04-04-23	Yes	5.580	18.220	Y	HOBO	Y	
BH170	04-04-23	No	-	-	-	-	-	Not located.
BH175	04-04-23	Yes	3.812	18.020	Y	HOBO	N	Data logger failed to be read by computer, same as in February round.
BH219	05-04-23	Yes	0.685	18.280	Y	HOBO	Y	

* BH104, BH107 and BH112 destroyed November 2022 and replacement wells BH104R, BH107R and BH112R are now in use.
* BH145 is no longer in use as of this month (April 2023) and replacement well BH145R is available for sampling.

Purging and Sampling Record

Bore ID: BH104R

Job Information		Sampling Information		Bore Information			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	9.440 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	NA m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	Yes	**Pump Depth:**	17 m	**Ref.datum:**	TOC
Date:	02-05-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	18.155 m	**Bore Diam.:**	50 mm
Round	May 2023	**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*	
8:08	2.0	18.2	6.54	8363	7.58	28.1	9.410	Brown grey, cloudy, no sediment, no odour, no sheen,
8:11	3.0	18.6	6.53	8308	5.60	9.8	9.660	Pale grey, slightly cloudy, no sediment, no odour, no sheen
8:14	4.0	18.6	6.52	8250	6.52	7.3	9.740	
8:17	5.0	18.7	6.52	8258	6.52	6.5	9.710	DO is unusally high, confirmed readings
8:20	6.0	18.6	6.51	8221	6.51	6.1	9.760	
8:23	7.0	18.7	6.46	8135	2.16	-3.8	9.810	
8:26	8.0	18.7	6.53	8138	3.55	-4.0	9.840	
8:29	9.0	18.8	6.53	8108	3.58	-4.0	9.860	Good recharge
8:32	10.0	18.8	6.52	8072	3.10	-7.0	9.920	Mostly clear, no sediment, slight organic odour, no sheen.
								Samples collected.

Field QA Checks:		Analyte	Collected	Analyte	Collected		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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):**	7.150 **m**	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	**to**		**m**
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	NA **m**
Sampler:	E. Smith / A. Duval	**Flow Cell:**	Yes	**Pump Depth:**	13.1 m	**Ref.datum:**	TOC
Date:	02-05-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	14.490 **m**	**Bore Diam.:**	50 **mm**
Round	May 2023	**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*	
9:35	2.0	18.8	6.80	3238	2.65	41.9	7.680	Clear, no sediment, no odour, no sheen
9:38	3.0	18.7	6.80	3219	4.45	73.6	8.350	
9:41	4.0	18.8	6.80	3205	5.30	86.9	8.780	
9:44	5.0	18.8	6.81	3177	6.29	99.4	9.210	Poor recharge
9:47	6.0	18.8	6.81	3144	6.67	106.3	9.520	
9:50	7.0	18.8	6.82	3088	7.30	109.9	9.850	DO also unusually high in this well, potential YSI error.
9:53	8.0	18.8	6.83	3023	7.73	115.3	10.310	Parameters stable excluding DO, samples collected.
								Clear, no sediment, no odour, no sheen

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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:**		**SWL(mbTOC):**	m	**Logic Check:**	
Project:	M12 Motorway	**Sample Method:**		**Screen: From**	**to**		**m**
Proj. No.:	12554717	**WQ Meter Type:**		**NAPL Check:**	not present	**Stick Up:**	NA **m**
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:**	**Ref.datum:**	TOC	**Bore Diam.:**	50 **mm**
Date:	02-05-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	m	**Well Cap Secure?**	Yes
Round	May 2023	**Field Filtered?**					

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*	
								No access as per previous rounds

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*		*VOCs*		*Duplicate collected?*	
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*		*TRH*			
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*		*PFAS*		*# Bottles collected*	
COC updated?	Yes	*Dissolved metals*		*Total metals*			

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):**	12.030 **m**	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	**to** **m**		
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	NA **m**
Sampler:	E. Smith / A. Duval	**Flow Cell:** Yes	**Pump Depth:** 18.23	**Ref.datum:**	TOC	**Bore Diam.:**	50 **mm**
Date:	02-05-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	19.920 **m**	**Well Cap Secure?**	Yes
Round	May 2023	**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*	
1:27	1.0	19.6	6.61	10335	2.02	-94.2	12.100	Mostly clear, some grey sediment load, no sheen, no odour
1:30	1.5	19.1	6.60	10228	0.44	-109.8	12.140	
1:32	3.0	19.0	6.60	10217	0.31	-114.7	12.130	Great recharge
1:34	4.5	19.0	6.60	10213	0.24	-118.2	12.140	
1:36	6.0	19.0	6.60	10201	0.21	-121.7	12.150	Clear, no sediment
1:38	7.5	19.0	6.60	10239	0.35	121.0	12.160	
1:40	9.0	19.0	6.61	10263	0.47	-120.0	12.180	pale grey tinge, unidentified odour
1:42	10.5	18.9	6.61	10273	0.50	-120.0	12.160	Parameters stable, samples collected.

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***No***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***6***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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):**	9.850 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:** 16.3 m	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	07-06-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	18.150 m	**Well Cap Secure?**	Yes
Round	June 2023	**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*	
12:03	1.0	20.2	6.77	9690	1.76	42.8	10.100	Slightly grey, turbid, some sediment, no odour, no sheen
12:06	2.0	20.2	6.75	9701	1.31	43.7	10.130	
12:09	3.0	20.1	6.75	9701	2.19	41.5	10.190	
12:12	4.0	19.9	6.76	9689	2.71	43.1	10.280	Slightly grey, slightly turbid, no sediment, no odour, no sheen
12:15	5.0	20.4	5.82	9637	6.01	46.7	10.350	
12:18	6.0	20.5	6.83	9621	6.84	48.2	10.380	
12:21	7.0	20.1	6.85	9589	6.44	47.5	10.400	Clear, no odour, no sediment, no sheen
12:24	8.0	20.1	6.84	9563	5.74	42.1	10.450	
12:27	9.0	20.3	6.84	9529	5.43	39.4	10.480	
12:30	10.0	20.2	6.84	9530	5.61	36.9	10.510	
12:33	11.0	20.1	6.84	9508	5.20	32.2	10.520	Parameters stable, samples collected.

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?		*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?		*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?		*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?		*Dissolved metals*	***Yes***	*Total metals*	***No***		

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

GWDUP2 (Eurofins metals) 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:**		**SWL(mbTOC):**	m	**Logic Check:**	
Project:	M12 Motorway	**Sample Method:**		**Screen: From**	**to**	m	
Proj. No.:	12554717	**WQ Meter Type:**		**NAPL Check:**		**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:**	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	07-06-23	**WLevel Meter Type:**		**Bore Depth:**	m	**Well Cap Secure?**	
Round	June 2023	**Field Filtered?**					

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*	
								CPB determined no safe access across alignment from
								southern side to northern side where BH107R is located

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?		*Non-filtered inorganics*		*VOCs*		*Duplicate collected?*	
Decontamination as per GHD procedure?		*Preserved inorganics*		*TRH*			
Was sampling equipment pre-cleaned?		*Semi-VOCs*		*PFAS*		*# Bottles collected*	
COC updated?		*Dissolved metals*		*Total metals*			

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:**		**SWL(mbTOC):**	21.040 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**		**Screen: From**	to	m	
Proj. No.:	12554717	**WQ Meter Type:**		**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:**	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	07-06-23	**WLevel Meter Type:**		**Bore Depth:**	21.095 m	**Well Cap Secure?**	
Round	June 2023	**Field Filtered?**					

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*	
								Replacement well of replacement well BH112R.
								Drilled yesterday by Matrix Drilling, supervised by ADE
								Drilled using air hammer, well installed, not developed due to
								lack of water in well.
								Well measured as Dry by GHD today.

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?		*Non-filtered inorganics*		*VOCs*		*Duplicate collected?*	
Decontamination as per GHD procedure?		*Preserved inorganics*		*TRH*			
Was sampling equipment pre-cleaned?		*Semi-VOCs*		*PFAS*		*# Bottles collected*	
COC updated?		*Dissolved metals*		*Total metals*			

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):**	11.980 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:** 19 m	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	06-06-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	19.930 m	**Well Cap Secure?**	Yes
Round	June 2023	**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*	
12:45	1.0	18.5	6.94	12777	0.83	-98.9	12.040	Grey, turbid, moderate sediment load, no sheen, organic odour
12:48	2.0	18.4	6.94	12779	0.49	-115.9	12.040	
12:50	3.0	18.4	6.94	12762	0.38	-122.6	12.060	
12:52	4.0	18.4	6.94	12784	0.27	-128.7	12.070	
12:54	5.0	18.4	6.94	12766	0.25	-132.2	12.060	" "
12:56	6.0	18.4	6.94	12744	0.22	-136.4	12.080	
12:58	7.0	18.4	6.94	12744	0.21	-137.8	12.090	
13:00	8.0	18.4	6.93	12753	0.19	-139.4	12.090	
13:02	9.0	18.3	6.93	12800	0.17	-141.7	12.110	
13:04	10.0	18.3	6.93	12819	0.17	-142.3	12.110	Mostly clear, organic odour, no sediment, no sheen
13:06	11.0	18.3	6.93	12863	0.16	-143.0	12.130	Paramaters stable, samples collected

Field QA Checks:		Analyte	Collected	Analyte	Collected		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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

GWDUP1 ALS Metals 1 bottle

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: 06-06-2023 - 07-06-2023
Time:
Sampler: E. Smith / A. Duval

Well ID	Date	Accessible?	SWL (mbTOC)	BOC (mbTOC)	Data logger present?	Data logger brand type	Data logger downloaded?	Comment
BH104R*	07-06-23	Yes	9.850	18.150	Yes	HOBO	Yes	
BH107R*	07-06-23	No	-	-	-	-	-	
BH112R*	07-06-23	Yes	-	-	-	-	-	Newly drilled replacement well, measured as dry.
BH145R	06-06-23	Yes	11.980	19.930				
BH155	06-06-23	Yes	-	-	-	-	-	DRY
BH162	06-06-23	Yes	5.615	18.180	Yes	HOBO	Yes	
BH170	06-06-23	Not located	-	-	-	-	-	
BH175	06-06-23	Yes	4.180	18.020	Yes	HOBO	No	Logger could not be downloaded as per previous rounds, likely dead logger
BH219	06-06-23	Yes	0.300	18.260	Yes	HOBO	Yes	

* BH104, BH107 and BH112 destroyed November 2022 and replacement wells BH104R, BH107R and BH112R are now in use.
* BH145 is no longer in use as of this month (April 2023) and replacement well BH145R is available for sampling.

Purging and Sampling Record

Bore ID: BH104R

Job Information		Sampling Information		Bore Information			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	10.330 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:** 16.2 m	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	05-07-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	18.170 m	**Well Cap Secure?**	Yes
Round	July 2023	**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*	
10:21	1.0	18.6	6.76	8371	1.12	111.7	10.730	Clear, no odour, no sheen, no sediment
10:24	2.0	18.7	6.76	8376	0.74	124.0	10.840	
10:27	3.0	18.8	6.76	8368	0.41	113.6	11.000	
10:30	4.0	18.6	6.77	8289	0.29	92.0	11.120	Clear, no odour, no sheen, no sediment
10:33	5.0	18.6	6.77	8257	0.24	81.9	11.180	
10:36	6.0	18.8	6.79	8244	0.18	67.3	11.280	
10:39	7.0	18.8	6.78	8247	0.16	64.2	11.330	
10:42	8.0	18.9	6.79	8199	0.14	57.2	11.400	Clear, no odour, no sheen, no sediment
10:45	9.0	18.9	6.80	8174	0.12	47.8	11.440	
10:48	10.0	18.9	6.80	8110	0.11	38.4	11.480	Parameters stable, samples colldcted.

Field QA Checks:		Analyte	Collected	Analyte	Collected		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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):**	7.450 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:** 12.5 m	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	05-07-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	14.490 m	**Well Cap Secure?**	Yes
Round	July 2023	**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*	
8:47	1.0	17.2	7.17	3306	2.23	101.4	7.920	Clear, no odour, no sheen, no sediment
8:51	2.0	17.8	7.17	3341	0.85	171.8	8.350	
8:55	3.5	17.9	7.17	3323	0.52	253.2	8.650	
8:59	5.0	18.0	7.17	3303	0.39	131.8	8.930	
9:03	6.5	17.9	7.16	3197	0.25	290.6	9.420	
9:07	8.0	17.9	7.15	2965	0.24	370.7	9.940	
9:11	9.5	17.9	7.15	2864	0.30	393.6	10.180	
9:15	11.0	18.0	7.16	2731	0.55	414.4	10.650	
9:19	12.5	18.0	7.19	2582	1.02	428.3	11.050	
9:23	14.0	18.1	7.20	2568	1.42	440.1	11.460	Poor recharge, samples collected

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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:**		**SWL(mbTOC):**	12.000 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**		**Screen: From**	to	m	
Proj. No.:	12554717	**WQ Meter Type:**		**NAPL Check:**		**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:**	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	05-07-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	21.090 m	**Well Cap Secure?**	
Round	July 2023	**Field Filtered?**					

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*	
								Well not developed at this stage.
								Presence of water alerted to CPB and well to be developed

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?		*Non-filtered inorganics*		*VOCs*		*Duplicate collected?*	
Decontamination as per GHD procedure?		*Preserved inorganics*		*TRH*			
Was sampling equipment pre-cleaned?		*Semi-VOCs*		*PFAS*		*# Bottles collected*	
COC updated?		*Dissolved metals*		*Total metals*			

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):**	11.810 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:**	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	05-07-23	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	19.950 m	**Well Cap Secure?**	Yes
Round	July 2023	**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*	
14:40	1.0	19.1	6.94	12689	0.29	-66.7	11.860	Dark grey-brown, cloudy, medium sediment load, no odour, no s
14:43	2.0	18.9	6.94	12630	0.25	-70.3	11.870	Light grey tinge, mostly clear
14:46	3.0	19.0	6.94	12622	0.25	-72.1	11.880	Clear
14:49	4.0	18.7	6.93	12530	0.20	-74.9	11.890	
14:52	5.0	18.7	6.94	12502	0.15	-77.4	11.900	
14:55	6.0	19.0	6.94	12584	0.17	-78.5	11.900	
14:58	7.0	18.5	6.96	12450	0.15	-83.4	11.920	
15:01	8.0	18.5	6.40	12419	0.12	-83.9	11.930	Parameters stable, samples collected

Field QA Checks:		Analyte	Collected	Analyte	Collected		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***No***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***6***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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):**	11.570 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	Yes	**Pump Depth:**	15.4 m	**Ref.datum:**	TOC
Date:	9/08/2023	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	18.170 m	**Bore Diam.:**	50 mm
Round	August 2023	**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	1.0	17.3	7.15	8050	9.66	-3.4	11.910	Dark brown, cloudy, moderate sediment, no odour, no sheen
8:26	2.0	17.5	7.12	8118	9.07	40.0	11.980	Mostly clear, no sediment, no odour, no sheen
8:29	3.0	18.2	6.69	8257	4.71	57.3	12.100	
8:32	4.0	18.3	7.02	8240	9.58	24.7	12.210	
8:35	5.0	18.3	7.11	8231	9.58	16.5	12.230	
8:38	6.0	18.4	7.07	8208	9.46	14.0	12.260	
8:41	7.0	18.3	7.06	8206	9.38	11.1	12.240	
8:44	8.0	18.3	7.15	8154	9.39	10.4	12.250	Good recharge, parameters stable, samples collected.

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***No***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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):**	7.620 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:** 13.5 m	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	9/08/2023	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	14.515 m	**Well Cap Secure?**	Yes
Round	August 2023	**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*	
10:01	1.5	18.7	7.12	3337	4.43	3.2	8.390	Clear, no odour, no sheen, no sediment
10:04	3.0	18.7	7.17	3315	6.23	27.4	8.810	
10:07	4.5	18.7	7.25	3259	7.25	49.8	9.440	
10:10	6.0	18.7	7.30	3214	8.71	61.1	9.990	
10;13	7.5	18.7	7.34	3170	9.30	66.4	10.350	
10:16	9.0	18.7	7.36	3156	9.38	67.6	10.550	
10:19	10.5	18.7	7.38	3136	9.51	69.1	10.750	
10:22	12.0	18.7	7.41	3107	9.65	71.8	11.360	Water level not stabilising, parameters stable, samples collected

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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

GWDUP2 - Eurofins Metals. HOBO data logger switched with Solinst logger due to dying battery.

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:**	Micropurge	**SWL(mbTOC):**	12.425 m	**Logic Check:**	
Project:	M12 Motorway	**Sample Method:**	Bailer	**Screen: From**	to	m	
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:** 20 m	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	9/08/2023	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	21.115 m	**Well Cap Secure?**	Yes
Round	August 2023	**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*	
12:39	1.0	19.7	6.92	14563	7.72	107.5	12.960	Mostly, no odour, no sheen, no sediment
12:42	2.0	19.6	7.01	14477	8.82	108.2	12.130	
12:45	3.0	19.7	7.00	14444	9.05	109.3	13.295	
12:48	4.0	19.7	6.97	14406	9.28	110.9	13.570	
12:51	5.0	19.7	6.93	14370	9.38	112.0	13.910	
12:54	6.0	19.7	6.90	14371	8.85	112.8	14.180	
12:57	7.0	19.7	6.88	14408	8.38	113.0	14.330	Poor recharge, parameters stable, micropurge malfunction at 7L
								Samples collected with bailer due to micropurge malfunction

Field QA Checks:		Analyte	Collected	Analyte	Collected		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***No***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***6***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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

New data logger (Solinst) set up and placed into monitoring well.

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:**	Grab sample	**SWL(mbTOC):**	11.906 m	**Logic Check:**	
Project:	M12 Motorway	**Sample Method:**	Bailer	**Screen: From**	to	m	
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / A. Duval	**Flow Cell:**	**Pump Depth:**	**Ref.datum:**	TOC	**Bore Diam.:**	50 mm
Date:	9/08/2023	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	19.978 m	**Well Cap Secure?**	Yes
Round	August 2023	**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*	
16:30		19.1	6.78	13966	2.27	-79.7		Grab sample, one set of parameters collected as geocontrol
								pump is faulty.

Field QA Checks:		Analyte	Collected	Analyte	Collected		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***No***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***6***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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: 8/08/2023 - 9/08/2023
Time:
Sampler: E. Smith / A. Duval

Well ID	Date	Accessible?	SWL (mbTOC)	BOC (mbTOC)	Data logger present?	Data logger brand type	Data logger downloaded?	Comment
BH104R*	9/08/2023	Yes	11.570	18.170	Yes	HOBO	Yes	
BH107R*	9/08/2023	Yes	7.620	14.515	Yes	HOBO	Yes	Data logger switched with Solinst logger as existing HOBO data logger has extremely low battery warning.
BH112R*	9/08/2023	Yes	12.425	21.115	No	-	-	Solinst logger set up and placed into monitoring well.
BH145R	9/08/2023	Yes	11.906	19.978	Yes	HOBO	Yes	
BH155	8/08/2023	Yes	DRY		No	-	-	
BH162	8/08/2023	Yes	6.000	18.190	Yes	HOBO	Yes	
BH170	8/08/2023	Attempt to locate	-	-	-	-	-	Not located.
BH175	8/08/2023	Yes	4.600	18.010	Yes	HOBO	No	Data logger replaced with Solinst logger since existing logger was dead.
BH219	8/08/2023	Yes	0.540	18.270	Yes	HOBO	Yes	

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

Purging and Sampling Record

Bore ID: BH104R

Job Information		Sampling Information		Bore Information			
Client:	Transport for NSW	**Purge Method:**	Low flow	**SWL(mbTOC):**	11.563 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	898 mm
Sampler:	E. Smith / J. Miller	**Flow Cell:**	Yes	**Pump Depth:**	17.5 m	**Ref.datum:**	TOC
Date:	5/09/2023	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	18.150 m	**Bore Diam.:**	50 mm
Round	September 2023	**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*	
9:29	1.0	19.1	6.70	8420	2.56	72.6	11.950	Light brown, moderate turbidity, moderate sediment,
9:34	3.0	19.0	6.73	8382	3.41	66.3	12.190	no odour or sheen.
9:40	4.5	19.0	6.75	8373	3.64	47.8	12.330	""
9:45	6.0	19.1	6.75	8380	3.46	44.1	12.390	
9:50	7.5	19.1	6.77	8354	3.08	34.4	12.490	""
9:55	9.0	19.1	6.80	8354	3.07	-7.3	12.550	Light brown tinge, mostly clear, no odour or sheen.
10:00	10.5	19.1	6.81	8350	2.81	-28.8	12.600	Stabilising water level.
								Parameters mostly stable, samples collected.

Field QA Checks:		Analyte	Collected	Analyte	Collected		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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

GWDUP2 collected (EF 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):**	7.579 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	900 mm
Sampler:	E. Smith / J. Miller	**Flow Cell:**	Yes	**Pump Depth:**	13.5 m	**Ref.datum:**	TOC
Date:	5/09/2023	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	14.490 m	**Bore Diam.:**	50 mm
Round	September 2023	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume	Temp	pH	Elec.Cond	Dis.Oxygen	Ox-Red Pt.	SWL	Comment:
7:55	(L)	(°C)	(pH units)	(µs/cm)	(mg/L)	(± mV)	(m bTOC)	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	1.5	18.3	7.14	3443	2.23	33.2	8.460	
8:15	3.0	18.4	7.16	3427	3.35	38.4	8.990	Pale brown tinge, slightly turbid, no odour or sheen.
8:22	4.5	18.4	7.17	3382	4.02	45.5	9.540	Ongoing water level difficult to obtain with temperamental IP
8:29	6.0	18.4	7.17	3307	4.58	50.8	10.070	""
8:34	7.5	18.4	7.16	3210	4.75	55.4	10.630	
8:39	9.0	18.4	7.15	3144	4.96	60.6	11.310	Water level not stabilising, parameters mostly stable.
								Samples collected.

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***7***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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

GWDUP1 collected (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):**	12.407 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	1030 mm
Sampler:	E. Smith / J. Miller	**Flow Cell:**	Yes	**Pump Depth:**	17.5 m	**Ref.datum:**	TOC
Date:	5/09/2023	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	21.100 m	**Bore Diam.:**	50 mm
Round	September 2023	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time 10:45	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*	
10:52	2.0	19.9	6.70	14777	0.89	90.6	12.910	light brown, moderate turbidity, moderate sediment,
10:56	3.0	19.9	6.71	14827	0.38	73.4	13.040	no odour or sheen
11:00	4.0	20.0	6.71	14857	0.35	63.5	13.180	
11:04	5.0	19.9	6.71	14817	0.32	59.9	13.340	
11:08	6.0	20.0	6.71	14979	0.68	56.6	13.470	
11:12	7.0	19.9	6.71	14918	0.38	58.3	13.610	
11:16	8.0	19.9	6.71	14971	0.31	55.1	13.800	Parameters stable, samples collected.

Field QA Checks:		*Analyte*	*Collected*	*Analyte*	*Collected*		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***No***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***6***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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):**	11.777 m	**Logic Check:**	Yes
Project:	M12 Motorway	**Sample Method:**	Micropurge	**Screen: From**	to		m
Proj. No.:	12554717	**WQ Meter Type:**	YSI	**NAPL Check:**	not present	**Stick Up:**	m
Sampler:	E. Smith / J. Miller	**Flow Cell:**	Yes	**Pump Depth:**	18 m	**Ref.datum:**	TOC
Date:	6/09/2023	**WLevel Meter Type:**	Int.Fce	**Bore Depth:**	19.970 m	**Bore Diam.:**	50 mm
Round	September 2023	**Field Filtered?**	Yes (disposable filter)			**Well Cap Secure?**	Yes

Time	Volume	Temp	pH	Elec.Cond	Dis.Oxygen	Ox-Red Pt.	SWL	Comment:
8:30	(L)	(°C)	(pH units)	(µs/cm)	(mg/L)	(± mV)	(m bTOC)	Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*	
8:46	0.5	18.4	6.69	13604	4.14	-8.2	11.800	Sightly brown, low turbidity, low sediment, no odour or sheen.
8:50	1.5	18.3	6.68	13975	0.96	-45.3	11.810	Great recharge.
8:54	3.0	18.3	6.68	14089	0.61	-54.8	11.820	""
8:58	4.0	18.4	6.69	14171	0.50	-62.1	11.830	
9:02	5.0	18.2	6.70	14174	0.43	-67.2	11.840	""
9:06	6.0	18.3	6.70	14238	0.43	-69.7	11.850	
9:10	7.0	18.3	6.71	14262	0.40	-72.2	11.860	Parameters stable, samples collected.

Field QA Checks:		Analyte	Collected	Analyte	Collected		
Air bubbles in vials or violent reactions?	No	*Non-filtered inorganics*	***Yes***	*VOCs*	***Yes***	*Duplicate collected?*	***Yes***
Decontamination as per GHD procedure?	Yes	*Preserved inorganics*	***Yes***	*TRH*	***Yes***		
Was sampling equipment pre-cleaned?	Yes	*Semi-VOCs*	***Yes***	*PFAS*	***No***	*# Bottles collected*	***6***
COC updated?	Yes	*Dissolved metals*	***Yes***	*Total metals*	***No***		

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

Appendix H

Laboratory reports

Environmental Division
Sydney
Work Order Reference
ES2311426

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
ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@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 4014 2500 E: newcastle@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
SYDNEY 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

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREME** ☐ Standard TAT **(List due date):** STANDARD TAT		**FOR LABORA**
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g.. Ultra Trace) ☐ Non Standard or urgent TAT **(List due date):**		Custody Seal Int: N/A
PROJECT: M12 Groundwater	**ALS QUOTE NO.:** SY/322/21	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen: N/A
ORDER NUMBER: 12554717		COC: 1 2 3 4 5 6 7	Random Sample
PROJECT MANAGER: Henry Luo	**CONTACT PH: Henry Luo** 0414 090 002	OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER: Terry Nham	**SAMPLER MOBILE:** 0403 251 883	**RELINQUISHED BY:** Emily Smith GHD ~~Terry Nham GHD~~	**RECEIVED BY:** Jack	**RELINQUISHED BY:**
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT	DATE/TIME: 5/4/23 2:15 pm	DATE/TIME: 05/04/23 1415	DATE/TIME:
Email Reports to: henry.luo@ghd.com, ghdlabreports@ghd.com; terry.nham@ghd.com; emily.smith@ghd.com				

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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 (8 dissovled 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 (SS)	W-14A (PAH/Phenols)	W-02T (8 total metals)	BTEXN		
1	BH104R	4/4/23	Water		6	X	X	X	X	X	X	X					
2	BH107R	4/4/23	Water		6	X	X	X	X	X	X	X					
	~~BH112R~~		Water		6	X	X	X	X	X	X	X					
3	BH145R	5/4/23	Water		6	X	X	X	X	X	X	X					
4	GWDUP1	4/4/23	Water		1	X											
5	GWRB1	5/4/23	Water		1									X			
6	Trip spike	30/3/23	Water		1										X		
7	Trip blank	30/3/23	Water		1										X		

HT

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2311426**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: sarah.mathew@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)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: M12 Groundwater		
Sampler	: TERRY NHAM		

Dates

Date Samples Received	: 05-Apr-2023 14:15	Issue Date	: 05-Apr-2023
Client Requested Due Date	: 14-Apr-2023	Scheduled Reporting Date	: **14-Apr-2023**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 8	Temperature	: 2.0'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 7 / 7

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.**

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

ES2311426-006 : [30-Mar-2023] : Trip Spike - Trip Spike 16

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
ES2311426-001	04-Apr-2023 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2311426-002	04-Apr-2023 00:00	BH107R	✓	✓	✓	✓	✓	✓	✓
ES2311426-003	05-Apr-2023 00:00	BH145R	✓	✓	✓	✓	✓	✓	✓
ES2311426-004	04-Apr-2023 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
ES2311426-005	05-Apr-2023 00:00	GWRB1		✓	
ES2311426-006	30-Mar-2023 00:00	Trip Spike Trip Spi...	✓		
ES2311426-007	30-Mar-2023 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

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

TERRY NHAM

- *AU Certificate of Analysis - NATA (COA)	Email	terry.nham@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	terry.nham@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	terry.nham@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	terry.nham@ghd.com
- Chain of Custody (CoC) (COC)	Email	terry.nham@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	terry.nham@ghd.com
- EDI Format - XTab (XTAB)	Email	terry.nham@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	terry.nham@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2311426**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: 05-Apr-2023 14:15
Order number	: ----	Date Analysis Commenced	: 05-Apr-2023
C-O-C number	: ----	Issue Date	: 14-Apr-2023 18:05
Sampler	: TERRY NHAM		
Site	: M12 Groundwater		
Quote number	: SY/322/21		
No. of samples received	: 7		
No. of samples analysed	: 7		

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

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

This 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
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- 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 ES2311426-03 is confirmed by re-analysis.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH145R	GWDUP1	GWRB1
				Sampling date / time	04-Apr-2023 00:00	04-Apr-2023 00:00	05-Apr-2023 00:00	04-Apr-2023 00:00	05-Apr-2023 00:00
Compound	CAS Number	LOR	Unit		ES2311426-001	ES2311426-002	ES2311426-003	ES2311426-004	ES2311426-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**5260**	**2240**	**5710**	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**366**	**248**	**38**	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**1380**	**427**	**974**	----	----
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		**877**	**1470**	**696**	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**877**	**1470**	**696**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**137**	**207**	**243**	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**2570**	**306**	**3040**	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**155**	**34**	**80**	----	----
Magnesium	7439-95-4	1	mg/L		**241**	**83**	**188**	----	----
Sodium	7440-23-5	1	mg/L		**1440**	**746**	**1740**	----	----
Potassium	7440-09-7	1	mg/L		**20**	**15**	**14**	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.003**	<0.001	**0.016**	**0.003**	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L		<0.001	**0.005**	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L		**0.014**	**0.006**	**0.026**	**0.012**	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L		**0.008**	**0.010**	<0.005	**0.009**	----
Manganese	7439-96-5	0.001	mg/L		**0.269**	**0.089**	**0.639**	----	----
Iron	7439-89-6	0.05	mg/L		**1.27**	<0.05	**3.66**	----	----
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

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH145R	GWDUP1	GWRB1
				Sampling date / time	04-Apr-2023 00:00	04-Apr-2023 00:00	05-Apr-2023 00:00	04-Apr-2023 00:00	05-Apr-2023 00:00
Compound	CAS Number	LOR	Unit		ES2311426-001	ES2311426-002	ES2311426-003	ES2311426-004	ES2311426-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
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	<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		**1.20**	**0.23**	**1.40**	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	**0.01**	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.02**	**0.83**	**0.01**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.02**	**0.83**	**0.02**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.7**	**0.6**	**1.8**	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**1.7**	**1.4**	**1.8**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.32**	**0.13**	**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	<0.01	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**92.9**	**42.3**	**105**	----	----
ø Total Cations	----	0.01	meq/L		**90.7**	**41.4**	**95.5**	----	----
ø Ionic Balance	----	0.01	%		**1.17**	**1.14**	**4.60**	----	----
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	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH145R	GWDUP1	GWRB1
				Sampling date / time	04-Apr-2023 00:00	04-Apr-2023 00:00	05-Apr-2023 00:00	04-Apr-2023 00:00	05-Apr-2023 00:00
Compound	CAS Number	LOR	Unit		ES2311426-001	ES2311426-002	ES2311426-003	ES2311426-004	ES2311426-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ 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	3	----	----
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	----	----
^ Sum of BTEX	----	1	µg/L		<1	<1	4	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		96.0	80.8	95.8	----	----
Toluene-D8	2037-26-5	2	%		103	87.2	104	----	----
4-Bromofluorobenzene	460-00-4	2	%		106	87.8	105	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Trip Spike Trip Spike 16	Trip Blank	----	----	----
				Sampling date / time	30-Mar-2023 00:00	30-Mar-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES2311426-006	ES2311426-007	--------	--------	--------
					Result	Result	----	----	----
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		**15**	<1	**----**	**----**	**----**
Toluene	108-88-3	2	µg/L		**16**	<2	**----**	**----**	**----**
Ethylbenzene	100-41-4	2	µg/L		**16**	<2	**----**	**----**	**----**
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		**16**	<2	**----**	**----**	**----**
ortho-Xylene	95-47-6	2	µg/L		**17**	<2	**----**	**----**	**----**
^ **Total Xylenes**	----	2	µg/L		**33**	<2	**----**	**----**	**----**
^ **Sum of BTEX**	----	1	µg/L		**80**	<1	**----**	**----**	**----**
Naphthalene	91-20-3	5	µg/L		**20**	<5	**----**	**----**	**----**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**112**	**109**	**----**	**----**	**----**
Toluene-D8	2037-26-5	2	%		**117**	**110**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	2	%		**117**	**104**	**----**	**----**	**----**

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	: **ES2311426**	Page	: 1 of 13
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: 05-Apr-2023
Order number	: ----	Date Analysis Commenced	: 05-Apr-2023
C-O-C number	: ----	Issue Date	: 14-Apr-2023
Sampler	: TERRY NHAM		
Site	: M12 Groundwater		
Quote number	: SY/322/21		
No. of samples received	: 7		
No. of samples analysed	: 7		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

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
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

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: 4981933)									
ES2311257-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	926	942	1.8	0% - 20%
ES2311425-011	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	169	172	1.8	0% - 50%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 4986522)									
ES2311350-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1490	1600	7.5	0% - 20%
ES2311436-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	237	237	0.0	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 4981934)									
ES2311257-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	14	12	21.4	No Limit
ES2311425-011	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	60	58	3.0	0% - 50%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 4986523)									
ES2311350-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	522	559	6.7	0% - 20%
ES2311436-002	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 4975812)									
ES2311419-028	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	762	762	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	762	762	0.0	0% - 20%
ES2311419-038	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	36	37	3.2	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	36	37	3.2	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4977585)									
ES2311435-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	29	29	0.0	0% - 20%
ES2310029-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	73	72	1.5	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 (%)*
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4979243)									
ME2300684-010	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	44	45	2.6	0% - 20%
ES2311426-003	BH145R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	243	240	1.3	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 4977589)									
ES2311435-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	11	11	0.0	0% - 50%
ES2310029-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	123	123	0.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 4979244)									
ME2300684-012	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	474	481	1.5	0% - 20%
ES2311426-003	BH145R	ED045G: Chloride	16887-00-6	1	mg/L	3040	3060	0.7	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 4982937)									
ES2311629-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	27	27	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	22	22	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	70	68	1.5	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	6	6	0.0	No Limit
ME2300684-005	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	34	34	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	18	18	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	64	65	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	10	10	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4982939)									
ES2311629-001	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	0.301	0.298	1.2	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.009	0.010	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	0.13	0.13	0.0	No Limit
ME2300684-005	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	0.002	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: Manganese	7439-96-5	0.001	mg/L	0.617	0.616	0.2	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	0.86	0.86	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4983042)									
ES2311567-004	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	0.004	0.004	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: 4983042) - continued									
ES2311567-004	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	0.002	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	0.429	0.430	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	0.006	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.61	0.62	0.0	0% - 50%
ES2311382-001	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	0.003	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	0.390	0.383	2.0	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	0.008	0.009	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: 4984088)									
ES2311326-002	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	0.039	0.038	0.0	0% - 20%
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.002	0.002	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	0.004	0.002	50.7	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.016	0.015	0.0	No Limit
ES2311425-009	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	0.002	0.002	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	0.002	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.007	0.007	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4982938)									
ES2311426-002	BH107R	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ME2300650-001	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: 4983044)									
ES2311382-003	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2311628-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4982611)									
ES2311416-003	Anonymous	EG035T: 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 (%)*
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4982611) - continued									
ES2311425-008	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: 4981181)									
ES2311425-009	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.04	30.6	No Limit
ES2311432-002	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: 4977586)									
ES2311432-003	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2310029-001	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: 4979241)									
ME2300651-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2311425-008	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: 4981180)									
ES2311425-009	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	3.03	3.01	0.6	0% - 20%
ES2311432-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	12.6	12.6	0.6	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4981177)									
ES2311425-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.7	52.5	No Limit
ES2311425-011	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	1.0	29.8	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 4981176)									
ES2311425-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.07	77.2	No Limit
ES2311425-011	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.07	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 4977587)									
ES2311432-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2310029-001	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: 4979242)									
ME2300684-008	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.02	0.0	No Limit
ES2311425-008	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.56	0.57	0.0	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4980988)									
ES2311428-006	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	30	30	0.0	No Limit
ES2311459-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4982407)									
ES2311376-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2311543-024	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4980988)									
ES2311428-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	30	30	0.0	No Limit
ES2311459-001	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: 4982407)									
ES2311376-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2311543-024	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: 4980988)									
ES2311428-006	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2311459-001	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
EP080: BTEXN (QC Lot: 4982407)									
ES2311376-001	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
ES2311543-024	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: 4981933)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	96.8	87.0	109
				<10	293 mg/L	106	75.2	126
				<10	2340 mg/L	105	83.0	124
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 4986522)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	96.0	87.0	109
				<10	293 mg/L	102	75.2	126
				<10	2340 mg/L	105	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 4981934)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	97.0	83.0	129
				<5	1000 mg/L	94.4	82.0	110
				<5	825 mg/L	110	83.0	118
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 4986523)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	89.3	83.0	129
				<5	1000 mg/L	93.2	82.0	110
				<5	825 mg/L	109	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 4975812)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	99.6	81.0	111
				----	50 mg/L	105	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4977585)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	102	82.0	122
				<1	500 mg/L	103	82.0	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4979243)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	82.0	122
				<1	500 mg/L	93.3	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 4977589)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	96.6	80.9	127
				<1	1000 mg/L	93.9	80.9	127
ED045G: Chloride by Discrete Analyser (QCLot: 4979244)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	102	80.9	127
				<1	1000 mg/L	104	80.9	127
ED093F: Dissolved Major Cations (QCLot: 4982937)								

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
ED093F: Dissolved Major Cations (QCLot: 4982937) - continued								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.2	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.9	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	99.4	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.8	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 4982939)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.0	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.6	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.0	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.5	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	91.6	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	93.5	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.0	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.9	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	93.4	82.0	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 4983042)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.8	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.8	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.8	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.7	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.3	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	90.8	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	94.1	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	90.1	82.0	112
EG020T: Total Metals by ICP-MS (QCLot: 4984088)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.6	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.6	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.1	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.7	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.2	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.7	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.7	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 4982938)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	94.6	83.0	105

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
EG035F: Dissolved Mercury by FIMS (QCLot: 4983044)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	95.5	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4982611)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	96.1	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4981181)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	102	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4977586)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	82.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4979241)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4981180)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	108	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4981177)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	86.8	69.0	101
				<0.1	1 mg/L	98.5	70.0	118
				<0.1	5 mg/L	101	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4981176)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	96.3	71.3	126
				<0.01	0.442 mg/L	101	71.3	126
				<0.01	1 mg/L	106	71.3	126
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 4977587)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	95.6	85.0	117
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 4979242)								
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: 4977198)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	85.9	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	83.9	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	82.0	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4980988)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	88.4	75.0	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4982407)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	88.3	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4977198)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	82.2	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	84.6	57.8	110

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: 4977198) - continued								
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	72.1	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4980988)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	89.9	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4982407)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	91.5	75.0	127
EP080: BTEXN (QCLot: 4980988)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	85.4	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	93.7	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	98.3	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	99.1	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	99.5	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	102	75.5	124
EP080: BTEXN (QCLot: 4982407)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	95.4	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	97.4	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	103	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	99.6	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	103	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	98.4	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: 4977585)							
ES2310029-001	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: 4979243)							
ES2311426-003	BH145R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4977589)							

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: 4977589) - continued							
ES2310029-001	Anonymous	ED045G: Chloride	16887-00-6	50 mg/L	110	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4979244)							
ES2311426-003	BH145R	ED045G: Chloride	16887-00-6	50 mg/L	# Not Determined	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 4982939)							
ES2311419-042	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	100	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	95.0	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	89.2	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	94.7	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	96.0	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	90.8	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	94.1	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	92.4	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 4983042)							
ES2311382-004	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	107	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	102	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	106	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	103	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	104	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	105	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 4984088)							
ES2311326-003	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	120	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	121	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	117	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	124	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	123	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	117	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	121	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4982938)							
ES2311426-001	BH104R	EG035F: Mercury	7439-97-6	0.01 mg/L	86.2	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4983044)							
ES2311382-002	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	89.9	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4982611)							
ES2311416-004	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	93.4	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
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4981181)							
ES2311425-009	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	92.9	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4977586)							
ES2310029-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	110	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4979241)							
ES2311425-008	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	100	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4981180)							
ES2311425-009	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4981177)							
ES2311425-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	90.7	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4981176)							
ES2311425-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	98.5	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 4977587)							
ES2310029-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	102	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 4979242)							
ES2311425-008	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	79.1	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4980988)							
ES2311428-006	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	99.2	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4982407)							
ES2311376-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	73.8	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4980988)							
ES2311428-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	97.0	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4982407)							
ES2311376-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	74.2	70.0	130
EP080: BTEXN (QCLot: 4980988)							
ES2311428-006	Anonymous	EP080: Benzene	71-43-2	25 µg/L	90.4	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	98.5	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	104	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	103	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	104	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	96.4	70.0	130
EP080: BTEXN (QCLot: 4982407)							
ES2311376-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	74.9	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: 4982407) - continued							
ES2311376-001	Anonymous	EP080: Toluene	108-88-3	25 µg/L	75.6	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	82.6	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	80.8	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	84.0	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	80.0	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2311426**	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	: 05-Apr-2023
Site	: M12 Groundwater	Issue Date	: 14-Apr-2023
Sampler	: TERRY NHAM	No. of samples received	: 7
Order number	: ----	No. of samples analysed	: 7

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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

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

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	ES2311426--003	BH145R	**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	ES2310029--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.**
ED045G: Chloride by Discrete Analyser	ES2311426--003	BH145R	**Chloride**	16887-00-6	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	ES2311425--009	Anonymous	**Nitrite + Nitrate as N**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural						
BH145R	----	----	----	11-Apr-2023	07-Apr-2023	**4**
EK071G: Reactive Phosphorus as P by discrete analyser						
Clear Plastic Bottle - Natural						
BH145R	----	----	----	11-Apr-2023	07-Apr-2023	**4**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

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

Analysis Holding Time Compliance

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

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

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

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

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

Method / 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	**04-Apr-2023**	**----**	----	**----**	**11-Apr-2023**	11-Apr-2023	✓
Clear Plastic Bottle - Natural (EA015H) BH145R	**05-Apr-2023**	**----**	----	**----**	**12-Apr-2023**	12-Apr-2023	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H) BH104R, BH107R	**04-Apr-2023**	**----**	----	**----**	**11-Apr-2023**	11-Apr-2023	✓
Clear Plastic Bottle - Natural (EA025H) BH145R	**05-Apr-2023**	**----**	----	**----**	**12-Apr-2023**	12-Apr-2023	✓
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH104R, BH107R	**04-Apr-2023**	**----**	----	**----**	**11-Apr-2023**	02-May-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH145R	**05-Apr-2023**	**----**	----	**----**	**11-Apr-2023**	03-May-2023	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) BH104R, BH107R	**04-Apr-2023**	**----**	----	**----**	**05-Apr-2023**	18-Apr-2023	✓
Clear Plastic Bottle - Natural (ED037-P) BH145R	**05-Apr-2023**	**----**	----	**----**	**05-Apr-2023**	19-Apr-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) BH104R, BH107R	**04-Apr-2023**	**----**	----	**----**	**06-Apr-2023**	02-May-2023	✓
Clear Plastic Bottle - Natural (ED041G) BH145R	**05-Apr-2023**	**----**	----	**----**	**11-Apr-2023**	03-May-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) BH104R, BH107R	**04-Apr-2023**	**----**	----	**----**	**06-Apr-2023**	02-May-2023	✓
Clear Plastic Bottle - Natural (ED045G) BH145R	**05-Apr-2023**	**----**	----	**----**	**11-Apr-2023**	03-May-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R	**04-Apr-2023**	**----**	----	----	**11-Apr-2023**	02-May-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH145R	**05-Apr-2023**	**----**	----	----	**11-Apr-2023**	03-May-2023	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH104R, BH107R, GWDUP1	**04-Apr-2023**	**----**	----	----	**11-Apr-2023**	01-Oct-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH145R	**05-Apr-2023**	**----**	----	----	**11-Apr-2023**	02-Oct-2023	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
GWRB1	**05-Apr-2023**	**12-Apr-2023**	02-Oct-2023	✓	**12-Apr-2023**	02-Oct-2023	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH104R, BH107R, GWDUP1	**04-Apr-2023**	**----**	----	----	**13-Apr-2023**	02-May-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH145R	**05-Apr-2023**	**----**	----	----	**13-Apr-2023**	03-May-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
GWRB1	**05-Apr-2023**	**----**	----	----	**13-Apr-2023**	03-May-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH104R, BH107R	**04-Apr-2023**	**----**	----	----	**13-Apr-2023**	02-May-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH145R	**05-Apr-2023**	**----**	----	----	**13-Apr-2023**	03-May-2023	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
BH104R, BH107R	**04-Apr-2023**	**----**	----	----	**06-Apr-2023**	06-Apr-2023	✓
Clear Plastic Bottle - Natural (EK057G)							
BH145R	**05-Apr-2023**	**----**	----	----	**11-Apr-2023**	07-Apr-2023	×
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH104R, BH107R	**04-Apr-2023**	**----**	----	----	**13-Apr-2023**	02-May-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH145R	**05-Apr-2023**	**----**	----	----	**13-Apr-2023**	03-May-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
BH104R, BH107R	**04-Apr-2023**	**11-Apr-2023**	02-May-2023	✓	**13-Apr-2023**	02-May-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
BH145R	**05-Apr-2023**	**11-Apr-2023**	03-May-2023	✓	**13-Apr-2023**	03-May-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH104R, BH107R	**04-Apr-2023**	**11-Apr-2023**	02-May-2023	✓	**13-Apr-2023**	02-May-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH145R	**05-Apr-2023**	**11-Apr-2023**	03-May-2023	✓	**13-Apr-2023**	03-May-2023	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) BH104R, BH107R	**04-Apr-2023**	**----**	----	----	**06-Apr-2023**	06-Apr-2023	✓
Clear Plastic Bottle - Natural (EK071G) BH145R	**05-Apr-2023**	**----**	----	----	**11-Apr-2023**	07-Apr-2023	×
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R	**04-Apr-2023**	**06-Apr-2023**	11-Apr-2023	✓	**13-Apr-2023**	16-May-2023	✓
Amber Glass Bottle - Unpreserved (EP071) BH145R	**05-Apr-2023**	**06-Apr-2023**	12-Apr-2023	✓	**13-Apr-2023**	16-May-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R	**04-Apr-2023**	**11-Apr-2023**	18-Apr-2023	✓	**12-Apr-2023**	18-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**05-Apr-2023**	**11-Apr-2023**	19-Apr-2023	✓	**12-Apr-2023**	19-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**30-Mar-2023**	**12-Apr-2023**	13-Apr-2023	✓	**12-Apr-2023**	13-Apr-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BH104R, BH107R	**04-Apr-2023**	**06-Apr-2023**	11-Apr-2023	✓	**13-Apr-2023**	16-May-2023	✓
Amber Glass Bottle - Unpreserved (EP071) BH145R	**05-Apr-2023**	**06-Apr-2023**	12-Apr-2023	✓	**13-Apr-2023**	16-May-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R	**04-Apr-2023**	**11-Apr-2023**	18-Apr-2023	✓	**12-Apr-2023**	18-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**05-Apr-2023**	**11-Apr-2023**	19-Apr-2023	✓	**12-Apr-2023**	19-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**30-Mar-2023**	**12-Apr-2023**	13-Apr-2023	✓	**12-Apr-2023**	13-Apr-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) BH104R, BH107R	**04-Apr-2023**	**11-Apr-2023**	18-Apr-2023	✓	**12-Apr-2023**	18-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**05-Apr-2023**	**11-Apr-2023**	19-Apr-2023	✓	**12-Apr-2023**	19-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**30-Mar-2023**	**12-Apr-2023**	13-Apr-2023	✓	**12-Apr-2023**	13-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Spike - Trip Spike 16	**30-Mar-2023**	**12-Apr-2023**	13-Apr-2023	✓	**13-Apr-2023**	13-Apr-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		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	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	4	40	**10.00**	**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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	37	**10.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	4	37	**10.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total 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	15	**13.33**	**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	8	**0.00**	**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	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	40	**5.00**	**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	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	6	39	**15.38**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	6	39	**15.38**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	19	**15.79**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total 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	15	**6.67**	**5.00**	✓	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	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	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	40	**5.00**	**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	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total 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	15	**6.67**	**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	8	**12.50**	**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	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	40	**5.00**	**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	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total 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	15	**6.67**	**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	8	**0.00**	**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.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

Lab / Analysis: Eurofins - SWDUP2, GWDUP2

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GLADSTONE 1/235 Toolooa Street South Gladstone QLD 4680 E: samples.gladstone@alsglobal.com

Environmental Division Sydney

Work Order Reference

ES2311425

Telephone : +61-2-8784 8555

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREMENT: ☐ Standard TAT (List due date): Courier / Courier STANDARD TAT		FOR LAB
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		Custody Se
PROJECT: M12 Surface Water	ALS QUOTE NO.: SY/322/21	COC SEQUENCE NUMBER (Circle)	Free Ice / fr
ORDER NUMBER: 12554717		COC: 1 2 3 4 5 6 7	Random Sa
PROJECT MANAGER: Henry Luo	CONTACT PH: Henry Luo 0414 090 002	OF: 1 2 3 4 5 6 7	Other comm
SAMPLER: Terry Nham, Emily Smith	SAMPLER MOBILE: 0403 251 883	RELINQUISHED BY: Emily Smith - GHD	RECEIVED BY: Jack
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT	DATE/TIME: 5/4/23 2:15pm	DATE/TIME: 05/04/23 1415
Email Reports to: henry.luo@ghd.com , ghdlabreports@ghd.com; terry.nham@ghd.com, emily.smith@ghd.com			RELINQUISHED DATE/TIME: 12pm 6/4/23

Attached By PO / Internal Sheet

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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-02T (8 total metals)	EG020T (total Fe, Mn)	NT-08A (total N, No2, No3, NH3, Total P, reactive P)	EP008 (chlorophyll a)	EP020 (oil & grease)	UTO-9W Ultra trace OC/OP	EP074DEFG (VOC - fugigants, Hal aliphatics, Hal Aromatics, THM)	[redacted] HARDNESS	W-14A (PAH/phenols)	EA015H (TDS), EA025H (TSS)	EP080 (BTEXN)	Ultra trace OPP (EP234AX)	Super Ultra Trace PCB's (EP1318-ST)	PFAS - full suite (EP231X)
1	BADDS	4/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
2	BADMS	4/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
3	BADUS	4/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
4	COSDS	4/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
5	COSUS	4/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
6	HINDS	4/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
7	HINUS	4/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
8	KEMDS	5/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
9	KEMUS	5/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
10	ROPDS	4/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
11	ROPUS	4/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
12	SOUDS	5/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
13	SOUUS	5/4/23	Water		11	X	X	X	X	X	X	X	X	X	X	X			
14	SWDUP1	5/4/23	Water		1	X													
—	SWDUP 2	5/4/23	Water	FORWARD TO EUROFINS WITH ATTACHED COC	1														
—	GWDUP 2	4/4/23	Water		1														

HT

979752

eurofins mgt

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS Page 1 of 1

Company Name : GHD Pty Ltd, Sydney	**Contact Name :** Terry Nham 0403 251 883	**Purchase Order :** 12554717	**COC Number :**
Office Address :	**Project Manager:** Henry Luo	**PROJECT Number :** 12554717	**Eurofins | mgt quote ID :**
Level 15, 133 Castlereagh Street, Sydney NSW 2000	**Email for results :** emily.smith@ghd.com; terry.nham@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	5/4/23	water		X					
2	GWDUP2	5/4/23	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:								Sample comments:
500P	250P	60P	1LA	40mL vial	200mL A	Jar	Bag	

Laboratory Staff

Relinquished By: ~~Terry Nham (GHD)~~ Emily Smith (GHD)
Date & Time : 5/4/23 2:15 pm
Signature: eSmith

Received By:
Date & Time :
Signature:

Method Of Shipment

☐ Courier
☐ Hand Delivered
☐ Postal
Courier Consignment # :

Temperature on arrival:

Report number:

979752

eurofins | Environment Testing

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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 6, 2023 5:05 PM
Eurofins reference	979752

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 : 3.1 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:

Quinn Raw on phone : or by email: QuinnRaw@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.

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 **979752-W**
Project name M12 WATER SAMPLING
Project ID 12554717
Received Date Apr 06, 2023

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S23-Ap0020709**	**S23-Ap0020710**
Date Sampled			**Apr 05, 2023**	**Apr 05, 2023**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	< 0.01	-
Arsenic (filtered)	0.001	mg/L	-	0.001
Cadmium	0.0002	mg/L	< 0.002	-
Cadmium (filtered)	0.0002	mg/L	-	< 0.0002
Chromium	0.001	mg/L	< 0.01	-
Chromium (filtered)	0.001	mg/L	-	< 0.001
Copper	0.001	mg/L	< 0.01	-
Copper (filtered)	0.001	mg/L	-	0.004
Lead	0.001	mg/L	< 0.01	-
Lead (filtered)	0.001	mg/L	-	< 0.001
Mercury	0.0001	mg/L	< 0.001	-
Mercury (filtered)	0.0001	mg/L	-	< 0.0001
Nickel	0.001	mg/L	< 0.01	-
Nickel (filtered)	0.001	mg/L	-	0.005
Zinc	0.005	mg/L	< 0.05	-
Zinc (filtered)	0.005	mg/L	-	0.008

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 13, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Apr 13, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins

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IANZ# 1290

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 #: 979752
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Apr 6, 2023 5:05 PM
Due: Apr 17, 2023
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Quinn Raw

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 05, 2023		Water	S23-Ap0020709	X	
2	GWDUP2	Apr 05, 2023		Water	S23-Ap0020710		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 follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

Units

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

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*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 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. 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	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	90			80-120	Pass	
Arsenic (filtered)	%	107			80-120	Pass	
Cadmium	%	92			80-120	Pass	
Cadmium (filtered)	%	103			80-120	Pass	
Chromium	%	96			80-120	Pass	
Chromium (filtered)	%	105			80-120	Pass	
Copper	%	94			80-120	Pass	
Copper (filtered)	%	105			80-120	Pass	
Lead	%	92			80-120	Pass	
Lead (filtered)	%	102			80-120	Pass	
Mercury	%	98			80-120	Pass	
Mercury (filtered)	%	110			80-120	Pass	
Nickel	%	99			80-120	Pass	
Nickel (filtered)	%	106			80-120	Pass	
Zinc	%	92			80-120	Pass	
Zinc (filtered)	%	112			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Chromium	S23-Ap0025500	NCP	mg/L	0.002	0.004	61	30%	Fail	
Copper	S23-Ap0025500	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	S23-Ap0025500	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Zinc	R23-Ap0009206	NCP	mg/L	0.053	0.063	18	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S23-Ap0022063	NCP	mg/L	0.011	0.011	3.6	30%	Pass	
Cadmium (filtered)	S23-Ap0023831	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Copper (filtered)	S23-Ap0022063	NCP	mg/L	0.002	0.003	11	30%	Pass	
Lead (filtered)	S23-Ap0022063	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S23-Ap0022063	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S23-Ap0022063	NCP	mg/L	0.005	0.005	14	30%	Pass	
Zinc (filtered)	S23-Ap0022063	NCP	mg/L	0.006	0.006	11	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
Mickael Ros	Senior Analyst-Metal



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

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

Environmental Division
Sydney
Work Order Reference
ES2314383

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
☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐TOWNSVILLE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐MACKAY 76 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@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 LABORAT**
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g., Ultra Trace) ☐ Non Standard or urgent TAT **(List due date):**		Custody Seal Inta N/A
PROJECT: M12 Groundwater	**ALS QUOTE NO.:** SY/322/21	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen i N/A
ORDER NUMBER: 12554717		COC: 1 2 3 4 5 6 7	Random Sample T
PROJECT MANAGER: Henry Luo	**CONTACT PH:** Henry Luo 0414 090 002	OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER: Emily Smith — **SAMPLER MOBILE:** 0431 522 928	**RELINQUISHED BY:** Emily Smith	**RECEIVED BY:** Jack	**RELINQUISHED BY:**	**RECEIVED BY:**
COC emailed to ALS? (YES / NO) — **EDD FORMAT (or default):** ESDAT	DATE/TIME: 2/5/2023 3:30 pm	DATE/TIME: 07/05/23 1530	DATE/TIME:	DATE/TIME:
Email Reports to: henry.luo@ghd.com, ghdlabreports@ghd.com; terry.nham@ghd.com; emily.smith@ghd.com; andrew.duval@ghd.com				

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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 (8 dissovled 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 (SS)	W-14A (PAH/Phenols)	W-02T (8 total metals)	BTEXN		
1	BH104R	2/5/23	Water		6	X	X	X	X	X	X	X					
2	BH107R	2/5/23	Water		6	X	X	X	X	X	X	X					
~~[illegible]~~	~~BH112R~~		~~Water~~			~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~					
3	BH145R	2/5/23	Water		6	X	X	X	X	X	X	X					
4	GWDUP1	2/5/23	Water		1	X											
5	GWRB1	2/5/23	Water		1									X			
6	Trip spike	2/5/23	Water		1										X		
7	Trip blank	2/5/23	Water		1										X		

HT

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2314383**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: sarah.mathew@alsglobal.com
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9239 7199	Facsimile	: +61-2-8784 8500
Project	: M12 GROUNDWATER	Page	: 1 of 3
Order number	: 12554717	Quote number	: ES2021GHDSER0026 (SY/322/21)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Emily Smith		

Dates

Date Samples Received	: 02-May-2023 15:30	Issue Date	: 02-May-2023
Client Requested Due Date	: 08-May-2023	Scheduled Reporting Date	: **08-May-2023**

Delivery Details

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

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
- **samples 6 and 7 had a sample date of 02/05 on the COC but the bottle had 27/04**
- **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
ES2314383-001	02-May-2023 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2314383-002	02-May-2023 00:00	BH107R	✓	✓	✓	✓	✓	✓	✓
ES2314383-003	02-May-2023 00:00	BH145R	✓	✓	✓	✓	✓	✓	✓
ES2314383-004	02-May-2023 00:00	GWDUP1						✓	

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP080 BTEXN	WATER - W-02T 8 metals (Total)
ES2314383-005	02-May-2023 00:00	GWRB1		✓
ES2314383-006	02-May-2023 00:00	Trip spike	✓	
ES2314383-007	27-Apr-2023 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
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- 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
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- EDI Format - XTab (XTAB)	Email	henry.luo@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	henry.luo@ghd.com
TERRY NHAM		
- *AU Certificate of Analysis - NATA (COA)	Email	terry.nham@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	terry.nham@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	terry.nham@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	terry.nham@ghd.com
- Chain of Custody (CoC) (COC)	Email	terry.nham@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	terry.nham@ghd.com
- EDI Format - XTab (XTAB)	Email	terry.nham@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	terry.nham@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2314383**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: M12 GROUNDWATER	Date Samples Received	: 02-May-2023 15:30
Order number	: 12554717	Date Analysis Commenced	: 03-May-2023
C-O-C number	: ----	Issue Date	: 08-May-2023 16:21
Sampler	: Emily Smith		
Site	: ----		
Quote number	: SY/322/21		
No. of samples received	: 7		
No. of samples analysed	: 7		

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

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

This 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.
- EG020: Poor matrix spike recovery was obtained on sample ES2314235 - #001 due to sample matrix interference. Results have been confirmed by reanalysis.
- EP080:Results confirmed by re analysis and re run.
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EK055G: It has been noted that Ammonia is greater than TKN on sample 1, 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH145R	GWDUP1	GWRB1
				Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2314383-001	ES2314383-002	ES2314383-003	ES2314383-004	ES2314383-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		5030	2160	6230	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		100	155	79	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		1180	397	1170	----	----
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		888	1430	818	----	----
Total Alkalinity as CaCO3	----	1	mg/L		888	1430	818	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		125	172	241	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		2640	270	3400	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		155	32	105	----	----
Magnesium	7439-95-4	1	mg/L		193	77	221	----	----
Sodium	7440-23-5	1	mg/L		1330	598	1870	----	----
Potassium	7440-09-7	1	mg/L		17	12	13	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		0.003	<0.001	0.016	0.003	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L		<0.001	0.005	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L		0.004	0.010	0.005	0.004	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L		0.036	0.026	0.006	0.035	----
Manganese	7439-96-5	0.001	mg/L		0.194	0.042	0.494	----	----
Iron	7439-89-6	0.05	mg/L		1.24	<0.05	3.32	----	----
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

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH145R	GWDUP1	GWRB1
				Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2314383-001	ES2314383-002	ES2314383-003	ES2314383-004	ES2314383-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
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	<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		**1.35**	**0.12**	**1.67**	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.02**	**2.08**	<0.01	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.02**	**2.08**	<0.01	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.3**	**0.6**	**1.9**	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**1.3**	**2.7**	**1.9**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.10**	**0.09**	**0.09**	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**94.8**	**39.8**	**117**	----	----
ø Total Cations	----	0.01	meq/L		**81.9**	**34.2**	**105**	----	----
ø Ionic Balance	----	0.01	%		**7.30**	**7.45**	**5.47**	----	----
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	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH145R	GWDUP1	GWRB1
				Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2314383-001	ES2314383-002	ES2314383-003	ES2314383-004	ES2314383-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ 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	3	----	----
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	----	----
^ Sum of BTEX	----	1	µg/L		<1	<1	4	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		78.4	84.1	99.2	----	----
Toluene-D8	2037-26-5	2	%		108	110	119	----	----
4-Bromofluorobenzene	460-00-4	2	%		108	122	130	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Trip spike	Trip blank	----	----	----
				Sampling date / time	02-May-2023 00:00	27-Apr-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES2314383-006	ES2314383-007	--------	--------	--------
					Result	Result	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		**17**	<1	**----**	**----**	**----**
Toluene	108-88-3	2	µg/L		**16**	<2	**----**	**----**	**----**
Ethylbenzene	100-41-4	2	µg/L		**17**	<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		**19**	<5	**----**	**----**	**----**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**120**	**86.9**	**----**	**----**	**----**
Toluene-D8	2037-26-5	2	%		**96.6**	**110**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	2	%		**110**	**125**	**----**	**----**	**----**

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	: **ES2314383**	Page	: 1 of 10
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: M12 GROUNDWATER	Date Samples Received	: 02-May-2023
Order number	: 12554717	Date Analysis Commenced	: 03-May-2023
C-O-C number	: ----	Issue Date	: 08-May-2023
Sampler	: Emily Smith		
Site	: ----		
Quote number	: SY/322/21		
No. of samples received	: 7		
No. of samples analysed	: 7		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

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: 5026582)									
ES2314164-003	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	454	422	7.3	0% - 20%
ES2314205-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	520	512	1.6	0% - 20%
ES2314320-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1160	1250	7.5	0% - 20%
ES2314438-003	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2070	2060	0.5	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5026583)									
ES2314164-003	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	144	124	15.3	0% - 20%
ES2314205-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	24	28	12.4	No Limit
ES2314320-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	12	10	16.1	No Limit
ES2314438-003	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	9000	8930	0.8	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5025526)									
ES2314321-010	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	3	<1	100	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	3	<1	100	No Limit
ES2314321-008	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	5	4	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	5	4	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5024020)									
ME2300771-008	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	638	662	3.6	0% - 20%
ES2314383-001	BH104R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	125	144	14.2	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5024019)									
ES2314383-001	BH104R	ED045G: Chloride	16887-00-6	1	mg/L	2640	2630	0.5	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 (%)*
ED093F: Dissolved Major Cations (QC Lot: 5026708)									
ES2314326-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	685	724	5.5	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2450	2560	4.7	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	23200	23900	3.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	800	826	3.3	0% - 20%
ES2314131-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	16	16	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	6	6	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	44	44	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	34	34	0.0	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5026707)									
ES2314326-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	6.37	6.70	5.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.017	0.016	8.2	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.32	0.33	0.0	No Limit
ES2314131-001	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	0.003	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	0.021	0.021	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	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	0.08	0.08	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 5028453)									
EW2301940-001	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	0.002	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	0.002	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
ES2314131-001	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	0.083	0.093	11.0	0% - 20%
		EG020A-T: Lead	7439-92-1	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: 5028453) - continued									
ES2314131-001	Anonymous	EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.042	0.043	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5026709)									
ES2314131-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2314383-002	BH107R	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: 5028449)									
ES2314088-049	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2314186-001	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: 5026794)									
ES2314515-004	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2314383-001	BH104R	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.35	1.34	0.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5024017)									
ES2314383-001	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: 5026795)									
ES2314515-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.27	0.27	0.0	0% - 20%
ES2314383-001	BH104R	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: 5026798)									
ES2314383-001	BH104R	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.3	1.3	0.0	0% - 50%
ES2314515-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.2	43.7	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5026799)									
ES2314383-001	BH104R	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.10	0.09	12.0	No Limit
ES2314515-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.18	0.16	6.8	0% - 50%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5024018)									
ES2314383-001	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: 5026073)									
ES2314383-001	BH104R	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2314328-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5026073)									
ES2314383-001	BH104R	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2314328-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5026073)									
ES2314383-001	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

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: 5026073) - continued									
ES2314328-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

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

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

Sub-Matrix: **WATER**

				Method 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: 5026582)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	97.8	87.0	109
				<10	293 mg/L	104	75.2	126
				<10	2340 mg/L	100	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5026583)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	94.0	83.0	129
				<5	1000 mg/L	87.4	82.0	110
				<5	825 mg/L	95.4	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 5025526)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	96.5	81.0	115
				----	50 mg/L	108	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5024020)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	97.1	82.0	122
				<1	500 mg/L	96.2	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 5024019)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	93.9	80.9	127
				<1	1000 mg/L	91.0	80.9	127
ED093F: Dissolved Major Cations (QCLot: 5026708)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	94.2	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	92.4	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	93.9	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	90.3	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 5026707)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	88.0	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	88.1	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	86.6	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	86.5	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	87.0	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	86.4	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	85.6	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	87.4	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	92.7	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: 5028453)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.2	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	92.6	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.4	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.3	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	91.6	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.0	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	91.2	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 5026709)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	92.4	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5028449)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	93.6	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5026794)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	104	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5024017)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	98.1	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5026795)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	106	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5026798)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	86.8	69.0	101
				<0.1	1 mg/L	93.2	70.0	118
				<0.1	5 mg/L	80.0	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5026799)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	100	71.3	126
				<0.01	0.442 mg/L	91.8	71.3	126
				<0.01	1 mg/L	108	71.3	126
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5024018)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	93.8	85.0	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5024223)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	65.4	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	79.6	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: 5026073)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	78.0	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5024223)								

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: 5024223) - continued								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	75.4	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	83.9	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	73.5	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5026073)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	81.1	75.0	127
EP080: BTEXN (QCLot: 5026073)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	71.8	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	94.5	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	95.8	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	100.0	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	109	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	84.9	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: 5024020)							
ES2314383-001	BH104R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5024019)							
ES2314383-001	BH104R	ED045G: Chloride	16887-00-6	50 mg/L	# Not Determined	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5026707)							
ES2314235-001	Anonymous	EG020A-F: Arsenic	7440-38-2	10 mg/L	# 34.4	70.0	130
		EG020A-F: Cadmium	7440-43-9	2.5 mg/L	# 31.9	70.0	130
		EG020A-F: Chromium	7440-47-3	10 mg/L	# 28.8	70.0	130
		EG020A-F: Copper	7440-50-8	10 mg/L	# 32.8	70.0	130
		EG020A-F: Lead	7439-92-1	10 mg/L	# 30.9	70.0	130
		EG020A-F: Manganese	7439-96-5	10 mg/L	# 30.5	70.0	130
		EG020A-F: Nickel	7440-02-0	10 mg/L	# 32.5	70.0	130
		EG020A-F: Zinc	7440-66-6	10 mg/L	# 32.4	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*
EG020T: Total Metals by ICP-MS (QCLot: 5028453)							
ES2314131-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	95.8	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	97.9	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	97.0	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	101	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	101	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	95.3	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	95.1	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5026709)							
ES2314131-003	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	90.4	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5028449)							
ES2314088-049	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	95.0	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5026794)							
ES2314383-001	BH104R	EK055G: Ammonia as N	7664-41-7	1 mg/L	88.8	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5024017)							
ES2314383-001	BH104R	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	109	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5026795)							
ES2314383-001	BH104R	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	103	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5026798)							
ES2314383-002	BH107R	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	92.4	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5026799)							
ES2314383-002	BH107R	EK067G: Total Phosphorus as P	----	1 mg/L	98.4	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5024018)							
ES2314383-001	BH104R	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	107	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5026073)							
ES2314383-001	BH104R	EP080: C6 - C9 Fraction	----	325 µg/L	98.0	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5026073)							
ES2314383-001	BH104R	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	101	70.0	130
EP080: BTEXN (QCLot: 5026073)							
ES2314383-001	BH104R	EP080: Benzene	71-43-2	25 µg/L	78.1	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	98.5	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	104	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	103	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	99.2	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2314383**	Page	: 1 of 10
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Telephone	: +61-2-8784 8555
Project	: M12 GROUNDWATER	Date Samples Received	: 02-May-2023
Site	: ----	Issue Date	: 08-May-2023
Sampler	: Emily Smith	No. of samples received	: 7
Order number	: 12554717	No. of samples analysed	: 7

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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	ES2314383--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	ES2314383--001	BH104R	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG020F: Dissolved Metals by ICP-MS	ES2314235--001	Anonymous	**Arsenic**	7440-38-2	34.4 %	70.0-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES2314235--001	Anonymous	**Cadmium**	7440-43-9	31.9 %	70.0-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES2314235--001	Anonymous	**Chromium**	7440-47-3	28.8 %	70.0-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES2314235--001	Anonymous	**Copper**	7440-50-8	32.8 %	70.0-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES2314235--001	Anonymous	**Lead**	7439-92-1	30.9 %	70.0-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES2314235--001	Anonymous	**Manganese**	7439-96-5	30.5 %	70.0-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES2314235--001	Anonymous	**Nickel**	7440-02-0	32.5 %	70.0-130%	**Recovery less than lower data quality objective**
EG020F: Dissolved Metals by ICP-MS	ES2314235--001	Anonymous	**Zinc**	7440-66-6	32.4 %	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
Method	QC 0	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	5	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	5	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, BH145R	**02-May-2023**	**----**	----	**----**	**04-May-2023**	09-May-2023	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
BH104R, BH107R, BH145R	**02-May-2023**	**----**	----	**----**	**04-May-2023**	09-May-2023	✓
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH145R	**02-May-2023**	**----**	----	**----**	**04-May-2023**	30-May-2023	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
BH104R, BH107R, BH145R	**02-May-2023**	**----**	----	**----**	**03-May-2023**	16-May-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
BH104R, BH107R, BH145R	**02-May-2023**	**----**	----	**----**	**04-May-2023**	30-May-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
BH104R, BH107R, BH145R	**02-May-2023**	**----**	----	**----**	**04-May-2023**	30-May-2023	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH145R	**02-May-2023**	**----**	----	**----**	**04-May-2023**	30-May-2023	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH104R, BH107R, BH145R, GWDUP1	**02-May-2023**	**----**	----	**----**	**04-May-2023**	29-Oct-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
GWRB1	**02-May-2023**	**04-May-2023**	29-Oct-2023	✓	**04-May-2023**	29-Oct-2023	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH104R, BH107R, BH145R, GWDUP1	**02-May-2023**	**----**	----	----	**05-May-2023**	30-May-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
GWRB1	**02-May-2023**	**----**	----	----	**07-May-2023**	30-May-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH104R, BH107R, BH145R	**02-May-2023**	**----**	----	----	**05-May-2023**	30-May-2023	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
BH104R, BH107R, BH145R	**02-May-2023**	**----**	----	----	**04-May-2023**	04-May-2023	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH104R, BH107R, BH145R	**02-May-2023**	**----**	----	----	**05-May-2023**	30-May-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
BH104R, BH107R, BH145R	**02-May-2023**	**04-May-2023**	30-May-2023	✓	**05-May-2023**	30-May-2023	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
BH104R, BH107R, BH145R	**02-May-2023**	**04-May-2023**	30-May-2023	✓	**05-May-2023**	30-May-2023	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
BH104R, BH107R, BH145R	**02-May-2023**	**----**	----	----	**04-May-2023**	04-May-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
BH104R, BH107R, BH145R	**02-May-2023**	**04-May-2023**	09-May-2023	✓	**05-May-2023**	13-Jun-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH145R	**02-May-2023**	**04-May-2023**	16-May-2023	✓	**04-May-2023**	16-May-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
BH104R, BH107R, BH145R	**02-May-2023**	**04-May-2023**	09-May-2023	✓	**05-May-2023**	13-Jun-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH145R	**02-May-2023**	**04-May-2023**	16-May-2023	✓	**04-May-2023**	16-May-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH145R, Trip spike	**02-May-2023**	**04-May-2023**	16-May-2023	✓	**04-May-2023**	16-May-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip blank	**27-Apr-2023**	**04-May-2023**	11-May-2023	✓	**04-May-2023**	11-May-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		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	1	3	**33.33**	**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	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	4	**25.00**	**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	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	16	**12.50**	**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	9	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	5	**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	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	3	**66.67**	**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	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	4	**25.00**	**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	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	16	**18.75**	**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	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	17	**17.65**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**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	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	3	**33.33**	**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	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	4	**25.00**	**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	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	16	**6.25**	**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	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**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	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	3	**33.33**	**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	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	4	**25.00**	**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	16	**6.25**	**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	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	5	**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.

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Company Name : GHD Pty Ltd, Sydney	**Contact Name :** Emily Smith 0431 522 928	**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; terry.nham@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	2/5/23	Water		X
2	GWDUP2	2/5/23	Water	X	
3					
4					
5					
6					
7					
8					
9					
10					

Laboratory Staff: Batch / Forwarded / Split No: SWDUP2, GWDUP2 EUROFINS
Lab Analysis: Organised By / Date: Relinquished By Date: Courier / Courier: WO No: 23-498L Attached By PO Internal Shop:

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:

Relinquished By: Emily Smith	**Received By:**	**Method Of Shipment**
Date & Time : 2/5/23 3.30pm	**Date & Time :** 7/5 9:00	☐ Courier ☐ Hand Delivered ☐ Postal ☐
Signature: eSmith	**Signature:**	**Courier Consignment # :**

Temperature on arrival: 3.9

Report number: 986190

eurofins | Environment Testing

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

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43 Detroit Drive
Rolleston,
Christchurch 7675
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IANZ# 1290

Sample Receipt Advice

Company name:	GHD Pty Ltd NSW
Contact name:	Emily Smith
Project name:	M12 WATER SAMPLING
Project ID:	12554717
Turnaround time:	5 Day
Date/Time received	May 3, 2023 4:00 PM
Eurofins reference	986190

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 : 3.4 degrees Celsius.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
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 Emily Smith - emily.smith@ghd.com.

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

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: **Emily Smith**

Report **986190-W**
Project name M12 WATER SAMPLING
Project ID 12554717
Received Date May 03, 2023

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S23-My0008656**	**S23-My0008657**
Date Sampled			**May 02, 2023**	**May 02, 2023**
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	0.001	-
Chromium (filtered)	0.001	mg/L	-	< 0.001
Copper	0.001	mg/L	0.002	-
Copper (filtered)	0.001	mg/L	-	0.006
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	-	0.008
Zinc	0.005	mg/L	< 0.005	-
Zinc (filtered)	0.005	mg/L	-	0.025

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 04, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	May 04, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins

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43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

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 #: 986190
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: May 3, 2023 4:00 PM
Due: May 10, 2023
Priority: 5 Day
Contact Name: Emily Smith

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 02, 2023		Water	S23-My0008656	X	
2	GWDUP2	May 02, 2023		Water	S23-My0008657		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 follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

Units

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

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*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 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. 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	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	90			80-120	Pass	
Arsenic (filtered)	%	94			80-120	Pass	
Cadmium	%	88			80-120	Pass	
Cadmium (filtered)	%	94			80-120	Pass	
Chromium	%	81			80-120	Pass	
Chromium (filtered)	%	83			80-120	Pass	
Copper	%	81			80-120	Pass	
Copper (filtered)	%	83			80-120	Pass	
Lead	%	87			80-120	Pass	
Lead (filtered)	%	87			80-120	Pass	
Mercury	%	97			80-120	Pass	
Mercury (filtered)	%	99			80-120	Pass	
Nickel	%	87			80-120	Pass	
Nickel (filtered)	%	90			80-120	Pass	
Zinc	%	88			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	N23-My0002941	NCP	%	107			75-125	Pass	
Cadmium	N23-My0002941	NCP	%	98			75-125	Pass	
Chromium	N23-My0002941	NCP	%	93			75-125	Pass	
Copper	N23-My0002941	NCP	%	87			75-125	Pass	
Lead	N23-My0002941	NCP	%	89			75-125	Pass	
Mercury	N23-My0002941	NCP	%	92			75-125	Pass	
Nickel	N23-My0002941	NCP	%	89			75-125	Pass	
Zinc	N23-My0002941	NCP	%	93			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S23-My0006619	NCP	%	93			75-125	Pass	
Cadmium (filtered)	S23-My0006619	NCP	%	89			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Copper (filtered)	S23-My0003197	NCP	%	81			75-125	Pass	
Lead (filtered)	S23-My0003197	NCP	%	85			75-125	Pass	
Mercury (filtered)	S23-My0006619	NCP	%	88			75-125	Pass	
Nickel (filtered)	S23-My0006619	NCP	%	81			75-125	Pass	
Zinc (filtered)	S23-My0006619	NCP	%	84			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	S23-My0002357	NCP	mg/L	0.006	0.006	2.4	30%	Pass	
Cadmium	S23-My0002357	NCP	mg/L	< 0.0002	0.0002	6.5	30%	Pass	
Chromium	S23-My0002357	NCP	mg/L	0.006	0.008	27	30%	Pass	
Copper	S23-My0002357	NCP	mg/L	0.044	0.046	4.9	30%	Pass	
Lead	S23-My0002357	NCP	mg/L	0.034	0.035	2.9	30%	Pass	
Mercury	S23-My0002357	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S23-My0002357	NCP	mg/L	0.017	0.019	7.3	30%	Pass	
Zinc	S23-My0002357	NCP	mg/L	0.069	0.074	6.2	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S23-My0008630	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S23-My0008630	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S23-My0008630	NCP	mg/L	0.057	0.056	1.8	30%	Pass	
Copper (filtered)	S23-My0008630	NCP	mg/L	0.001	0.001	2.5	30%	Pass	
Lead (filtered)	S23-My0008630	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S23-My0008630	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S23-My0008630	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc (filtered)	S23-My0008630	NCP	mg/L	0.015	0.014	1.5	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
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

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CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

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☐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	**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: Emily Smith	**SAMPLER MOBILE:** 0431 522 928	**RELINQUISHED BY:** Andrew Duval	**RECEIVED BY:**	**RELINQUISHED BY:**
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT	DATE/TIME: 7/6/23 4:00pm	DATE/TIME: 7/6/23 15:55	DATE/TIME:
Email Reports to: henry.luo@ghd.com, ghdlabreports@ghd.com; terry.nham@ghd.com; emily.smith@ghd.com; andrew.duval@ghd.com				**RECEIVED BY:**
				DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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 (8 dissolved 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 (SS)	W-14A (PAH/Phenols)	W-02T (8 total metals)	BTEXN		
1	BH104R	7/6/23	Water		6	X	X	X	X	X	X	X					
	BH107R		Water			X	X	X	X	X	X	X					
	BH112R		Water			X	X	X	X	X	X	X					
2	BH145R	6/6/23	Water		6	X	X	X	X	X	X	X					
3	GWDUP1	6/6/23	Water		1	X											
4	GWRB1	07/6/23	Water		1									X			
5	Trip spike	30/05/23	Water		1										X		
	Trip blank	05/06/23	Water		1										X		

HT

Environmental Division Sydney
Work Order Reference
ES2319027

Telephone : + 61-2-8784 8555

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2319027**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: sarah.mathew@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)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: EMILY SMITH		

Dates

Date Samples Received	: 07-Jun-2023 15:55	Issue Date	: 07-Jun-2023
Client Requested Due Date	: 15-Jun-2023	Scheduled Reporting Date	: **15-Jun-2023**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 7	Temperature	: 7.8'C
Receipt Detail	:	No. of samples received / analysed	: 6 / 6

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 - 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
ES2319027-001	07-Jun-2023 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2319027-002	06-Jun-2023 00:00	BH145R	✓	✓	✓	✓	✓	✓	✓
ES2319027-003	06-Jun-2023 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
ES2319027-004	07-Jun-2023 00:00	GWRB1		✓	
ES2319027-005	30-May-2023 00:00	Trip Spike	✓		
ES2319027-006	05-Jun-2023 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
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- 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
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- Electronic SRN for ESdat (ESRN_ESDAT)	Email	henry.luo@ghd.com

TERRY NHAM

- *AU Certificate of Analysis - NATA (COA)	Email	terry.nham@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	terry.nham@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	terry.nham@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	terry.nham@ghd.com
- Chain of Custody (CoC) (COC)	Email	terry.nham@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	terry.nham@ghd.com
- EDI Format - XTab (XTAB)	Email	terry.nham@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	terry.nham@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2319027**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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-Jun-2023 15:55
Order number	: 12554717	Date Analysis Commenced	: 07-Jun-2023
C-O-C number	: ----	Issue Date	: 15-Jun-2023 13:59
Sampler	: EMILY SMITH		
Site	: ----		
Quote number	: SY/322/21		
No. of samples received	: 6		
No. of samples analysed	: 6		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH145R	GWDUP1	GWRB1	Trip Spike
				Sampling date / time	07-Jun-2023 00:00	06-Jun-2023 00:00	06-Jun-2023 00:00	07-Jun-2023 00:00	30-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2319027-001	ES2319027-002	ES2319027-003	ES2319027-004	ES2319027-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**5250**	**7490**	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**83**	**67**	----	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**1520**	**1580**	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**802**	**834**	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**802**	**834**	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**135**	**269**	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**2870**	**4270**	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**171**	**125**	----	----	----
Magnesium	7439-95-4	1	mg/L		**265**	**308**	----	----	----
Sodium	7440-23-5	1	mg/L		**1430**	**2270**	----	----	----
Potassium	7440-09-7	1	mg/L		**19**	**14**	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.001**	**0.012**	**0.010**	----	----
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		**0.002**	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		**0.003**	**0.002**	**0.002**	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L		**0.007**	<0.005	<0.005	----	----
Manganese	7439-96-5	0.001	mg/L		**0.198**	**0.508**	----	----	----
Iron	7439-89-6	0.05	mg/L		**0.48**	**5.08**	----	----	----
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	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH145R	GWDUP1	GWRB1	Trip Spike
				Sampling date / time	07-Jun-2023 00:00	06-Jun-2023 00:00	06-Jun-2023 00:00	07-Jun-2023 00:00	30-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2319027-001	ES2319027-002	ES2319027-003	ES2319027-004	ES2319027-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
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		**1.10**	**1.82**	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.06**	<0.01	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.06**	<0.01	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.2**	**1.9**	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**1.3**	**1.9**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.07**	**0.05**	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	----	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**99.8**	**143**	----	----	----
ø Total Cations	----	0.01	meq/L		**93.0**	**131**	----	----	----
ø Ionic Balance	----	0.01	%		**3.51**	**4.40**	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH145R	GWDUP1	GWRB1	Trip Spike
				Sampling date / time	07-Jun-2023 00:00	06-Jun-2023 00:00	06-Jun-2023 00:00	07-Jun-2023 00:00	30-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2319027-001	ES2319027-002	ES2319027-003	ES2319027-004	ES2319027-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	----	----	**16**
Toluene	108-88-3	2	µg/L		<2	<2	----	----	**16**
Ethylbenzene	100-41-4	2	µg/L		<2	<2	----	----	**15**
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	----	----	**15**
ortho-Xylene	95-47-6	2	µg/L		<2	<2	----	----	**17**
^ Total Xylenes	----	2	µg/L		<2	<2	----	----	**32**
^ Sum of BTEX	----	1	µg/L		<1	<1	----	----	**79**
Naphthalene	91-20-3	5	µg/L		<5	<5	----	----	**17**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**106**	**106**	----	----	**107**
Toluene-D8	2037-26-5	2	%		**105**	**106**	----	----	**102**
4-Bromofluorobenzene	460-00-4	2	%		**107**	**105**	----	----	**103**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Trip Blank	----	----	----	----
			Sampling date / time	05-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2319027-006	--------	--------	--------	--------
				Result	----	----	----	----
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	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ **Total Xylenes**	----	2	µg/L	<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**104**	----	----	----	----
Toluene-D8	2037-26-5	2	%	**96.6**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	**96.8**	----	----	----	----

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	: **ES2319027**	Page	: 1 of 10
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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-Jun-2023
Order number	: 12554717	Date Analysis Commenced	: 07-Jun-2023
C-O-C number	: ----	Issue Date	: 15-Jun-2023
Sampler	: EMILY SMITH		
Site	: ----		
Quote number	: SY/322/21		
No. of samples received	: 6		
No. of samples analysed	: 6		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
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: 5103384)									
ES2318784-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	34200	36500	6.4	0% - 20%
ES2318962-008	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	286	282	1.2	0% - 20%
ES2318995-020	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2870	2830	1.2	0% - 20%
ES2319028-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	244	262	7.5	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5103385)									
ES2318784-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	176	158	11.4	0% - 20%
ES2318962-008	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2318995-020	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	10	10	0.0	No Limit
ES2319028-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	7	10	38.8	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 5103843)									
ES2318877-019	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	1860	1860	0.4	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	1860	1860	0.4	0% - 20%
ES2319027-001	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	802	801	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	802	801	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5098299)									
EW2302564-008	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2	2	0.0	No Limit
ES2319027-001	BH104R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	135	133	1.8	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5098298)									
EW2302564-008	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	10	10	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 (%)*
ED045G: Chloride by Discrete Analyser (QC Lot: 5098298) - continued									
ES2319027-001	BH104R	ED045G: Chloride	16887-00-6	1	mg/L	2870	2810	1.8	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5098817)									
ES2318894-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	1720	1720	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	62	62	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	1180	1150	2.6	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	6	6	0.0	No Limit
EW2302541-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	1	1	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	14	13	0.0	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5098821)									
EW2302541-002	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	0.002	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	0.046	0.046	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.007	0.007	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.147	0.147	0.0	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EW2302570-002	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	0.083	0.083	0.0	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	0.012	0.012	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.87	0.87	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5103310)									
ES2318963-013	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	1.04	1.04	0.4	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	0.016	103	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.09	0.10	0.0	No Limit
WN2307159-001	Anonymous	EG020A-F: Cadmium	7440-43-9	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 (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5103310) - continued									
WN2307159-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	<0.001	103	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	0.042	0.042	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.007	0.007	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.023	<0.005	128	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: 5103290)									
ES2319020-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	0.0010	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	0.003	0.002	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.044	0.044	0.0	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.026	0.026	0.0	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.990	0.993	0.3	0% - 20%
ES2318604-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	0.0003	0.0003	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.017	0.017	0.0	0% - 50%
		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	0.009	0.008	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.106	0.102	3.5	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.009	0.009	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	240 µg/L	0.239	0.0	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 5098819)									
ES2318894-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2318906-005	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: 5103309)									
ES2318963-016	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	0.0001	0.0001	0.0	No Limit
ES2318963-022	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: 5100847)									
ES2318604-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	0.1 µg/L	0.0001	0.0	No Limit
ES2319002-001	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: 5106626)									
ES2319027-001	BH104R	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.10	1.09	0.0	0% - 20%
ES2319028-008	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.11	0.0	0% - 50%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5098296)									
ES2319028-008	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.01	0.01	0.0	No Limit
ES2319027-001	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: 5106627)									

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 (%)*
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5106627) - continued									
ES2319027-001	BH104R	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.06	0.06	0.0	No Limit
ES2319028-008	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	4.75	4.74	0.0	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5106622)									
ES2318998-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	6.5	6.6	2.1	No Limit
ES2319028-008	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.3	1.3	0.0	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5106623)									
ES2318998-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.27	1.30	2.3	0% - 50%
ES2319028-008	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.70	0.72	2.7	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5098297)									
ES2319028-008	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.43	0.44	3.2	0% - 20%
ES2319027-001	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: 5099380)									
ES2319028-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2319028-005	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5099380)									
ES2319028-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2319028-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5099380)									
ES2319028-001	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
ES2319028-005	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: 5103384)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	92.4	87.0	109
				<10	293 mg/L	90.4	75.2	126
				<10	2320 mg/L	104	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5103385)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	98.3	83.0	129
				<5	1000 mg/L	91.5	82.0	110
				<5	926 mg/L	92.5	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 5103843)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	96.0	81.0	115
				----	50 mg/L	106	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5098299)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	106	82.0	122
				<1	500 mg/L	98.4	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 5098298)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	97.6	80.9	127
				<1	1000 mg/L	99.4	80.9	127
ED093F: Dissolved Major Cations (QCLot: 5098817)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	95.4	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	102	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	101	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 5098821)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.3	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	100	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.9	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.6	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.5	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	96.3	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.0	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.6	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.7	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
EG020F: Dissolved Metals by ICP-MS (QCLot: 5103310)								
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	96.6	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	90.6	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	91.5	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	94.8	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.0	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.4	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	92.2	82.0	112
EG020T: Total Metals by ICP-MS (QCLot: 5103290)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	107	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	106	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	107	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	106	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	105	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: 5098819)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	93.6	83.0	105
EG035F: Dissolved Mercury by FIMS (QCLot: 5103309)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	100	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5100847)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	94.6	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5106626)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	105	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5098296)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	106	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5106627)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	106	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5106622)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	97.6	69.0	101
				<0.1	1 mg/L	86.9	70.0	118
				<0.1	5 mg/L	92.2	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5106623)								

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: 5106623) - 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	112	71.3	126
				<0.01	1 mg/L	106	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5098297)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	101	85.0	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5099380)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	110	75.0	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5099611)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	85.9	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	79.9	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	106	58.3	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5099380)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	112	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5099611)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	80.0	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	79.2	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	69.5	50.5	115
EP080: BTEXN (QCLot: 5099380)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	99.0	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	104	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	98.2	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	101	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	104	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	97.1	75.5	124

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

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: 5098299)							
ES2319027-001	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: 5098298)							
ES2319027-001	BH104R	ED045G: Chloride	16887-00-6	50 mg/L	# Not Determined	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5098821)							
ES2318931-004	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	117	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	117	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	120	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	126	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	128	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	114	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	112	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	115	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5103310)							
ES2318963-014	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	99.3	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	99.7	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	97.1	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	94.8	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	95.3	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	95.7	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	97.0	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 5103290)							
ES2318837-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	101	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	103	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	108	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	118	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	100	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5098819)							
ES2318607-005	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	94.6	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5103309)							
ES2318963-015	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	90.4	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5100847)							
ES2318607-005	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	88.1	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5106626)							
ES2319027-001	BH104R	EK055G: Ammonia as N	7664-41-7	1 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*
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5098296)							
ES2319027-001	BH104R	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	105	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5106627)							
ES2319027-001	BH104R	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	96.5	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5106622)							
ES2319027-001	BH104R	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	99.6	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5106623)							
ES2319027-001	BH104R	EK067G: Total Phosphorus as P	----	1 mg/L	109	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5098297)							
ES2319027-001	BH104R	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	99.2	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5099380)							
ES2319028-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	129	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5099380)							
ES2319028-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	126	70.0	130
EP080: BTEXN (QCLot: 5099380)							
ES2319028-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	119	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	116	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	116	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	114	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	115	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	102	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2319027**	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-Jun-2023
Site	: ----	Issue Date	: 15-Jun-2023
Sampler	: EMILY SMITH	No. of samples received	: 6
Order number	: 12554717	No. of samples analysed	: 6

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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	ES2319027--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	ES2319027--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 / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
	0				
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	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* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) BH145R	**06-Jun-2023**	**----**	----	**----**	**09-Jun-2023**	13-Jun-2023	✓
Clear Plastic Bottle - Natural (EA015H) BH104R	**07-Jun-2023**	**----**	----	**----**	**09-Jun-2023**	14-Jun-2023	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H) BH145R	**06-Jun-2023**	**----**	----	**----**	**09-Jun-2023**	13-Jun-2023	✓
Clear Plastic Bottle - Natural (EA025H) BH104R	**07-Jun-2023**	**----**	----	**----**	**09-Jun-2023**	14-Jun-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH145R	06-Jun-2023	----	----	----	08-Jun-2023	04-Jul-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH104R	07-Jun-2023	----	----	----	08-Jun-2023	05-Jul-2023	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) BH145R	06-Jun-2023	----	----	----	10-Jun-2023	20-Jun-2023	✓
Clear Plastic Bottle - Natural (ED037-P) BH104R	07-Jun-2023	----	----	----	10-Jun-2023	21-Jun-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) BH145R	06-Jun-2023	----	----	----	08-Jun-2023	04-Jul-2023	✓
Clear Plastic Bottle - Natural (ED041G) BH104R	07-Jun-2023	----	----	----	08-Jun-2023	05-Jul-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) BH145R	06-Jun-2023	----	----	----	08-Jun-2023	04-Jul-2023	✓
Clear Plastic Bottle - Natural (ED045G) BH104R	07-Jun-2023	----	----	----	08-Jun-2023	05-Jul-2023	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH145R	06-Jun-2023	----	----	----	08-Jun-2023	04-Jul-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) BH104R	07-Jun-2023	----	----	----	08-Jun-2023	05-Jul-2023	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) BH145R	06-Jun-2023	----	----	----	08-Jun-2023	03-Dec-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) GWDUP1	06-Jun-2023	----	----	----	09-Jun-2023	03-Dec-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) BH104R	07-Jun-2023	----	----	----	08-Jun-2023	04-Dec-2023	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) GWRB1	07-Jun-2023	09-Jun-2023	04-Dec-2023	✓	09-Jun-2023	04-Dec-2023	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) BH145R	06-Jun-2023	----	----	----	09-Jun-2023	04-Jul-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) GWDUP1	06-Jun-2023	----	----	----	13-Jun-2023	04-Jul-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) BH104R	07-Jun-2023	----	----	----	09-Jun-2023	05-Jul-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) GWRB1	07-Jun-2023	----	----	----	11-Jun-2023	05-Jul-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH145R	06-Jun-2023	----	----	----	13-Jun-2023	04-Jul-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH104R	07-Jun-2023	----	----	----	13-Jun-2023	05-Jul-2023	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BH145R	06-Jun-2023	----	----	----	08-Jun-2023	08-Jun-2023	✓
Clear Plastic Bottle - Natural (EK057G) BH104R	07-Jun-2023	----	----	----	08-Jun-2023	09-Jun-2023	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH145R	06-Jun-2023	----	----	----	13-Jun-2023	04-Jul-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH104R	07-Jun-2023	----	----	----	13-Jun-2023	05-Jul-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH145R	06-Jun-2023	13-Jun-2023	04-Jul-2023	✓	13-Jun-2023	04-Jul-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH104R	07-Jun-2023	13-Jun-2023	05-Jul-2023	✓	13-Jun-2023	05-Jul-2023	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH145R	06-Jun-2023	13-Jun-2023	04-Jul-2023	✓	13-Jun-2023	04-Jul-2023	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH104R	07-Jun-2023	13-Jun-2023	05-Jul-2023	✓	13-Jun-2023	05-Jul-2023	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) BH145R	06-Jun-2023	----	----	----	08-Jun-2023	08-Jun-2023	✓
Clear Plastic Bottle - Natural (EK071G) BH104R	07-Jun-2023	----	----	----	08-Jun-2023	09-Jun-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BH145R	**06-Jun-2023**	**08-Jun-2023**	13-Jun-2023	✓	**09-Jun-2023**	18-Jul-2023	✓
Amber Glass Bottle - Unpreserved (EP071) BH104R	**07-Jun-2023**	**08-Jun-2023**	14-Jun-2023	✓	**09-Jun-2023**	18-Jul-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**05-Jun-2023**	**08-Jun-2023**	19-Jun-2023	✓	**08-Jun-2023**	19-Jun-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**06-Jun-2023**	**08-Jun-2023**	20-Jun-2023	✓	**08-Jun-2023**	20-Jun-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R	**07-Jun-2023**	**08-Jun-2023**	21-Jun-2023	✓	**08-Jun-2023**	21-Jun-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BH145R	**06-Jun-2023**	**08-Jun-2023**	13-Jun-2023	✓	**09-Jun-2023**	18-Jul-2023	✓
Amber Glass Bottle - Unpreserved (EP071) BH104R	**07-Jun-2023**	**08-Jun-2023**	14-Jun-2023	✓	**09-Jun-2023**	18-Jul-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**05-Jun-2023**	**08-Jun-2023**	19-Jun-2023	✓	**08-Jun-2023**	19-Jun-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**06-Jun-2023**	**08-Jun-2023**	20-Jun-2023	✓	**08-Jun-2023**	20-Jun-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R	**07-Jun-2023**	**08-Jun-2023**	21-Jun-2023	✓	**08-Jun-2023**	21-Jun-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) Trip Blank	**05-Jun-2023**	**08-Jun-2023**	19-Jun-2023	✓	**08-Jun-2023**	19-Jun-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH145R	**06-Jun-2023**	**08-Jun-2023**	20-Jun-2023	✓	**08-Jun-2023**	20-Jun-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH104R	**07-Jun-2023**	**08-Jun-2023**	21-Jun-2023	✓	**08-Jun-2023**	21-Jun-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) Trip Spike	**30-May-2023**	**08-Jun-2023**	13-Jun-2023	✓	**08-Jun-2023**	13-Jun-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	4	37	**10.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	33	**12.12**	**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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	**10.00**	**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	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	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	11	**18.18**	**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	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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	**6.06**	**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	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**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	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	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	11	**9.09**	**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	20	**5.00**	**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	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	**6.06**	**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	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**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	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	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	11	**9.09**	**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	20	**5.00**	**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	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	**6.06**	**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	20	**5.00**	**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 Mercury by FIMS	EG035T	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	11	**9.09**	**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.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

□BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
□GLADSTONE 1/2 Kitchener Drive Callemondah QLD 4680 Ph: 07 4971 9730 E: samples.gladstone@alsglobal.com
□MACKAY 78 Harbour Road MACKAY QLD 4740 Ph: 07 4944 0177 E: samples.mackay@alsglobal.com
□NEWCASTLE 5/19 Asquith Street Mayfield West NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
□TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: samples.townsville@alsglobal.com
□WAGGA WAGGA 2 Dalman Road Wagga Wagga NSW 2650 Ph: 02 6971 9696 E: samples.wagga@alsglobal.com
□WOLLONGONG Unit 1, 16 Steel Place Morningside QLD 4170 Ph: 07 3841 8312 E: samples.wollongong@alsglobal.com
□SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
□PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

Environmental Division Sydney

Work Order Reference ES2319028

8.2

+61-2-8784 8555

STANDARD TAT

CLIENT:	GHD Pty Ltd
OFFICE:	Sydney
PROJECT:	M12 Surface Water
ORDER NUMBER:	12554717
PROJECT MANAGER:	Henry Luo
SAMPLER:	Emily Smith
COC emailed to ALS? (YES / NO)	
Email Reports to:	henry.luo@ghd.com , ghdlabreports@ghd.com; terry.nham@ghd.com, emily.smith@ghd.com; andrew.duval@ghd.com

TURNAROUND REQUIREMENT: (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)
☐ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.: SY/322/21

CONTACT PH: Henry Luo 0414 090 002

SAMPLER MOBILE: 0431 522 928

EDD FORMAT (or default): ESDAT

COC SEQUENCE NUMBER (Circle)

COC:	1	2	3	4	5	6	7
OF:	1	2	3	4	5	6	7

RELINQUISHED BY: Andrew Duval
DATE/TIME: 7/6/23 4:00pm

RECEIVED BY:
DATE/TIME: 7/6/23 15:55

RELINQUISHED B
DATE/TIME: 8/8 12:20

FOR LABO
Custody Seal
Free Ice / froze
Random Samp
Other commen

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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).

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		W-02T (8 total metals)	EG020T (total Fe, Mn)	NT-08A (total N, NO2, NO3, NH3, Total P, reactive P)	EP008 (chlorophyll a)	EP020 (oil & grease)	UTO-9W Ultra trace OP Only	EP074DEFG (VOC - fumigants, Hal aliphatics, Hal Aromatics, THM)	MW006 (FC) Thermotolerant Coliforms	W-14A (PAH/phenols)	EA015H (TDS), EA025H (TSS)	EP080 (BTEXN)	Ultra trace OPP (EP234AX)	Super Utra Trace PCB's (EP1318-ST)	PFAS - full suite (EP231X)
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	Comments	TOTAL CONTAINERS														
1	BADDS	7/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
2	BADMS	7/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
3	BADUS	7/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
4	COSDS	7/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
5	COSUS	7/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
6	HINDS	6/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
7	HINUS	6/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
8	KEMDS	6/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
9	KEMUS	6/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
10	ROPDS	6/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
11	ROPUS	6/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
12	SOUDS	6/6/23	Water		11	X	X	X	X	X	X	X		X	X	X			
13	SOUUS	6/6/23	Water		1	X													
14	SWDUP1	6/6/23	Water	PLEASE FORWARD TO EUROFINS WITH ATTACHED COC	1														
-	SWDUP2	7/6/23	Water	PLEASE FORWARD TO EUROFINS WITH ATTACHED COC	1														
-	GWDUP2	7/6/23	Water																

HT

Subcon: ____ / Split WO: ____
Lab / Analyst: Euro+(0) - SWDUP2 Bur GWDUP2
Organised by / Date: ____
Relinquished by / Date: ____
Courier: ____

ES2319028

eurofins | mgt

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

☐ Brisbane
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Phone: +617 3902 4600
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☐ 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

Office Address :

Level 15, 133 Castlereagh Street, Sydney NSW 2000

Contact Name : Emily Smith 0431 522 928

Project Manager: Henry Luo 0414 090 002

Email for results : emily.smith@ghd.com; terry.nham@ghd.com; henry.luo@ghd.com; ghdlabreports@ghd.com

Purchase Order : 12554717

PROJECT Number : 12554717

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	7/6/23	Water		X							
2	GWDUP2	7/6/23	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:

Laboratory Staff

Relinquished By: Andrew Duval

Date & Time : 7/6/23 4pm

Signature: Duval

Received By:

Date & Time :

Signature:

Method Of Shipment

☐ Courier
☐ Hand Delivered
☐ Postal
☐ Courier Consignment # :

Temperature on arrival:

Report number:

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
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VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	Tel: +61 2 4968 8448
Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261 Site# 1254	NATA# 1261 Site# 25403	NATA# 1261 Site# 18217	NATA# 1261 Site# 25466	NATA# 1261 Site# 20794	Site# 25079 & 25289

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Penrose,	Rolleston,
Auckland 1061	Christchurch 7675
Tel: +64 9 526 4551	Tel: +64 3 343 5201
IANZ# 1327	IANZ# 1290

Sample Receipt Advice

Company name:	GHD Pty Ltd NSW
Contact name:	Emily Smith
Project name:	M12 WATER SAMPLING
Project ID:	12554717
Turnaround time:	5 Day
Date/Time received	Jun 8, 2023 4:20 PM
Eurofins reference	997826

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 : 8.4 degrees Celsius.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
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 Emily Smith - emily.smith@ghd.com.

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

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: **Emily Smith**

Report **997826-W**
Project name M12 WATER SAMPLING
Project ID 12554717
Received Date Jun 08, 2023

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S23-Jn0024630**	**S23-Jn0024631**
Date Sampled			**Jun 07, 2023**	**Jun 07, 2023**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	< 0.001	-
Arsenic (filtered)	0.001	mg/L	-	0.002
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	-	< 0.001
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	-	0.002
Zinc	0.005	mg/L	< 0.005	-
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	Jun 16, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Jun 13, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins

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NATA# 1261 Site# 18217

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43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: +64 3 343 5201
IANZ# 1290

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 #: 997826
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Jun 8, 2023 4:20 PM
Due: Jun 16, 2023
Priority: 5 Day
Contact Name: Emily Smith

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Metals M8	Metals M8 filtered
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SWDUP2	Jun 07, 2023		Water	S23-Jn0024630	X	
2	GWDUP2	Jun 07, 2023		Water	S23-Jn0024631		X
Test Counts						1	1

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Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*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 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. 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	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	93			80-120	Pass	
Arsenic (filtered)	%	83			80-120	Pass	
Cadmium	%	92			80-120	Pass	
Cadmium (filtered)	%	82			80-120	Pass	
Chromium	%	96			80-120	Pass	
Chromium (filtered)	%	83			80-120	Pass	
Copper	%	105			80-120	Pass	
Copper (filtered)	%	85			80-120	Pass	
Lead	%	107			80-120	Pass	
Lead (filtered)	%	85			80-120	Pass	
Mercury	%	104			80-120	Pass	
Mercury (filtered)	%	94			80-120	Pass	
Nickel	%	96			80-120	Pass	
Nickel (filtered)	%	84			80-120	Pass	
Zinc	%	100			80-120	Pass	
Zinc (filtered)	%	84			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	S23-Jn0027532	NCP	%	91			75-125	Pass	
Cadmium	S23-Jn0027532	NCP	%	89			75-125	Pass	
Chromium	S23-Jn0027532	NCP	%	87			75-125	Pass	
Copper	S23-Jn0027532	NCP	%	94			75-125	Pass	
Lead	S23-Jn0027532	NCP	%	96			75-125	Pass	
Mercury	S23-Jn0027532	NCP	%	98			75-125	Pass	
Nickel	S23-Jn0027532	NCP	%	86			75-125	Pass	
Zinc	S23-Jn0027532	NCP	%	93			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S23-Jn0027532	NCP	%	91			75-125	Pass	
Cadmium (filtered)	S23-Jn0027532	NCP	%	86			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chromium (filtered)	S23-Jn0027532	NCP	%	83			75-125	Pass	
Copper (filtered)	S23-Jn0027532	NCP	%	82			75-125	Pass	
Lead (filtered)	S23-Jn0027532	NCP	%	83			75-125	Pass	
Mercury (filtered)	S23-Jn0027532	NCP	%	93			75-125	Pass	
Nickel (filtered)	S23-Jn0027532	NCP	%	81			75-125	Pass	
Zinc (filtered)	S23-Jn0027532	NCP	%	82			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	R23-Jn0018617	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	R23-Jn0018617	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	R23-Jn0018617	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	R23-Jn0018617	NCP	mg/L	0.033	0.033	<1	30%	Pass	
Lead	R23-Jn0018617	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	R23-Jn0018617	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	R23-Jn0018617	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	R23-Jn0018617	NCP	mg/L	0.029	0.028	4.9	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	R23-Jn0019376	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	R23-Jn0019376	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	R23-Jn0019376	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	R23-Jn0019376	NCP	mg/L	0.003	0.003	1.3	30%	Pass	
Lead (filtered)	R23-Jn0019376	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	R23-Jn0019376	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	R23-Jn0019376	NCP	mg/L	0.002	0.002	2.7	30%	Pass	
Zinc (filtered)	R23-Jn0019376	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



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

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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
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☐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	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: Emily Smith Andrew Duval	**SAMPLER MOBILE:** 0431 522 928	**RELINQUISHED BY:** Andrew Duval	**RECEIVED BY:**	**RELINQUISHED BY:**
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT	DATE/TIME: 7/7/23	DATE/TIME: 7/7/23 4:30	DATE/TIME:
Email Reports to: henry.luo@ghd.com, ghdlabreports@ghd.com; terry.nham@ghd.com; emily.smith@ghd.com; andrew.duval@ghd.com				

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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 (8 dissovled 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 (SS)	W-14A (PAH/Phenols)	W-02T (8 total metals)	BTEXN		
1	BH104R	7/7/23	Water		6	X	X	X	X	X	X	X					
2	BH107R	7/7/23	Water		6	X	X	X	X	X	X	X					
~~BH112R~~			Water			X	X	X	X	X	X	X					
3	BH145R		Water		6	X	X	X	X	X	X	X					
4	GWDUP1	7/7/23	Water		1	X											
5	GWRB1	7/7/23	Water		1									X			
6	Trip spike	7/7/23	Water		1										X		
7	Trip blank	7/7/23	Water		1										X		
	GWDUP2	7/7/23	W	PLEASE FWD TO EUROFINS	1												
	SW DUP2	7/7/23	W	PLEASE FWD TO EUROFINS WITH ATTACHED COC	1												

Environmental Division
Sydney
Work Order Reference
ES2322790

Telephone : +61-2-8784 8555

HT

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 :** Emily Smith 0431 522 928	**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; terry.nham@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	7/7/23	Water		X					
2	GWDUP2	7/7/23	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:

Laboratory Staff

Relinquished By: Andrew Duval	**Received By:**
Date & Time : 7/7/23	**Date & Time :**
Signature:	**Signature:**

Method Of Shipment

☐ Courier
☐ Hand Delivered
☐ Postal
☐
Courier Consignment # :

Temperature on arrival:

Report number:

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
☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@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: samples.melbourne@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4421 3125 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 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	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: Emily Smith Andrew Duval	**SAMPLER MOBILE:** 0431 522 928	**RELINQUISHED BY:** Andrew Duval	**RECEIVED BY:**	**RELINQUISHED BY:**
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT	DATE/TIME: 7/7/23	DATE/TIME: 7/7/23 4:30	DATE/TIME:
Email Reports to: henry.luo@ghd.com, ghdlabreports@ghd.com; terry.nham@ghd.com; emily.smith@ghd.com; andrew.duval@ghd.com				

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

Forward to Lab WO
Lab / Analysis: Eurofins
Organised By / Date:
Relinquished By / Date:
Connote / Courier: QC FWD
WO No: ES2322790
Attach By POs / Email Sheet:

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 (8 dissovled 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 (SS)	W-14A (PAH/Phenols)	W-02T (8 total metals)	BTEXN		
1	BH104R	7/7/23	Water		6	X	X	X	X	X	X	X					
2	BH107R	7/7/23	Water		6	X	X	X	X	X	X	X					
~~BH112R~~			Water			X	X	X	X	X	X	X					
3	BH145R		Water		6	X	X	X	X	X	X	X					
4	GWDUP1	7/7/23	Water		1	X											
5	GWRB1	7/7/23	Water		1									X			
6	Trip spike	7/7/23	Water		1										X		
7	Trip blank	7/7/23	Water		1										X		
	GWDUP2	7/7/23	W	PLEASE FWD TO EUROFINS	1												
	SWDUP2	7/7/23	W	PLEASE FWD TO EUROFINS WITH ATTACHED COC	1												

Environmental Division
Sydney
Work Order Reference
ES2322790

Telephone : +61-2-8784 8555

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: samples.mackay@alsglobal.com

□TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: samples.townsville@alsglobal.com

□NEWCASTLE 4/19 Asquith Street Mayfield West NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

□SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

□ORANGE 1/10 Warne Street Orange NSW 2800 Ph: 02 6364 5990 E: samples.orange@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 REQUIREMENTS** ☐ 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 Organics) ☐ Non Standard or urgent TAT **(List due date):**		Custody Seal Intact? No N/A
PROJECT: M12 Surface Water	**ALS QUOTE NO.:** SY/322/21	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt? 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: Emily Smith, Andrew Duval	**SAMPLER MOBILE:** 0431 522 928	**RELINQUISHED BY:** ~~Emily Smith~~ Andrew Duval	**RECEIVED BY:** Farv	**RELINQUISHED BY:**
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** ESDAT	DATE/TIME: 7/7/23	DATE/TIME: 7/7/23 4:32	DATE/TIME:
Email Reports to: henry.luo@ghd.com , ghdlabreports@ghd.com; terry.nham@ghd.com, emily.smith@ghd.com; andrew.duval@ghd.com				**RECEIVED BY:**
				DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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-02T (8 total metals)	EG020T (total Fe, Mn)	NT-08A (total N, No2, No3, NH3, Total P, reactive P)	EP008 (chlorophyll a)	EP020 (oil & grease)	UTO-9W Ultra trace OC/OP	EP074DEFG (VOC - fumigants, Hal aliphatics, Hal Aromatics, THM)	MW006 (FC) Thermotolerant Coliforms	W-14A (PAH/phenols)	EA015H (TDS), EA025H (TSS)	EP080 (BTEXN)	Ultra trace OPP (EP234AX)	Super Utra Trace PCB's (EP1318-ST)	PFAS - full suite (EP231X)
1	BADDS	7/7/23	Water		11	X	X	X	X	X		X		X	X	X	X		
9	BADMS	7/7/23	W		11	X	X	X	X	X		X		X	X	X	X		
10	BADUS	7/7/23	W		11	X	X	X	X	X		X		X	X	X	X		

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2322790**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: sarah.mathew@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)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: ANDREW DUVAL, EMILY SMITH		

Dates

Date Samples Received	: 07-Jul-2023 16:30	Issue Date	: 10-Jul-2023
Client Requested Due Date	: 14-Jul-2023	Scheduled Reporting Date	: **14-Jul-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 2	Temperature	: ----
Receipt Detail	:	No. of samples received / analysed	: 7 / 7

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
- 10/07/2023 - This is an updated SRN which indicates the removal of samples to be processed in a separate COC as per client.
- **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
ES2322790-001	07-Jul-2023 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2322790-002	07-Jul-2023 00:00	BH107R	✓	✓	✓	✓	✓	✓	✓
ES2322790-003	07-Jul-2023 00:00	BH145R	✓	✓	✓	✓	✓	✓	✓
ES2322790-004	07-Jul-2023 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
ES2322790-005	07-Jul-2023 00:00	GWRB1		✓	
ES2322790-006	07-Jul-2023 00:00	Trip spike	✓		
ES2322790-007	07-Jul-2023 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
TERRY NHAM		
- *AU Certificate of Analysis - NATA (COA)	Email	terry.nham@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	terry.nham@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	terry.nham@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	terry.nham@ghd.com
- Chain of Custody (CoC) (COC)	Email	terry.nham@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	terry.nham@ghd.com
- EDI Format - XTab (XTAB)	Email	terry.nham@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	terry.nham@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2322790**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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-Jul-2023 16:30
Order number	: ----	Date Analysis Commenced	: 10-Jul-2023
C-O-C number	: ----	Issue Date	: 13-Jul-2023 18:29
Sampler	: ANDREW DUVAL, EMILY SMITH		
Site	: ----		
Quote number	: SY/322/21		
No. of samples received	: 7		
No. of samples analysed	: 7		

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

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

This 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: Results for ES2322790-01 and #3 have been confirmed by re-analysis.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH145R	GWDUP1	GWRB1
				Sampling date / time	07-Jul-2023 00:00	07-Jul-2023 00:00	07-Jul-2023 00:00	07-Jul-2023 00:00	07-Jul-2023 00:00
Compound	CAS Number	LOR	Unit		ES2322790-001	ES2322790-002	ES2322790-003	ES2322790-004	ES2322790-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**5540**	**1840**	**8730**	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**144**	**161**	**111**	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**1360**	**447**	**1830**	----	----
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		**840**	**1360**	**881**	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**840**	**1360**	**881**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**120**	**156**	**271**	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**2710**	**183**	**4220**	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**143**	**29**	**126**	----	----
Magnesium	7439-95-4	1	mg/L		**243**	**91**	**368**	----	----
Sodium	7440-23-5	1	mg/L		**1490**	**622**	**2480**	----	----
Potassium	7440-09-7	1	mg/L		**18**	**12**	**15**	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.002**	<0.001	**0.006**	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		<0.001	**0.001**	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L		<0.001	**0.005**	**0.002**	**0.005**	----
Nickel	7440-02-0	0.001	mg/L		**0.003**	**0.002**	**0.001**	**0.001**	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L		<0.005	**0.012**	<0.005	**0.007**	----
Manganese	7439-96-5	0.001	mg/L		**0.178**	**0.033**	**0.352**	----	----
Iron	7439-89-6	0.05	mg/L		**0.91**	<0.05	**4.40**	----	----
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

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH145R	GWDUP1	GWRB1
				Sampling date / time	07-Jul-2023 00:00	07-Jul-2023 00:00	07-Jul-2023 00:00	07-Jul-2023 00:00	07-Jul-2023 00:00
Compound	CAS Number	LOR	Unit		ES2322790-001	ES2322790-002	ES2322790-003	ES2322790-004	ES2322790-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
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	<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		**1.06**	**0.03**	**1.86**	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.04**	**3.23**	<0.01	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.04**	**3.23**	<0.01	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.3**	**0.8**	**1.9**	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**1.3**	**4.0**	**1.9**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.14**	**0.09**	**0.11**	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**95.7**	**35.6**	**142**	----	----
ø Total Cations	----	0.01	meq/L		**92.4**	**36.3**	**145**	----	----
ø Ionic Balance	----	0.01	%		**1.76**	**1.00**	**0.89**	----	----
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	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH145R	GWDUP1	GWRB1
				Sampling date / time	07-Jul-2023 00:00	07-Jul-2023 00:00	07-Jul-2023 00:00	07-Jul-2023 00:00	07-Jul-2023 00:00
Compound	CAS Number	LOR	Unit		ES2322790-001	ES2322790-002	ES2322790-003	ES2322790-004	ES2322790-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ 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	----	----
^ 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	%		**102**	**119**	**105**	----	----
Toluene-D8	2037-26-5	2	%		**99.6**	**97.7**	**102**	----	----
4-Bromofluorobenzene	460-00-4	2	%		**96.8**	**104**	**102**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Trip spike	Trip blank	----	----	----
			Sampling date / time	07-Jul-2023 00:00	07-Jul-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES2322790-006	ES2322790-007	--------	--------	--------
				Result	Result	----	----	----
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	**18**	<1	**----**	**----**	**----**
Toluene	108-88-3	2	µg/L	**18**	<2	**----**	**----**	**----**
Ethylbenzene	100-41-4	2	µg/L	**17**	<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	**88**	<1	**----**	**----**	**----**
Naphthalene	91-20-3	5	µg/L	**19**	<5	**----**	**----**	**----**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**102**	**108**	**----**	**----**	**----**
Toluene-D8	2037-26-5	2	%	**106**	**103**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	2	%	**102**	**102**	**----**	**----**	**----**

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	: **ES2322790**	Page	: 1 of 9
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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-Jul-2023
Order number	: ----	Date Analysis Commenced	: 10-Jul-2023
C-O-C number	: ----	Issue Date	: 13-Jul-2023
Sampler	: ANDREW DUVAL, EMILY SMITH		
Site	: ----		
Quote number	: SY/322/21		
No. of samples received	: 7		
No. of samples analysed	: 7		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

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: 5166792)									
ES2322594-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	416	408	2.1	0% - 20%
ES2322594-011	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	508	518	2.0	0% - 20%
ES2322639-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	778	822	5.4	0% - 20%
ES2322772-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	127	127	0.0	0% - 50%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5166793)									
ES2322594-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2322594-011	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2322639-005	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2322772-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 5163883)									
ES2322703-004	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	654	655	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	654	655	0.0	0% - 20%
EW2303063-001	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	36	43	18.5	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	36	43	18.5	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5164218)									
ES2322300-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	26	26	0.0	0% - 20%
ES2322790-001	BH104R	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	120	125	3.8	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5164219)									
ES2322489-035	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	9	8	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 (%)*
ED045G: Chloride by Discrete Analyser (QC Lot: 5164219) - continued									
ES2322697-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	15000	15300	1.9	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5164674)									
ES2322640-021	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	80	79	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	101	102	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	724	730	0.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	26	26	0.0	0% - 20%
ES2322790-001	BH104R	ED093F: Calcium	7440-70-2	1	mg/L	143	141	1.3	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	243	241	1.1	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	1490	1470	1.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	18	18	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5164675)									
ES2322640-021	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	0.295	0.291	1.3	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.004	50.6	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
ES2322790-001	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	0.002	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	0.002	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	0.178	0.178	0.0	0% - 20%
		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	<0.005	<0.005	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.91	0.87	4.9	0% - 50%
EG020T: Total Metals by ICP-MS (QC Lot: 5165688)									
ES2322640-020	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	0.0003	<0.0001	95.4	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	0.002	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	0.003	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.008	0.009	0.0	No Limit
ES2322640-030	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	0.002	0.002	0.0	No Limit
		EG020A-T: 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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 5165688) - continued									
ES2322640-030	Anonymous	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	0.003	<0.001	95.0	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: 5164673)									
ES2322640-016	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2322640-024	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: 5164363)									
ES2322685-002	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2322736-026	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: 5166778)									
ES2322790-001	BH104R	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.06	1.08	1.3	0% - 20%
EW2303025-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5164223)									
ES2322696-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.11	0.11	0.0	0% - 50%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5166777)									
ES2322790-001	BH104R	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.04	0.0	No Limit
EW2303025-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.03	0.04	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5166773)									
ES2322707-007	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EW2302969-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5166774)									
ES2322707-007	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.0	No Limit
EW2302969-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.08	156	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5164221)									
ES2322665-001	Anonymous	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: 5166321)									
ES2321960-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	60	60	0.0	No Limit
ES2322790-001	BH104R	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5166321)									
ES2321960-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	80	80	0.0	No Limit
ES2322790-001	BH104R	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5166321)									
ES2321960-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	20	20	0.0	0% - 20%
		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

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: 5166321) - continued									
ES2321960-001	Anonymous	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
ES2322790-001	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

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: 5166792)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	103	87.0	109
				<10	293 mg/L	102	75.2	126
				<10	2320 mg/L	109	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5166793)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	102	83.0	129
				<5	1000 mg/L	97.6	82.0	110
				<5	926 mg/L	106	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 5163883)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	99.6	81.0	115
				----	50 mg/L	109	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5164218)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	82.0	122
				<1	500 mg/L	99.4	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 5164219)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	99.1	80.9	127
				<1	1000 mg/L	98.5	80.9	127
ED093F: Dissolved Major Cations (QCLot: 5164674)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	92.2	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	102	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	103	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.8	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 5164675)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	89.1	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	90.2	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.0	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	89.8	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.8	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	94.3	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.5	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	89.3	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	90.9	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: 5165688)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.5	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.0	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.6	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	100	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.0	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	103	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	103	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 5164673)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	104	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5164363)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	106	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5166778)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	104	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5164223)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	99.7	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5166777)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	99.7	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5166773)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	77.7	69.0	101
				<0.1	1 mg/L	80.6	70.0	118
				<0.1	5 mg/L	93.6	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5166774)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	92.0	71.3	126
				<0.01	0.442 mg/L	99.2	71.3	126
				<0.01	1 mg/L	72.0	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5164221)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	94.3	85.0	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5163576)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	65.9	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	76.3	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	107	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5166321)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	83.8	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5163576)								

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: 5163576) - continued								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	75.0	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	73.2	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	90.3	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5166321)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	84.2	75.0	127
EP080: BTEXN (QCLot: 5166321)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	94.8	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	91.2	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	89.9	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	92.6	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	95.5	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: 5164218)							
ES2322300-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	94.3	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5164219)							
ES2322489-035	Anonymous	ED045G: Chloride	16887-00-6	50 mg/L	122	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5164675)							
ES2322640-022	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	102	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	92.5	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	90.3	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	95.5	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	91.5	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	91.2	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	95.9	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	93.5	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 5165688)							
ES2322640-021	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	108	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: 5165688) - continued							
ES2322640-021	Anonymous	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	97.4	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	94.3	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	102	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	96.3	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	101	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5164673)							
ES2322640-015	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	96.0	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5164363)							
ES2322685-003	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	92.4	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5166778)							
ES2322790-001	BH104R	EK055G: Ammonia as N	7664-41-7	1 mg/L	100	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5164223)							
ES2322696-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	106	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5166777)							
ES2322790-001	BH104R	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	110	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5166773)							
ES2322707-008	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	91.8	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5166774)							
ES2322707-008	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	97.1	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5164221)							
ES2322665-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	99.1	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5166321)							
ES2321960-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	110	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5166321)							
ES2321960-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	109	70.0	130
EP080: BTEXN (QCLot: 5166321)							
ES2321960-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	108	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	109	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	112	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	116	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	109	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2322790**	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	: 07-Jul-2023
Site	: ----	Issue Date	: 13-Jul-2023
Sampler	: ANDREW DUVAL, EMILY SMITH	No. of samples received	: 7
Order number	: ----	No. of samples analysed	: 7

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural						
BH104R, BH107R, BH145R	----	----	----	11-Jul-2023	09-Jul-2023	**2**
EK071G: Reactive Phosphorus as P by discrete analyser						
Clear Plastic Bottle - Natural						
BH104R, BH107R, BH145R	----	----	----	11-Jul-2023	09-Jul-2023	**2**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
	0				
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	7	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	7	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, BH145R	**07-Jul-2023**	**----**	----	**----**	**12-Jul-2023**	14-Jul-2023	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
BH104R, BH107R, BH145R	**07-Jul-2023**	**----**	----	**----**	**12-Jul-2023**	14-Jul-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH145R	**07-Jul-2023**	----	----	----	**11-Jul-2023**	04-Aug-2023	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
BH104R, BH107R, BH145R	**07-Jul-2023**	----	----	----	**10-Jul-2023**	21-Jul-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
BH104R, BH107R, BH145R	**07-Jul-2023**	----	----	----	**11-Jul-2023**	04-Aug-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
BH104R, BH107R, BH145R	**07-Jul-2023**	----	----	----	**11-Jul-2023**	04-Aug-2023	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH145R	**07-Jul-2023**	----	----	----	**11-Jul-2023**	04-Aug-2023	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH104R, BH107R, BH145R, GWDUP1	**07-Jul-2023**	----	----	----	**11-Jul-2023**	03-Jan-2024	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
GWRB1	**07-Jul-2023**	**11-Jul-2023**	03-Jan-2024	✓	**11-Jul-2023**	03-Jan-2024	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH104R, BH107R, BH145R, GWDUP1	**07-Jul-2023**	----	----	----	**12-Jul-2023**	04-Aug-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
GWRB1	**07-Jul-2023**	----	----	----	**11-Jul-2023**	04-Aug-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH104R, BH107R, BH145R	**07-Jul-2023**	----	----	----	**13-Jul-2023**	04-Aug-2023	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
BH104R, BH107R, BH145R	**07-Jul-2023**	----	----	----	**11-Jul-2023**	09-Jul-2023	×

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH104R, BH107R, BH145R	**07-Jul-2023**	**----**	----	----	**13-Jul-2023**	04-Aug-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
BH104R, BH107R, BH145R	**07-Jul-2023**	**12-Jul-2023**	04-Aug-2023	✓	**13-Jul-2023**	04-Aug-2023	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
BH104R, BH107R, BH145R	**07-Jul-2023**	**12-Jul-2023**	04-Aug-2023	✓	**13-Jul-2023**	04-Aug-2023	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
BH104R, BH107R, BH145R	**07-Jul-2023**	**----**	----	----	**11-Jul-2023**	09-Jul-2023	×
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
BH104R, BH107R, BH145R	**07-Jul-2023**	**11-Jul-2023**	14-Jul-2023	✓	**13-Jul-2023**	20-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH145R	**07-Jul-2023**	**12-Jul-2023**	21-Jul-2023	✓	**12-Jul-2023**	21-Jul-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip blank	**07-Jul-2023**	**12-Jul-2023**	21-Jul-2023	✓	**13-Jul-2023**	21-Jul-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
BH104R, BH107R, BH145R	**07-Jul-2023**	**11-Jul-2023**	14-Jul-2023	✓	**13-Jul-2023**	20-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH145R	**07-Jul-2023**	**12-Jul-2023**	21-Jul-2023	✓	**12-Jul-2023**	21-Jul-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip blank	**07-Jul-2023**	**12-Jul-2023**	21-Jul-2023	✓	**13-Jul-2023**	21-Jul-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH145R, Trip spike	**07-Jul-2023**	**12-Jul-2023**	21-Jul-2023	✓	**12-Jul-2023**	21-Jul-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip blank	**07-Jul-2023**	**12-Jul-2023**	21-Jul-2023	✓	**13-Jul-2023**	21-Jul-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		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	11	**18.18**	**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	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	**14.29**	**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	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	19	**10.53**	**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	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	7	**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	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	11	**9.09**	**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	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	**14.29**	**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	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	19	**15.79**	**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	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	18	**16.67**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	7	**14.29**	**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	11	**9.09**	**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	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	**14.29**	**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	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	19	**5.26**	**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	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	7	**14.29**	**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	11	**9.09**	**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	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	**14.29**	**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	19	**5.26**	**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	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	7	**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.

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS

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

Contact Name : Emily Smith 0431 522 928
Project Manager: Henry Luo 0414 090 002
Email for results : emily.smith@ghd.com; terry.nham@ghd.com; henry.luo@ghd.com; ghdlabreports@ghd.com

Purchase Order : 12554717
PROJECT Number : 12554717
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						
1	SWDUP2	7/7/23	Water		X						
2	GWDUP2	7/7/23	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:

Laboratory Staff

Relinquished By: Andrew [redacted]
Date & Time : 7/7/23
Signature:

Received By:
Date & Time : 11/7 1:01 Pm
Signature:

Method Of Shipment

☐ Courier
☐ Hand Delivered
☐ Postal
Courier Consignment # :

Temperature on arrival: 5.5

Report number: 1006932

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
☐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
☐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 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	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: Emily Smith Andrew Duval	SAMPLER MOBILE: 0431 522 928	RELINQUISHED BY: Andrew Duval	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT	DATE/TIME: 7/7/23	DATE/TIME: 7/7/23 4:30
Email Reports to: henry.luo@ghd.com, ghdlabreports@ghd.com; terry.nham@ghd.com; emily.smith@ghd.com; andrew.duval@ghd.com		RELINQUISHED BY: Lab / Analysis: Eurofins	RECEIVED BY:
		DATE/TIME: Organised By / Date:	DATE/TIME:
		Relinquished By / Date:	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Consignment / Courier: QC FWD

WO No: ES2322790

ANALYSIS REQUIRED by: [illegible]

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).

ALS USE: LAB ID	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W) SAMPLE ID	DATE / TIME	MATRIX	CONTAINER INFORMATION Comments	TOTAL CONTAINERS	W-02 (8 dissolved 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 (SS)		W-02T (8 total metals)	BTEXN		
1	BH104R	7/7/23	Water		6	X	X	X	X	X	X	X					
2	BH107R	7/7/23	Water		6	X	X	X	X	X	X	X					
[redacted]																	
3	BH145R		Water		6	X	X	X	X	X	X	X					
4	GWDUP1	7/7/23	Water		1	X											
5	GWRB1	7/7/23	Water		1									X			
6	Trip spike	7/7/23	Water		1										X		
7	Trip blank	7/7/23	Water		1										X		
	GWDUP2	7/7/23	W	PLEASE FWD TO EUROFINS	1												
	SWDUP2	7/7/23	W	PLEASE FWD TO EUROFINS WITH ATTACHED COC	1												

Environmental Division
Sydney
Work Order Reference
ES2322790

Telephone : +61-2-8784 8555

1066932

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 MENLO QLD 4805 Ross Gum Road Warabrook NSW 2304

FINLEYVALE 21 Smallwood Place Murarrie QLD 4172 E: samples.newcastle@alsglobal.com

TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 E: samples.townsville@alsglobal.com

Ph: 07 7471 5800 E: samples.mackay@alsglobal.com

Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

Ph: 07 4796 0600 E: townsville@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

CHEMISTRY 38 Jubilee Avenue Warriewood NSW 2102 E: chemistry.sydney@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREMENT: ☐ 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 Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	No N/A
PROJECT: M12 Surface Water	ALS QUOTE NO.: SY/322/21	Free Ice / frozen ice bricks present upon receipt?	No N/A
ORDER NUMBER: 12554717	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt	°C
PROJECT MANAGER: Henry Luo	CONTACT PH: Henry Luo 0414 090 002	Other comment:	
SAMPLER: Emily Smith, Andrew Duval	SAMPLER MOBILE: 0431 522 928		
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT		
Email Reports to: henry.luo@ghd.com , ghdlabreports@ghd.com; terry.nham@ghd.com, emily.smith@ghd.com; andrew.duval@ghd.com			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
~~[illegible]~~ Andrew Duval	Fan		
DATE/TIME: 7/7/23	DATE/TIME: 7/7/23 4:32	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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-02T (8 total metals)	EG020T (total Fe, Mn)	NT-08A (total N, No2, No3, NH3, Total P, reactive P)	EP008 (chlorophyll a)	EP020 (oil & grease)	UTO-9W Ultra trace OC/OP	EP074DEFG (VOC - fumigants, Hal aliphatics, Hal Aromatics, THM)	MW006 (FC) Thermotolerant Coliforms	W-14A (PAH/phenols)	EA015H (TDS), EA025H (TSS)	EP080 (BTEXN)	Ultra trace OPP (EP234AX)	Super Ultra Trace PCB's (EP1318-ST)	PFAS - full suite (EP231X)
8	BADDS	7/7/23	Water		11	X	X	X	X	X		X		X	X	X	X		
9	BADMS	7/7/23	W		11	X	X	X	X	X		X		X	X	X	X		
10	BADUS	7/7/23	W		11	X	X	X	X	X		X		X	X	X	X		

1006932

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 NSW 2304
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	Tel: +61 2 4968 8448
Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

Eurofins ARL Pty Ltd

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Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377
Site# 2370

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

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

Sample Receipt Advice

Company name:	GHD Pty Ltd NSW
Contact name:	Emily Smith
Project name:	M12 WATER SAMPLING
Project ID:	12554717
Turnaround time:	5 Day
Date/Time received	Jul 11, 2023 1:01 PM
Eurofins reference	1006932

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 : 5.5 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.
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 Emily Smith - emily.smith@ghd.com.

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

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: **Emily Smith**

Report **1006932-W-V2**
Project name M12 WATER SAMPLING
Project ID 12554717
Received Date Jul 11, 2023

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S23-Jl0021772**	**S23-Jl0021773**
Date Sampled			**Jul 07, 2023**	**Jul 07, 2023**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	< 0.001	-
Arsenic (filtered)	0.001	mg/L	-	0.002
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	-	< 0.001
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	-	0.001
Zinc	0.005	mg/L	0.012	-
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 20, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Jul 13, 2023	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 NSW 2304
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	Tel: +61 2 4968 8448
Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

Eurofins ARL Pty Ltd
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Tel: +61 8 6253 4444
NATA# 2377
Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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Penrose,	Rolleston,	Gate Pa,
Auckland 1061	Christchurch 7675	Tauranga 3112
Tel: +64 9 526 4551	Tel: +64 3 343 5201	Tel: +64 9 525 0568
IANZ# 1327	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 #: 1006932
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Jul 11, 2023 1:01 PM
Due: Jul 18, 2023
Priority: 5 Day
Contact Name: Emily Smith

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Metals M8 filtered
Sydney Laboratory - NATA # 1261 Site # 18217						X
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	SWDUP2	Jul 07, 2023		Water	S23-Jl0021772	X
2	GWDUP2	Jul 07, 2023		Water	S23-Jl0021773	X
Test Counts						2

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*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 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. 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	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S23-Jl0021773	CP	%	104			75-125	Pass	
Cadmium (filtered)	S23-Jl0021773	CP	%	93			75-125	Pass	
Chromium (filtered)	S23-Jl0021773	CP	%	87			75-125	Pass	
Copper (filtered)	S23-Jl0021773	CP	%	81			75-125	Pass	
Lead (filtered)	S23-Jl0021773	CP	%	89			75-125	Pass	
Mercury (filtered)	S23-Jl0021773	CP	%	90			75-125	Pass	
Nickel (filtered)	S23-Jl0021773	CP	%	82			75-125	Pass	
Zinc (filtered)	S23-Jl0021773	CP	%	85			75-125	Pass	

Comments

V2 - Sample 23-Jl0021772 has been rerun as total metals

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.

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CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

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WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

TURNAROUND REQUIREME (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) Custody Seal Intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: °C Other comment:
ALS QUOTE NO.: SY/322/21	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	
CONTACT PH: Henry Luo 0414 090 002		

SAMPLER MOBILE: 0431 522 928	RELINQUISHED BY: Andrew Duval	RECEIVED BY:	RELINQUISHED BY:
EDD FORMAT (or default): ESDAT	DATE/TIME: 09/08/2023, 5:45PM	DATE/TIME:	DATE/TIME:
ALS CONTACT: Henry Luo / Andrew Duval			RECEIVED BY: LRN
COMPLY TO SAMPLING GUIDELINES? (YES / NO)			DATE/TIME: 9/8/23 1829
EMAIL REPORT TO: henry.luo@ghd.com, ghdlabreports@ghd.com; terry.nham@ghd.com; andrew.duval@ghd.com			

SPECIAL HANDLING/STORAGE OR DISPOSAL:

HT

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).											
LABORATORY USE ONLY: SAMPLE ID	DATE / TIME	MATRIX	Comments	TOTAL CONTAINERS	W-02 (8 dissovled 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 (SS)	W-14A (PAH/Phenols)	W-02T (8 total metals)	BTEXN		
BH104R	9/08/2023	Water		6	X	X	X	X	X	X	X					
BH107R	9/08/2023	Water		6	X	X	X	X	X	X	X					
BH112R	9/08/2023	Water		6	X	X	X	X	X	X	X					
BH145R	9/08/2023	Water		6	X	X	X	X	X	X	X					
WDUP1	9/08/2023	Water		1	X											
GWRB1	9/08/2023	Water		1									X			
Trip spike	9/08/2023	Water		1										X		
Trip blank	9/08/2023	Water		1										X		

Environmental Division Sydney
Work Order Reference
ES2326796

Telephone : + 61-2-8784 8555

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2326796**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: sarah.mathew@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)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Emily Smith / Andrew Duval		

Dates

Date Samples Received	: 09-Aug-2023 17:14	Issue Date	: 09-Aug-2023
Client Requested Due Date	: 16-Aug-2023	Scheduled Reporting Date	: **16-Aug-2023**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 7	Temperature	: 5.2'C, 9.9'C, 7.0'C
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
- **The sampling date listed on the COC is 09/08/23, however the bottle was dated 31/07/23.**
- **The sampling date listed on the COC is 09/08/23, however the bottle was dated 1/08/23 for sample 9.**
- **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
ES2326796-001	09-Aug-2023 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2326796-002	09-Aug-2023 00:00	BH107R	✓	✓	✓	✓	✓	✓	✓
ES2326796-003	09-Aug-2023 00:00	BH112R	✓	✓	✓	✓	✓	✓	✓
ES2326796-004	09-Aug-2023 00:00	BH145R	✓	✓	✓	✓	✓	✓	✓
ES2326796-005	09-Aug-2023 00:00	GWDUP1						✓	

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP080 BTEXN	WATER - W-02T 8 metals (Total)
ES2326796-006	09-Aug-2023 00:00	GWRB1		✓
ES2326796-007	31-Jul-2023 00:00	Trip Spike	✓	
ES2326796-008	01-Aug-2023 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

TERRY NHAM

- *AU Certificate of Analysis - NATA (COA)	Email	terry.nham@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	terry.nham@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	terry.nham@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	terry.nham@ghd.com
- Chain of Custody (CoC) (COC)	Email	terry.nham@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	terry.nham@ghd.com
- EDI Format - XTab (XTAB)	Email	terry.nham@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	terry.nham@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2326796**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: 09-Aug-2023 17:14
Order number	: ----	Date Analysis Commenced	: 10-Aug-2023
C-O-C number	: ----	Issue Date	: 16-Aug-2023 16:48
Sampler	: Emily Smith / Andrew Duval		
Site	: ----		
Quote number	: SY/322/21		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- 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	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00
Compound	CAS Number	LOR	Unit		ES2326796-001	ES2326796-002	ES2326796-003	ES2326796-004	ES2326796-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**5430**	**2190**	**10200**	**9290**	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**405**	**315**	**566**	**288**	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**1570**	**470**	**2630**	**2380**	----
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		**890**	**1500**	**1350**	**903**	----
Total Alkalinity as CaCO3	----	1	mg/L		**890**	**1500**	**1350**	**903**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**123**	**199**	**1700**	**318**	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**2550**	**265**	**3930**	**4410**	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**194**	**38**	**280**	**197**	----
Magnesium	7439-95-4	1	mg/L		**264**	**91**	**468**	**458**	----
Sodium	7440-23-5	1	mg/L		**1500**	**708**	**3220**	**2980**	----
Potassium	7440-09-7	1	mg/L		**20**	**13**	**46**	**19**	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	**0.018**	**0.008**	**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	**0.002**	**0.001**	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.002**	**0.002**	**0.018**	<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		**0.012**	**0.006**	**0.008**	<0.005	**0.014**
Manganese	7439-96-5	0.001	mg/L		**0.154**	**0.033**	**0.130**	**0.348**	----
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	**4.82**	----
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		**1.11**	**0.12**	**2.32**	**1.77**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00
Compound	CAS Number	LOR	Unit		ES2326796-001	ES2326796-002	ES2326796-003	ES2326796-004	ES2326796-005
					Result	Result	Result	Result	Result
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.02**	<0.01	**2.00**	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.04**	**2.55**	**0.55**	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.06**	**2.55**	**2.55**	<0.01	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**3.8**	**0.6**	**2.8**	**2.2**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**3.9**	**3.2**	**5.4**	**2.2**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.38**	**0.10**	**1.04**	**0.51**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	**0.03**	**0.35**	<0.01	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**92.3**	**41.6**	**173**	**149**	----
ø Total Cations	----	0.01	meq/L		**97.2**	**40.5**	**194**	**178**	----
ø Ionic Balance	----	0.01	%		**2.58**	**1.31**	**5.59**	**8.74**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00	09-Aug-2023 00:00
Compound	CAS Number	LOR	Unit		ES2326796-001	ES2326796-002	ES2326796-003	ES2326796-004	ES2326796-005
					Result	Result	Result	Result	Result
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	%		**132**	**107**	**129**	**129**	----
Toluene-D8	2037-26-5	2	%		**130**	**100**	**129**	**124**	----
4-Bromofluorobenzene	460-00-4	2	%		**129**	**105**	**126**	**124**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	GWRB1	Trip Spike	Trip Blank	----	----
				Sampling date / time	09-Aug-2023 00:00	31-Jul-2023 00:00	01-Aug-2023 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2326796-006	ES2326796-007	ES2326796-008	--------	--------
					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: BTEXN									
Benzene	71-43-2	1	µg/L		----	**14**	<1	----	----
Toluene	108-88-3	2	µg/L		----	**18**	<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		----	**19**	<2	----	----
^ **Total Xylenes**	----	2	µg/L		----	**36**	<2	----	----
^ **Sum of BTEX**	----	1	µg/L		----	**84**	<1	----	----
Naphthalene	91-20-3	5	µg/L		----	**18**	<5	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	**77.3**	**125**	----	----
Toluene-D8	2037-26-5	2	%		----	**101**	**120**	----	----
4-Bromofluorobenzene	460-00-4	2	%		----	**117**	**126**	----	----

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	: **ES2326796**	Page	: 1 of 14
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: 09-Aug-2023
Order number	: ----	Date Analysis Commenced	: 10-Aug-2023
C-O-C number	: ----	Issue Date	: 16-Aug-2023
Sampler	: Emily Smith / Andrew Duval		
Site	: ----		
Quote number	: SY/322/21		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

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: 5234175)									
ES2326541-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	3460	3490	0.9	0% - 20%
ES2326796-001	BH104R	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	5430	5600	3.1	0% - 20%
ES2326951-008	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1180	1140	3.8	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5234176)									
ES2326541-005	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2326796-001	BH104R	EA025H: Suspended Solids (SS)	----	5	mg/L	405	396	2.3	0% - 20%
ES2326951-008	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	1390	1480	6.3	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5227825)									
ES2326541-001	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	532	531	0.2	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	532	531	0.2	0% - 20%
ES2326728-001	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	90	90	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	90	90	0.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5227828)									
ES2326796-002	BH107R	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	1500	1470	2.5	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	1500	1470	2.5	0% - 20%
ES2326872-004	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

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: 5227828) - continued									
ES2326872-004	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	20	18	9.5	0% - 50%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	20	18	9.5	0% - 50%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5227086)									
ES2326818-005	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	<10	0.0	No Limit
ES2326714-013	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	<10	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 5227088)									
ES2326820-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	62	62	0.0	0% - 20%
ES2326714-013	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	1290	1240	3.7	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5231705)									
ES2326796-003	BH112R	ED093F: Calcium	7440-70-2	1	mg/L	280	279	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	468	468	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	3220	3220	0.1	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	46	46	0.0	0% - 20%
ES2326202-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	17	16	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	24	24	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	716	698	2.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	53	52	3.5	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5231703)									
ES2326602-014	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	0.303	0.308	1.5	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.206	0.214	4.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.031	0.032	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.09	0.09	0.0	No Limit
ES2326202-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0004	0.0004	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.005	0.006	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.008	49.9	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.192	0.194	0.9	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.057	0.057	0.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.535	0.529	1.1	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	2.61	2.85	8.9	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5231707)									
ES2326796-003	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	0.018	0.019	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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5231707) - continued									
ES2326796-003	BH112R	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	0.003	91.4	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	0.130	0.137	5.2	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.018	0.021	12.1	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.008	0.013	48.9	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EW2303572-001	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	0.003	0.003	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.033	0.033	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.194	0.194	0.0	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.22	0.19	10.7	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5232809)									
ES2327232-004	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	0.005	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	0.19	0.19	0.0	No Limit
ES2326868-004	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	0.024	0.025	4.6	0% - 20%
		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	0.003	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.013	0.016	16.7	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.32	0.47	38.2	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 5233176)									
EB2324295-016	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

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: 5233176) - continued									
EB2324295-016	Anonymous	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
ES2325730-004	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.007	0.007	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.003	0.003	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	0.007	0.007	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.026	0.026	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5231706)									
ES2326541-005	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2326796-001	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: 5232808)									
ES2326868-005	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: 5232879)									
ES2326202-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	0.0008	0.0008	0.0	No Limit
ES2326642-001	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: 5232410)									
ES2326780-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	3.57	3.74	4.5	0% - 20%
ES2326875-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.03	77.3	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5236381)									
ES2326796-004	BH145R	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.77	1.76	0.0	0% - 20%
ES2326934-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.03	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5227087)									
ES2326796-001	BH104R	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.02	0.0	No Limit
ES2326714-013	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.10	<0.10	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5232411)									
ES2326780-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2326875-002	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: 5232409)									
ES2326780-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.0	3.8	3.3	0% - 20%
ES2326875-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5232408)									
ES2326780-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	<0.01	91.6	No Limit
ES2326875-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.02	105	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5227090)									
ES2326762-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	6.42	6.20	3.5	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 (%)*
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5227090) - continued									
ES2326796-002	BH107R	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.03	<0.01	105	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5230205)									
ES2326766-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2326767-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5230208)									
ES2326688-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2326951-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	20	30	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5230205)									
ES2326766-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2326767-004	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: 5230208)									
ES2326688-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2326951-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	20	30	0.0	No Limit
EP080: BTEXN (QC Lot: 5230205)									
ES2326766-001	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
ES2326767-004	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
EP080: BTEXN (QC Lot: 5230208)									
ES2326688-001	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
ES2326951-001	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

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: 5230208) - continued									
ES2326951-001	Anonymous	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: 5234175)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	101	87.0	109
				<10	293 mg/L	123	75.2	126
				<10	2380 mg/L	105	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5234176)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	103	83.0	129
				<5	1000 mg/L	95.2	82.0	110
				<5	931 mg/L	100	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 5227825)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	102	81.0	115
				----	50 mg/L	113	80.0	120
ED037P: Alkalinity by PC Titrator (QCLot: 5227828)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	113	81.0	115
				----	50 mg/L	120	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5227086)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	97.3	82.0	122
				<1	500 mg/L	103	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 5227088)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	111	80.9	127
				<1	1000 mg/L	94.4	80.9	127
ED093F: Dissolved Major Cations (QCLot: 5231705)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	98.3	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.7	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	94.8	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	93.3	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 5231703)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.8	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.2	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.5	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.3	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.0	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	97.4	82.0	110

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: 5231703) - continued								
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.4	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.7	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	110	82.0	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 5231707)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	103	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	107	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.4	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	102	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	103	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	109	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	109	82.0	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 5232809)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	94.2	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	92.8	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.9	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.6	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.9	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	91.7	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.9	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	91.3	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	98.9	82.0	112
EG020T: Total Metals by ICP-MS (QCLot: 5233176)								
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	96.8	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.4	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.7	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.5	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.6	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.6	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 5231706)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	102	83.0	105
EG035F: Dissolved Mercury by FIMS (QCLot: 5232808)								

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
EG035F: Dissolved Mercury by FIMS (QCLot: 5232808) - continued								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	96.2	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5232879)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	105	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5232410)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	105	90.0	114
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5236381)								
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: 5227087)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	99.4	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5232411)								
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: 5232409)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	82.2	69.0	101
				<0.1	1 mg/L	84.6	70.0	118
				<0.1	5 mg/L	91.3	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5232408)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	84.0	71.3	126
				<0.01	0.442 mg/L	89.3	71.3	126
				<0.01	1 mg/L	91.2	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5227090)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	95.8	85.0	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5226093)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	64.6	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	89.0	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	92.3	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5230205)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	93.1	75.0	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5230208)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	85.3	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5226093)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	74.8	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	91.1	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	99.0	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5230205)								

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: 5230205) - continued								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	78.9	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5230208)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	88.2	75.0	127
EP080: BTEXN (QCLot: 5230205)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	78.1	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	103	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	95.3	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	103	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	107	75.5	124
EP080: BTEXN (QCLot: 5230208)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	89.5	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	93.8	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	102	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	103	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	105	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	98.5	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: 5227086)							
ES2326714-013	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	113	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5227088)							
ES2326714-013	Anonymous	ED045G: Chloride	16887-00-6	50 mg/L	# Not Determined	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5231703)							
ES2326564-001	Anonymous	EG020A-F: Arsenic	7440-38-2	2 mg/L	79.7	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.5 mg/L	78.2	70.0	130
		EG020A-F: Chromium	7440-47-3	2 mg/L	77.4	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
EG020F: Dissolved Metals by ICP-MS (QCLot: 5231703) - continued							
ES2326564-001	Anonymous	EG020A-F: Copper	7440-50-8	1 mg/L	116	70.0	130
		EG020A-F: Lead	7439-92-1	2 mg/L	76.3	70.0	130
		EG020A-F: Manganese	7439-96-5	2 mg/L	78.9	70.0	130
		EG020A-F: Nickel	7440-02-0	2 mg/L	79.6	70.0	130
		EG020A-F: Zinc	7440-66-6	2 mg/L	79.1	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5231707)							
ES2326796-004	BH145R	EG020A-F: Arsenic	7440-38-2	1 mg/L	117	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	104	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	106	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	103	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	105	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	104	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	102	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5232809)							
ES2326968-004	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	95.4	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	96.9	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	93.3	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	94.2	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	93.8	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	93.0	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	95.4	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 5233176)							
EB2324295-017	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	107	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	106	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	109	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	112	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	109	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	104	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5231706)							
ES2326541-006	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	80.1	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5232808)							
ES2326796-005	GWDUP1	EG035F: Mercury	7439-97-6	0.01 mg/L	90.8	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5232879)							
ES2326541-005	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	74.9	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*
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5232410)							
ES2326780-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	110	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5236381)							
ES2326796-004	BH145R	EK055G: Ammonia as N	7664-41-7	1 mg/L	110	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5227087)							
ES2326714-013	Anonymous	EK057G: Nitrite as N	14797-65-0	5 mg/L	102	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5232411)							
ES2326780-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	112	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5232409)							
ES2326780-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	100 mg/L	78.0	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5232408)							
ES2326780-002	Anonymous	EK067G: Total Phosphorus as P	----	20 mg/L	94.9	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5227090)							
ES2326762-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	# Not Determined	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5230205)							
ES2326766-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	93.9	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5230208)							
ES2326688-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	108	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5230205)							
ES2326766-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	98.7	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5230208)							
ES2326688-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	114	70.0	130
EP080: BTEXN (QCLot: 5230205)							
ES2326766-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	96.8	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	125	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	121	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	127	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	117	70.0	130
EP080: BTEXN (QCLot: 5230208)							
ES2326688-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	109	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	108	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	114	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: 5230208) - continued							
ES2326688-001	Anonymous	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	117	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	126	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2326796**	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	: 09-Aug-2023
Site	: ----	Issue Date	: 16-Aug-2023
Sampler	: Emily Smith / Andrew Duval	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							
ED045G: Chloride by Discrete Analyser	ES2326714--013	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK071G: Reactive Phosphorus as P by discrete analyse	ES2326762--001	Anonymous	**Reactive Phosphorus as P**	14265-44-2	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 / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	16	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	16	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**15-Aug-2023**	16-Aug-2023	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**15-Aug-2023**	16-Aug-2023	✓
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**14-Aug-2023**	06-Sep-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**11-Aug-2023**	23-Aug-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**10-Aug-2023**	06-Sep-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**10-Aug-2023**	06-Sep-2023	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**14-Aug-2023**	06-Sep-2023	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH104R, BH107R, BH112R, BH145R, GWDUP1	**09-Aug-2023**	**----**	----	**----**	**14-Aug-2023**	05-Feb-2024	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
GWRB1	**09-Aug-2023**	**14-Aug-2023**	05-Feb-2024	✓	**14-Aug-2023**	05-Feb-2024	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**15-Aug-2023**	06-Sep-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
GWDUP1	**09-Aug-2023**	**----**	----	**----**	**16-Aug-2023**	06-Sep-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
GWRB1	**09-Aug-2023**	**----**	----	**----**	**15-Aug-2023**	06-Sep-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**15-Aug-2023**	06-Sep-2023	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**10-Aug-2023**	11-Aug-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**15-Aug-2023**	06-Sep-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**14-Aug-2023**	06-Sep-2023	✓	**14-Aug-2023**	06-Sep-2023	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**14-Aug-2023**	06-Sep-2023	✓	**14-Aug-2023**	06-Sep-2023	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**----**	----	**----**	**10-Aug-2023**	11-Aug-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**14-Aug-2023**	16-Aug-2023	✓	**16-Aug-2023**	23-Sep-2023	✓
Amber TOC Vial - Sulfuric Acid (EP080)							
BH104R	**09-Aug-2023**	**15-Aug-2023**	23-Aug-2023	✓	**15-Aug-2023**	23-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH107R, BH112R, BH145R	**09-Aug-2023**	**15-Aug-2023**	23-Aug-2023	✓	**15-Aug-2023**	23-Aug-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
BH104R, BH107R, BH112R, BH145R	**09-Aug-2023**	**14-Aug-2023**	16-Aug-2023	✓	**16-Aug-2023**	23-Sep-2023	✓
Amber TOC Vial - Sulfuric Acid (EP080)							
BH104R	**09-Aug-2023**	**15-Aug-2023**	23-Aug-2023	✓	**15-Aug-2023**	23-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH107R, BH112R, BH145R	**09-Aug-2023**	**15-Aug-2023**	23-Aug-2023	✓	**15-Aug-2023**	23-Aug-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Amber TOC Vial - Sulfuric Acid (EP080)							
BH104R	**09-Aug-2023**	**15-Aug-2023**	23-Aug-2023	✓	**15-Aug-2023**	23-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip Blank	**01-Aug-2023**	**15-Aug-2023**	15-Aug-2023	✓	**15-Aug-2023**	15-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH107R, BH112R, BH145R	**09-Aug-2023**	**15-Aug-2023**	23-Aug-2023	✓	**15-Aug-2023**	23-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Trip Spike	**31-Jul-2023**	**11-Aug-2023**	14-Aug-2023	✓	**12-Aug-2023**	14-Aug-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **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	4	31	**12.90**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	4	30	**13.33**	**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	3	25	**12.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	6	50	**12.00**	**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	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	**10.00**	**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	23	**13.04**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	23	**13.04**	**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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	6	**33.33**	**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	16	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	34	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	4	31	**12.90**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	30	**6.67**	**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	25	**8.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	3	50	**6.00**	**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	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**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	23	**21.74**	**12.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	5	23	**21.74**	**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	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	6	**16.67**	**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	16	**6.25**	**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	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	30	**6.67**	**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	25	**8.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	3	50	**6.00**	**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	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**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	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	23	**8.70**	**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	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	6	**16.67**	**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	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	30	**6.67**	**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	25	**8.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	3	50	**6.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**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	14	**7.14**	**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	6	**16.67**	**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	16	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	34	**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.

Subcontract / Split WO:

Lab Assigned: SYDVP2, GWDUP2 / EURO PINS

Organised by / Date:

Relinquished by / Date:

Courier:

WO No: ES2326795

Environmental Division
Sydney
Work Order Reference
ES2326795

CHAIN OF CUSTODY

CLIENT:
OFFICE:
PROJECT:
ORDER NUMBER:
PROJECT MANAGER:
SAMPLER:
COC emailed to ALS? (YES / NO):
Email Reports to:

TURNAROUND REQUIREMENT:
ALS QUOTE NO.:
CONTACT PH:

SAMPLER MOBILE:
EDD FORMAT (or default):

COC SEQUENCE NUMBER (Circle)
COC 1 2 3 4 5 6 7
OF 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY
Custody Seal Intact?
Free ice / frozen ice bricks present
Random Sample Temperature on
Other comments: 7.3

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
	Brandan		JRW
DATE/TIME:	10/8 3:30	DATE/TIME:	9/8/23 15:29

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

HT

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to ensure correct analysis) Where Metals are required, indicate if Total (unfiltered bottle required) and/or Dissolved (field filtered bottle required).
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	Comments	TOTAL # OF BOTTLES	
1			Water			
2			Water			
3			Water			
4			Water			
5			Water			
6			Water			
7			Water			
8			Water			
9			Water			
10			Water			
11			Water			
12			Water			
13			Water			
14			Water			
-			Water			
-			Water			

1015916

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Email: enviro.melbourne@eurofins.com.au

CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Page __1__ of __1__

Company Name:	Contact Name:	Purchase Order:	COC Number:
Office Address:	Project Manager: Henry Lau	PROJECT Number:	Eurofins | mgt quote ID:
	Email for results:	PROJECT Name:	Data output format:

Special Directions & Comments:

Soil from AGS

Eurofins | mgt Drinking water batch number:

Analytes

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

Waters		Soils	
BTEX, MAH, VOC	7 days	BTEX, MAH, VOC	14 days
OCP, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, DVC	28 days	Mercury, DVC	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, TKN*)	3 days	Anions	28 days
Solids - TSS, TDS, etc	7 days	SPOCAS, pH Field and FOC (*)	24 hours
Fertiliser (*)	7 days	ASLP, SLP	7 days

	Sample ID	Date	Matrix	Containers								Sample comments
				100C	250C*	500C	Jars	40mL vial	250mL p	1Litre	Bag	
1			Water			1						
2			Water			1						
3												
4												
5												
6												
7												
8												
9												
10												

Laboratory Staff

Relinquished By:

Date & Time:

Signature: AU

Received By:

Date & Time:

Signature:

Method Of Shipment

- Courier
- Hand Delivered
- Postal

Courier Consignment #

Temperature on arrival:

Report number:

Issue No: Issue Date: 25 February 2021 Page 1 of 1

1015966

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Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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Tel: +64 9 526 4551	Tel: +64 3 343 5201	Tel: +64 9 525 0568
IANZ# 1327	IANZ# 1290	IANZ# 1402

Sample Receipt Advice

Company name:	GHD Pty Ltd NSW
Contact name:	Henry Luo
Project name:	M12 SURFACE WATER
Project ID:	Not provided
Turnaround time:	5 Day
Date/Time received	Aug 10, 2023 3:30 PM
Eurofins reference	1015966

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 : 7.3 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.
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.

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 **1015966-W**
Project name M12 SURFACE WATER
Received Date Aug 10, 2023

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S23-Au0028765**	**S23-Au0028766**
Date Sampled			**Aug 08, 2023**	**Aug 09, 2023**
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	< 0.001	-
Chromium (filtered)	0.001	mg/L	-	< 0.001
Copper	0.001	mg/L	0.003	-
Copper (filtered)	0.001	mg/L	-	0.004
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	-	0.002
Zinc	0.005	mg/L	0.011	-
Zinc (filtered)	0.005	mg/L	-	0.006

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 11, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Aug 11, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

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ABN: 50 005 085 521

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Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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IANZ# 1327	IANZ# 1290	IANZ# 1402

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

Project Name: M12 SURFACE WATER

Order No.: 12554717
Report #: 1015966
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Aug 10, 2023 3:30 PM
Due: Aug 17, 2023
Priority: 5 Day
Contact Name: Henry Luo

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	Aug 08, 2023		Water	S23-Au0028765	X	
2	GWDUP2	Aug 09, 2023		Water	S23-Au0028766		X
Test Counts						1	1

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Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*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 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. 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	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	93			80-120	Pass	
Arsenic (filtered)	%	96			80-120	Pass	
Cadmium	%	93			80-120	Pass	
Cadmium (filtered)	%	101			80-120	Pass	
Chromium	%	97			80-120	Pass	
Chromium (filtered)	%	103			80-120	Pass	
Copper	%	97			80-120	Pass	
Copper (filtered)	%	102			80-120	Pass	
Lead	%	96			80-120	Pass	
Lead (filtered)	%	103			80-120	Pass	
Mercury	%	95			80-120	Pass	
Mercury (filtered)	%	106			80-120	Pass	
Nickel	%	99			80-120	Pass	
Nickel (filtered)	%	102			80-120	Pass	
Zinc	%	98			80-120	Pass	
Zinc (filtered)	%	100			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S23-Au0028765	CP	%	99			75-125	Pass	
Cadmium	S23-Au0028765	CP	%	93			75-125	Pass	
Chromium	S23-Au0028765	CP	%	94			75-125	Pass	
Copper	S23-Au0028765	CP	%	91			75-125	Pass	
Lead	S23-Au0028765	CP	%	91			75-125	Pass	
Mercury	S23-Au0028765	CP	%	92			75-125	Pass	
Nickel	S23-Au0028765	CP	%	92			75-125	Pass	
Zinc	S23-Au0028765	CP	%	93			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S23-Jl0038099	NCP	%	107			75-125	Pass	
Cadmium (filtered)	S23-Jl0038099	NCP	%	94			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chromium (filtered)	S23-Jl0038099	NCP	%	89			75-125	Pass	
Lead (filtered)	S23-Jl0038099	NCP	%	81			75-125	Pass	
Mercury (filtered)	S23-Jl0038099	NCP	%	86			75-125	Pass	
Nickel (filtered)	S23-Jl0038099	NCP	%	81			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	N23-Au0015445	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	N23-Au0015445	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	N23-Au0015445	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	N23-Au0015445	NCP	mg/L	0.002	0.002	4.9	30%	Pass	
Lead	N23-Au0015445	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	N23-Au0015445	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	N23-Au0015445	NCP	mg/L	0.001	0.001	15	30%	Pass	
Zinc	N23-Au0015445	NCP	mg/L	0.026	0.027	4.9	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S23-Au0030415	NCP	mg/L	0.001	0.001	1.0	30%	Pass	
Cadmium (filtered)	S23-Au0030415	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S23-Au0030415	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S23-Au0030415	NCP	mg/L	0.002	0.002	5.0	30%	Pass	
Lead (filtered)	S23-Au0030415	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S23-Au0030415	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S23-Au0030415	NCP	mg/L	0.003	0.003	5.0	30%	Pass	
Zinc (filtered)	S23-Au0030415	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:

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.

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
NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4225 3125 E: samples.newcastle@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

Environmental Division Sydney
Work Order Reference
ES2330598

Telephone : + 61-2-8784 8555

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREME ☐ Standard TAT (List due date):	STANDARD TAT	FOR LABORATORY USE
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	COC SEQUENCE NUMBER (Circle)	Free Ice / frozen ice bricks pre
ORDER NUMBER: 12554717		COC: 1 2 3 4 5 6 7	Random Sample Temperature
PROJECT MANAGER: Henry Luo	CONTACT PH: Henry Luo 0414 090 002	OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER: Emily Smith, Jackson Miller	SAMPLER MOBILE: 0431 522 928	RELINQUISHED BY: Jackson Miller	RECEIVED BY: FAST
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT	DATE/TIME: 6/9/23 13:15	DATE/TIME: 6/9/23 1:15
Email Reports to: henry.luo@ghd.com, ghdlabreports@ghd.com; terry.nham@ghd.com; emily.smith@ghd.com; andrew.duval@ghd.com			RELINQUISHED BY: / DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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 (8 dissovled 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 (SS)	W-14A (PAH/Phenols)	W-02T (8 total metals)	BTEXN		
1	BH104R	5/9/23	Water		6	X	X	X	X	X	X	X					
2	BH107R	5/9/23	Water		6	X	X	X	X	X	X	X					
3	BH112R	5/9/23	Water		6	X	X	X	X	X	X	X					
4	BH145R	6/9/23	Water		6	X	X	X	X	X	X	X					
5	GWDUP1	5/9/23	Water		1	X											
6	GWRB1	6/9/23	Water		1									X			
7	Trip spike	6/9/23	Water		1										X		
8	Trip blank	6/9/23	Water		1										X		

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2330598**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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	: sarah.mathew@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)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: EMILY SMITH, JACKSON MILLES		

Dates

Date Samples Received	: 06-Sep-2023 13:15	Issue Date	: 07-Sep-2023
Client Requested Due Date	: 13-Sep-2023	Scheduled Reporting Date	: **13-Sep-2023**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: ----
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 SWDUP2 and GWDUP2 have been 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.**
- 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
ES2330598-001	05-Sep-2023 00:00	BH104R	✓	✓	✓	✓	✓	✓	✓
ES2330598-002	05-Sep-2023 00:00	BH107R	✓	✓	✓	✓	✓	✓	✓
ES2330598-003	05-Sep-2023 00:00	BH112R	✓	✓	✓	✓	✓	✓	✓
ES2330598-004	06-Sep-2023 00:00	BH145R	✓	✓	✓	✓	✓	✓	✓
ES2330598-005	05-Sep-2023 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
ES2330598-006	06-Sep-2023 00:00	GWRB1		✓	
ES2330598-007	04-Sep-2023 00:00	TRIP SPIKE	✓		
ES2330598-008	04-Sep-2023 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

TERRY NHAM

- *AU Certificate of Analysis - NATA (COA)	Email	terry.nham@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	terry.nham@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	terry.nham@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	terry.nham@ghd.com
- Chain of Custody (CoC) (COC)	Email	terry.nham@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	terry.nham@ghd.com
- EDI Format - XTab (XTAB)	Email	terry.nham@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	terry.nham@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES2330598**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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-Sep-2023 13:15
Order number	: 12554717	Date Analysis Commenced	: 08-Sep-2023
C-O-C number	: ----	Issue Date	: 13-Sep-2023 17:53
Sampler	: EMILY SMITH, JACKSON MILLES		
Site	: ----		
Quote number	: SY/322/21		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

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

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: GROUNDWATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	05-Sep-2023 00:00	05-Sep-2023 00:00	05-Sep-2023 00:00	06-Sep-2023 00:00	05-Sep-2023 00:00
Compound	CAS Number	LOR	Unit		ES2330598-001	ES2330598-002	ES2330598-003	ES2330598-004	ES2330598-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**5010**	**2120**	**9920**	**9970**	**----**
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**128**	**49**	**80**	**89**	**----**
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**1190**	**503**	**2360**	**2090**	**----**
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		**884**	**1420**	**1290**	**884**	**----**
Total Alkalinity as CaCO3	----	1	mg/L		**884**	**1420**	**1290**	**884**	**----**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**171**	**209**	**1880**	**334**	**----**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**2500**	**264**	**4180**	**5020**	**----**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**163**	**40**	**266**	**181**	**----**
Magnesium	7439-95-4	1	mg/L		**191**	**98**	**412**	**398**	**----**
Sodium	7440-23-5	1	mg/L		**1510**	**685**	**2830**	**2480**	**----**
Potassium	7440-09-7	1	mg/L		**18**	**14**	**41**	**15**	**----**
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.001**	<0.001	**0.014**	**0.005**	<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	**0.009**	**0.013**	<0.001	**0.009**
Nickel	7440-02-0	0.001	mg/L		**0.001**	**0.002**	**0.047**	**0.025**	**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**	**0.019**	**0.006**	**0.010**
Manganese	7439-96-5	0.001	mg/L		**0.178**	**0.018**	**0.152**	**0.283**	**----**
Iron	7439-89-6	0.05	mg/L		**0.92**	<0.05	<0.05	**4.42**	**----**
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		**1.46**	**0.02**	**2.39**	**1.87**	**----**

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	05-Sep-2023 00:00	05-Sep-2023 00:00	05-Sep-2023 00:00	06-Sep-2023 00:00	05-Sep-2023 00:00
Compound	CAS Number	LOR	Unit		ES2330598-001	ES2330598-002	ES2330598-003	ES2330598-004	ES2330598-005
					Result	Result	Result	Result	Result
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.02**	<0.01	**1.34**	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.02**	**3.03**	**1.39**	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.04**	**3.03**	**2.73**	<0.01	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.7**	**0.5**	**3.4**	**2.0**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**1.7**	**3.5**	**6.1**	**2.0**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.18**	**0.05**	**0.37**	**0.06**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	**0.03**	**0.36**	<0.01	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**91.7**	**40.2**	**183**	**166**	----
ø Total Cations	----	0.01	meq/L		**90.0**	**40.2**	**171**	**150**	----
ø Ionic Balance	----	0.01	%		**0.96**	**0.06**	**3.25**	**5.12**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	BH104R	BH107R	BH112R	BH145R	GWDUP1
				Sampling date / time	05-Sep-2023 00:00	05-Sep-2023 00:00	05-Sep-2023 00:00	06-Sep-2023 00:00	05-Sep-2023 00:00
Compound	CAS Number	LOR	Unit		ES2330598-001	ES2330598-002	ES2330598-003	ES2330598-004	ES2330598-005
					Result	Result	Result	Result	Result
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	%		**100**	**107**	**100**	**109**	----
Toluene-D8	2037-26-5	2	%		**101**	**111**	**101**	**108**	----
4-Bromofluorobenzene	460-00-4	2	%		**115**	**124**	**116**	**121**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	GWRB1	TRIP SPIKE	TRIP BLANK	----	----
				Sampling date / time	06-Sep-2023 00:00	04-Sep-2023 00:00	04-Sep-2023 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2330598-006	ES2330598-007	ES2330598-008	--------	--------
					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		----	**19**	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		----	**18**	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	**20**	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		----	**21**	<2	----	----
^ **Total Xylenes**	----	2	µg/L		----	**41**	<2	----	----
^ **Sum of BTEX**	----	1	µg/L		----	**95**	<1	----	----
Naphthalene	91-20-3	5	µg/L		----	**19**	<5	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	**82.8**	**98.4**	----	----
Toluene-D8	2037-26-5	2	%		----	**87.5**	**95.6**	----	----
4-Bromofluorobenzene	460-00-4	2	%		----	**94.6**	**107**	----	----

Surrogate Control Limits

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

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	: **ES2330598**	Page	: 1 of 10
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Contact	: Sarah Mathew
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-Sep-2023
Order number	: 12554717	Date Analysis Commenced	: 08-Sep-2023
C-O-C number	: ----	Issue Date	: 13-Sep-2023
Sampler	: EMILY SMITH, JACKSON MILLES		
Site	: ----		
Quote number	: SY/322/21		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

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

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: 5288334)									
ES2330367-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1410	1260	11.2	0% - 20%
ES2330567-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1940	1930	0.4	0% - 20%
ES2330624-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	26	27	5.7	No Limit
ES2330631-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	75	75	0.0	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5288333)									
ES2330367-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	1110	1010	10.0	0% - 20%
ES2330567-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	14	14	0.0	No Limit
ES2330624-002	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2330631-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 5287341)									
ES2330533-006	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
ES2330755-009	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	252	254	0.8	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	252	254	0.8	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5286698)									
ES2330283-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3910	3860	1.2	0% - 20%
ES2330568-007	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	746	749	0.4	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5286699)									
ES2330283-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	763	755	1.1	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: 5286699) - continued									
ES2330568-007	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	72	76	6.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5286147)									
ES2330598-001	BH104R	ED093F: Calcium	7440-70-2	1	mg/L	163	155	5.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	191	182	4.6	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	1510	1430	5.6	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	18	17	0.0	0% - 50%
ES2330405-006	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	9	9	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	24	24	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	97	95	2.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	5	4	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5286145)									
ES2330405-001	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	2.36	2.16	8.8	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.021	0.020	9.1	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.110	0.102	7.6	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.39	0.40	0.0	No Limit
ES2330405-006	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	1.70	1.82	7.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.011	0.012	0.0	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.038	0.040	4.6	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.71	0.71	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5290753)									
ES2330332-005	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	0.004	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	0.008	0.008	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	1.38	1.44	4.4	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.022	0.024	6.7	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.016	0.017	6.2	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.08	0.08	0.0	No Limit
ES2330719-006	Anonymous	EG020A-F: Cadmium	7440-43-9	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 (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5290753) - continued									
ES2330719-006	Anonymous	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	<0.005	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: 5290841)									
EW2303990-004	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<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	0.007	0.007	0.0	No Limit
ES2330482-006	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
		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	0.002	0.002	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	0.014	0.014	0.0	0% - 50%
		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: 5286148)									
ES2330598-001	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: 5290754)									
ES2330314-001	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: 5290879)									
ES2330523-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.1 µg/L	<0.0001	0.0	No Limit
ES2330525-002	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.1 µg/L	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5287291)									
ES2330450-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2330598-002	BH107R	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5286700)									
ES2330568-006	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2330641-002	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: 5287292)									
ES2330450-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	11.8	11.7	0.4	0% - 20%
ES2330598-002	BH107R	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	3.03	3.02	0.4	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 (%)*
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5287287)									
ES2330450-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.5	1.1	33.4	0% - 50%
ES2330598-003	BH112R	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.4	3.6	6.6	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5287288)									
ES2330450-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.03	61.2	No Limit
ES2330598-003	BH112R	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.37	0.38	3.3	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5286697)									
ES2330587-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	53.5	53.8	0.5	0% - 20%
ES2330280-006	Anonymous	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: 5288501)									
CA2305413-003	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2330598-001	BH104R	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5288501)									
CA2305413-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2330598-001	BH104R	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5288501)									
CA2305413-003	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
ES2330598-001	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

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: 5288334)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	96.0	87.0	109
				<10	293 mg/L	115	75.2	126
				<10	2380 mg/L	109	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5288333)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	98.3	83.0	129
				<5	1000 mg/L	90.7	82.0	110
				<5	931 mg/L	105	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 5287341)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	91.7	81.0	115
				----	50 mg/L	96.2	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5286698)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.5	82.0	122
				<1	500 mg/L	97.9	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 5286699)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	102	80.9	127
				<1	1000 mg/L	105	80.9	127
ED093F: Dissolved Major Cations (QCLot: 5286147)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	95.7	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	93.6	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	93.1	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	91.6	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 5286145)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.8	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	100	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.2	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.5	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: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	98.2	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.8	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.9	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	103	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
EG020F: Dissolved Metals by ICP-MS (QCLot: 5290753)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	93.3	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.6	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.8	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	92.2	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	90.4	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	96.6	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.1	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	91.3	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: 5290841)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	105	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	104	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	104	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.3	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	103	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	103	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 5286148)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	83.3	83.0	105
EG035F: Dissolved Mercury by FIMS (QCLot: 5290754)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	101	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5290879)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	95.5	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5287291)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	95.9	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5286700)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	105	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5287292)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	102	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5287287)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	98.6	69.0	101
				<0.1	1 mg/L	114	70.0	118
				<0.1	5 mg/L	102	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5287288)								

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: 5287288) - continued								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	90.9	71.3	126
				<0.01	0.442 mg/L	98.7	71.3	126
				<0.01	1 mg/L	95.4	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5286697)								
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: 5285246)								
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	83.1	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	111	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5288501)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	93.1	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5285246)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	80.9	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	70.1	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	86.7	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5288501)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	93.3	75.0	127
EP080: BTEXN (QCLot: 5288501)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	94.5	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	101	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	109	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	119	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	108	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: 5286698)							
ES2330283-001	Anonymous	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: 5286699)							
ES2330283-001	Anonymous	ED045G: Chloride	16887-00-6	50 mg/L	# Not Determined	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5286145)							
ES2330405-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	106	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	110	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	107	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	110	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	106	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	104	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5290753)							
ES2330296-012	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	90.5	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	93.9	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	95.0	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	92.6	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	89.8	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	96.3	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	92.6	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	93.9	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 5290841)							
ES2330482-007	Anonymous	EG020A-T: Arsenic	7440-38-2	----		70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	120	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	116	70.0	130
		EG020A-T: Copper	7440-50-8	----		70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	123	70.0	130
		EG020A-T: Nickel	7440-02-0	----		70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	118	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5286148)							
ES2330482-011	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	89.2	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5290754)							
ES2330296-012	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	98.9	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5290879)							
ES2330523-002	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	91.2	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5287291)							
ES2330450-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	77.9	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: 5286700)							
ES2330568-006	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	118	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5287292)							
ES2330450-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5287287)							
ES2330450-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	84.8	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5287288)							
ES2330450-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	89.8	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5286697)							
ES2330280-006	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	110	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5288501)							
CA2305413-003	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	107	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5288501)							
CA2305413-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	108	70.0	130
EP080: BTEXN (QCLot: 5288501)							
CA2305413-003	Anonymous	EP080: Benzene	71-43-2	25 µg/L	98.5	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	115	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	120	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	129	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	: **ES2330598**	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	: 06-Sep-2023
Site	: ----	Issue Date	: 13-Sep-2023
Sampler	: EMILY SMITH, JACKSON MILLES	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, 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	ES2330283--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.**
ED045G: Chloride by Discrete Analyser	ES2330283--001	Anonymous	**Chloride**	16887-00-6	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	ES2330450--001	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 / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	18	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	18	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: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**----**	----	**----**	**11-Sep-2023**	13-Sep-2023	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**----**	----	**----**	**11-Sep-2023**	13-Sep-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH112R	**05-Sep-2023**	**----**	----	**----**	**08-Sep-2023**	03-Oct-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH145R	**06-Sep-2023**	**----**	----	**----**	**08-Sep-2023**	04-Oct-2023	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**----**	----	**----**	**10-Sep-2023**	20-Sep-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**----**	----	**----**	**08-Sep-2023**	04-Oct-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**----**	----	**----**	**08-Sep-2023**	04-Oct-2023	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH104R, BH107R, BH112R	**05-Sep-2023**	**----**	----	**----**	**08-Sep-2023**	03-Oct-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
BH145R	**06-Sep-2023**	**----**	----	**----**	**08-Sep-2023**	04-Oct-2023	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH104R, BH107R, BH112R	**05-Sep-2023**	**----**	----	**----**	**08-Sep-2023**	03-Mar-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
BH145R	**06-Sep-2023**	**----**	----	**----**	**08-Sep-2023**	04-Mar-2024	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
GWDUP1	**06-Sep-2023**	**----**	----	**----**	**12-Sep-2023**	04-Mar-2024	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
GWRB1	**06-Sep-2023**	**12-Sep-2023**	04-Mar-2024	✓	**12-Sep-2023**	04-Mar-2024	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH104R, BH107R, BH112R	**05-Sep-2023**	**----**	----	**----**	**10-Sep-2023**	03-Oct-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
BH145R	**06-Sep-2023**	**----**	----	**----**	**10-Sep-2023**	04-Oct-2023	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
GWDUP1	**06-Sep-2023**	**----**	----	**----**	**13-Sep-2023**	04-Oct-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
GWRB1	**06-Sep-2023**	**----**	----	**----**	**13-Sep-2023**	04-Oct-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**----**	----	**----**	**12-Sep-2023**	04-Oct-2023	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**----**	----	**----**	**08-Sep-2023**	08-Sep-2023	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**----**	----	**----**	**12-Sep-2023**	04-Oct-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**09-Sep-2023**	04-Oct-2023	✓	**11-Sep-2023**	04-Oct-2023	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**09-Sep-2023**	04-Oct-2023	✓	**11-Sep-2023**	04-Oct-2023	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**----**	----	**----**	**08-Sep-2023**	08-Sep-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**11-Sep-2023**	13-Sep-2023	✓	**13-Sep-2023**	21-Oct-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
TRIP BLANK	**04-Sep-2023**	**12-Sep-2023**	18-Sep-2023	✓	**13-Sep-2023**	18-Sep-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**12-Sep-2023**	20-Sep-2023	✓	**12-Sep-2023**	20-Sep-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**11-Sep-2023**	13-Sep-2023	✓	**13-Sep-2023**	21-Oct-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
TRIP BLANK	**04-Sep-2023**	**12-Sep-2023**	18-Sep-2023	✓	**13-Sep-2023**	18-Sep-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**12-Sep-2023**	20-Sep-2023	✓	**12-Sep-2023**	20-Sep-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
TRIP SPIKE, TRIP BLANK	**04-Sep-2023**	**12-Sep-2023**	18-Sep-2023	✓	**13-Sep-2023**	18-Sep-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
BH104R, BH107R, BH112R, BH145R	**06-Sep-2023**	**12-Sep-2023**	20-Sep-2023	✓	**12-Sep-2023**	20-Sep-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	11	**18.18**	**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	15	**13.33**	**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	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	**10.00**	**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	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	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	19	**10.53**	**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	18	**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	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	11	**18.18**	**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	15	**6.67**	**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	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**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	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	16	**18.75**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**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	18	**5.56**	**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	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	11	**18.18**	**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	15	**6.67**	**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	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**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	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	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**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	18	**5.56**	**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	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	11	**18.18**	**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	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**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	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**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	18	**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.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

Environmental Division Sydney

Work Order Reference ES2330280

Telephone: +61-2-8784 8555

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREMENT: ☐ Standard TAT (List due date): STANDARD TAT	FOR LABORA
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Int
PROJECT: M12 Surface Water	ALS QUOTE NO.: SY/322/21	Free ice / frozen
ORDER NUMBER: 12554717		Random Sampl
PROJECT MANAGER: Henry Luo	CONTACT PH: Henry Luo 0414 090 002	Other comment
SAMPLER: Emily Smith ~~Anthony Zuvela~~ Jackson Miles	SAMPLER MOBILE: 0431 522 928	
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT	
Email Reports to: henry.luo@ghd.com , ghdlabreports@ghd.com; terry.nham@ghd.com, emily.smith@ghd.com; andrew.duval@ghd.com		

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:
Jackson Miles		
DATE/TIME: 6/9/23 - 13:15	DATE/TIME: 6/9/23 1:14	DATE/TIME: DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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-02T (ls total metals)	EG020T (total Fe, Mn)	NT-06A (total N, NO2, NO3, NH3, Total P, reactive P)	EP008 (chlorophyll a)	EP020 (oil & grease)	UTO-9W Ultra trace OC/OP	EP074DEFG (VOC fumigants, Hal aliphatics, Hal Aromatics, THM)	MW005 (FC) Thermotolerant Coliforms	W-14A (PAH/phenols)	EA015H (TDS), EA025H (TSS)	EP080 (BTEXN)	Ultra trace OPP (EP234AX)	Super Ultra Trace PCB's (EP131B-ST)	PFAS - full suite (EP231X)
1	BADDS	5/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
2	BADMS	5/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
3	BADUS	5/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
4	COSDS	5/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
5	COSUS	5/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
6	HINDS	6/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
7	HINUS	6/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
8	KEMDS	5/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
9	KEMUS	5/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
10	ROPDS	6/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
11	ROPUS	6/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
12	SOUDS	6/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
13	SOUUS	6/9/23	Water		11	X	X	X	X	X		X		X	X	X	X		
14	SWDUP1	5/9/23	Water		1	X													
~~15~~	SWDUP2	6/9/23	Water	PLEASE FORWARD TO EUROFINS WITH ATTACHED COC	1														
~~16~~	GWDUP2	5/9/23	Water	PLEASE FORWARD TO EUROFINS WITH ATTACHED COC	1														

Eurofins DUP2

HT

1024024

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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	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: Emily Smith, Jackson Miller	SAMPLER MOBILE: 0431 522 928	RELINQUISHED BY: Jackson Miller	RECEIVED BY: Fazi
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESDAT	DATE/TIME: 6/9/23 13:15	DATE/TIME: 6/9/23 1:15
Email Reports to: henry.luo@ghd.com; ghdlabreports@ghd.com; terry.nham@ghd.com; emily.smith@ghd.com; andrew.duval@ghd.com		RELINQUISHED BY:	RECEIVED BY:
		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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 (B dissolved 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 (SS)		W-021 (B total metals)	BTEXN	
15	BH104R	5/9/23	Water		6	X	X	X	X	X	X	X				
16	BH107R	5/9/23	Water		6	X	X	X	X	X	X	X				
17	BH112R	5/9/23	Water		6	X	X	X	X	X	X	X				
18	BH145R	6/9/23	Water		6	X	X	X	X	X	X	X				
19	GWDUP1	5/9/23	Water		1	X										
20	GWRB1	6/9/23	Water		1									X		
21	Trip spike	6/9/23	Water		1										X	
22	Trip blank	6/9/23	Water		1										X	

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☐ **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
Office Address : Level 15, 133 Castlereagh Street, Sydney NSW 2000

Contact Name : Emily Smith 0431 522 928
Project Manager: Henry Luo 0414 090 002
Email for results : emily.smith@ghd.com; terry.nham@ghd.com; henry.luo@ghd.com; ghdlabreports@ghd.com

Purchase Order : 12554717
PROJECT Number : 12554717
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	Analytes: Dissolved metals	Total metals						Containers: 500P	250P	60P	1LA	40mL vial	200mL A	Jar	Bag	Sample comments:
1	SWDUP2	6/9/23	Water		X														
2	GWDUP2	5/9/23	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

Laboratory Staff

Relinquished By: Jackson Miller
Date & Time : 6/9/23 13:15
Signature:

Received By:
Date & Time : 7/9/23 1:10
Signature:

Method Of Shipment

☐ Courier
☐ Hand Delivered
☐ Postal
Courier Consignment # :

Temperature on arrival: 5.8

Report number:

1 2

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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Tel: +64 9 526 4551	Tel: +64 3 343 5201	Tel: +64 9 525 0568
IANZ# 1327	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 7, 2023 1:10 PM
Eurofins reference	1024024

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 : 5.8 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.

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 **1024024-W**
Project name M12 WATER SAMPLING
Project ID 12554717
Received Date Sep 07, 2023

Client Sample ID			**SWDUP2**	**GWDUP2**
Sample Matrix			**Water**	**Water**
Eurofins Sample No.			**S23-Se0014634**	**S23-Se0014635**
Date Sampled			**Sep 06, 2023**	**Sep 05, 2023**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	0.001	mg/L	0.002	-
Arsenic (filtered)	0.001	mg/L	-	0.002
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	-	< 0.001
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	-	0.001
Zinc	0.005	mg/L	< 0.005	-
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 12, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Sep 12, 2023	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 NSW 2304
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	Tel: +61 2 4968 8448
Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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Tel: +64 9 526 4551	Tel: +64 3 343 5201	Tel: +64 9 525 0568
IANZ# 1327	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 #: 1024024
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Sep 7, 2023 1:10 PM
Due: Sep 14, 2023
Priority: 5 Day
Contact Name: Henry Luo

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	Sep 06, 2023		Water	S23-Se0014634	X	
2	GWDUP2	Sep 05, 2023		Water	S23-Se0014635		X
Test Counts						1	1

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Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*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 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. 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	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	105			80-120	Pass	
Arsenic (filtered)	%	99			80-120	Pass	
Cadmium	%	99			80-120	Pass	
Cadmium (filtered)	%	97			80-120	Pass	
Chromium	%	100			80-120	Pass	
Chromium (filtered)	%	97			80-120	Pass	
Copper	%	99			80-120	Pass	
Copper (filtered)	%	95			80-120	Pass	
Lead	%	105			80-120	Pass	
Lead (filtered)	%	100			80-120	Pass	
Mercury	%	105			80-120	Pass	
Mercury (filtered)	%	102			80-120	Pass	
Nickel	%	99			80-120	Pass	
Nickel (filtered)	%	96			80-120	Pass	
Zinc	%	100			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	S23-Se0022843	NCP	%	111			75-125	Pass	
Cadmium	S23-Se0022843	NCP	%	102			75-125	Pass	
Chromium	S23-Se0022843	NCP	%	85			75-125	Pass	
Copper	S23-Se0022843	NCP	%	100			75-125	Pass	
Lead	S23-Se0022843	NCP	%	108			75-125	Pass	
Mercury	S23-Se0022843	NCP	%	109			75-125	Pass	
Nickel	S23-Se0022843	NCP	%	99			75-125	Pass	
Zinc	S23-Se0022843	NCP	%	98			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S23-Se0014635	CP	%	116			75-125	Pass	
Cadmium (filtered)	S23-Se0014635	CP	%	91			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chromium (filtered)	S23-Se0014635	CP	%	90			75-125	Pass	
Copper (filtered)	S23-Se0014635	CP	%	82			75-125	Pass	
Lead (filtered)	S23-Se0014635	CP	%	87			75-125	Pass	
Mercury (filtered)	S23-Se0014635	CP	%	88			75-125	Pass	
Nickel (filtered)	S23-Se0014635	CP	%	83			75-125	Pass	
Zinc (filtered)	S23-Se0014635	CP	%	84			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	S23-Se0014634	CP	mg/L	0.002	0.003	17	30%	Pass	
Cadmium	S23-Se0014634	CP	mg/L	0.0002	0.0003	23	30%	Pass	
Chromium	S23-Se0014634	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S23-Se0014634	CP	mg/L	0.002	0.001	2.1	30%	Pass	
Lead	S23-Se0014634	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	S23-Se0014634	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S23-Se0014634	CP	mg/L	0.001	0.001	4.8	30%	Pass	
Zinc	S23-Se0014634	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S23-Se0020988	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S23-Se0020988	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S23-Se0020988	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S23-Se0020988	NCP	mg/L	0.002	0.003	3.6	30%	Pass	
Lead (filtered)	S23-Se0020988	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S23-Se0020988	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S23-Se0020988	NCP	mg/L	0.002	0.002	5.2	30%	Pass	
Zinc (filtered)	S23-Se0020988	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

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:

Ursula Long	Analytical Services Manager
Mickael Ros	Senior Analyst-Metal



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

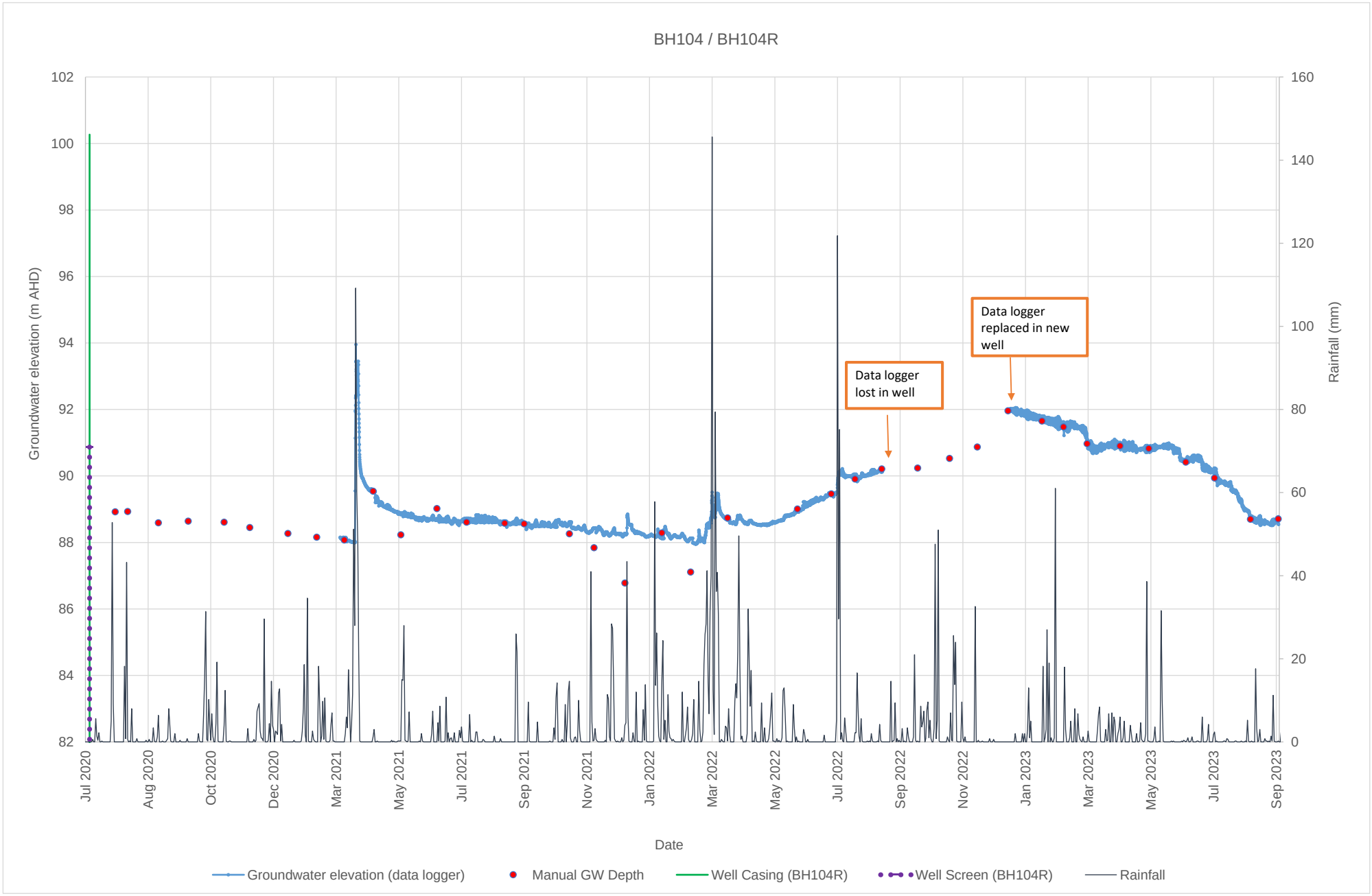
* Indicates NATA accreditation does not cover the performance of this service

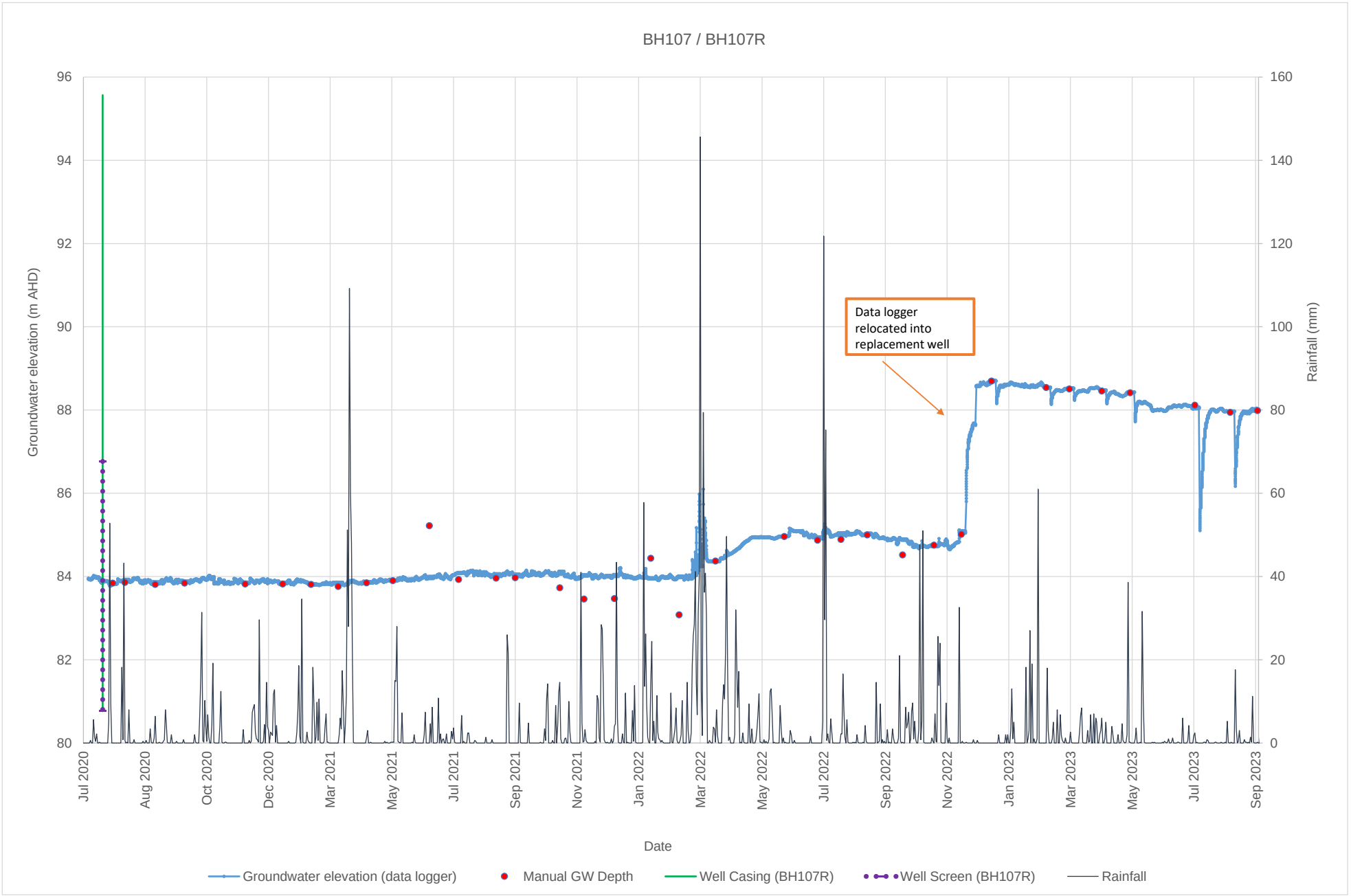
Measurement uncertainty of test data is available on request or please click here.

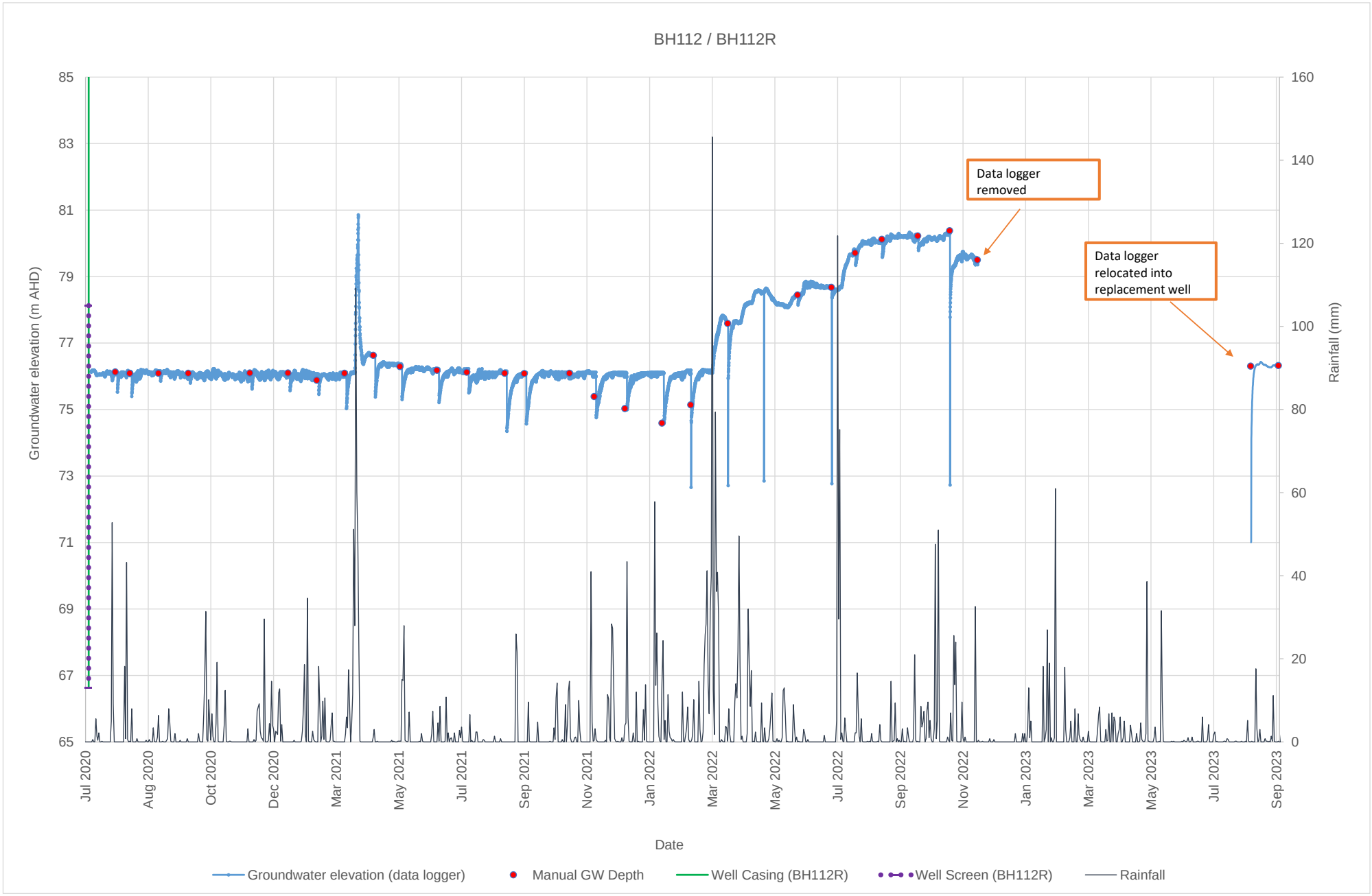
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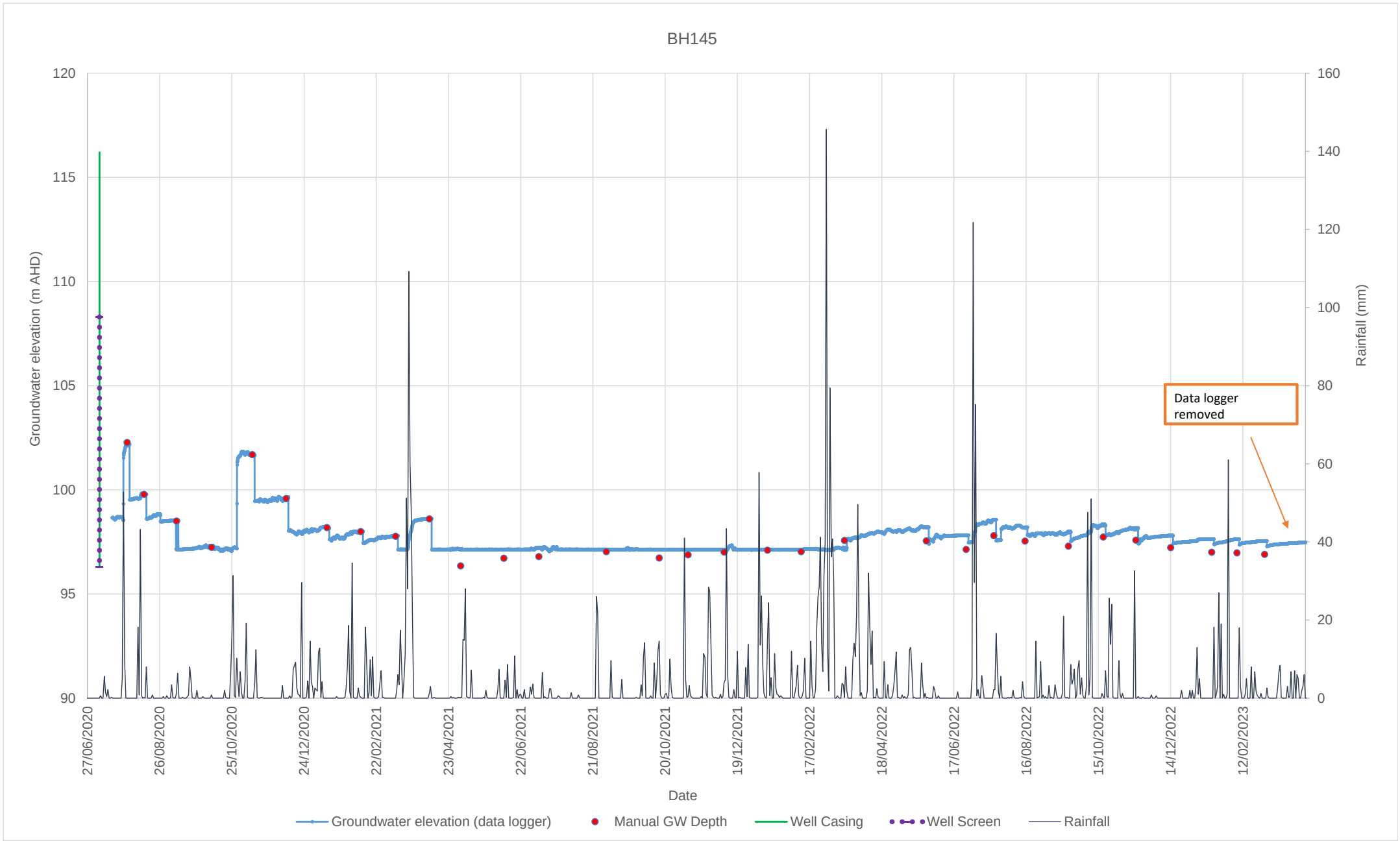
Appendix I

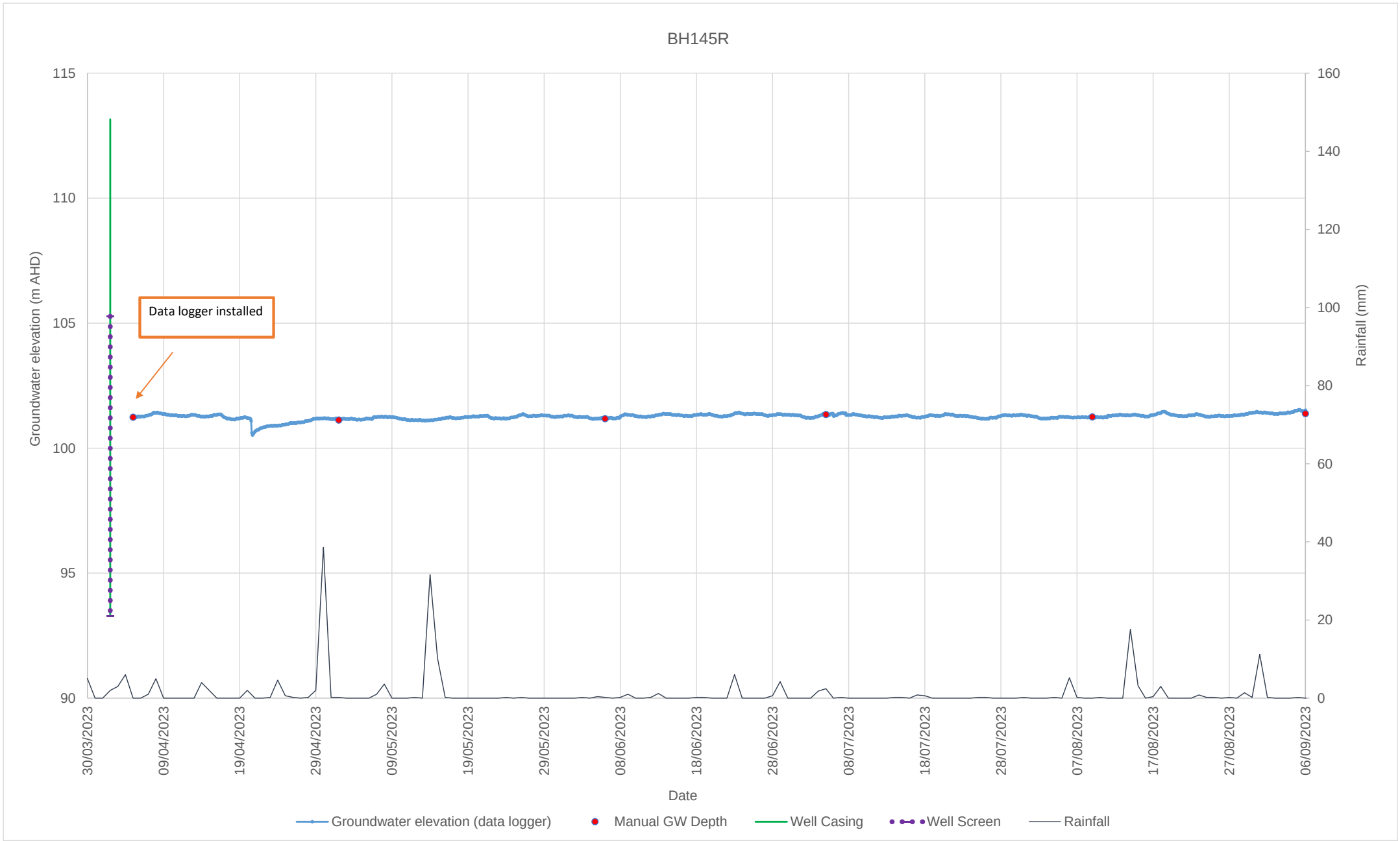
Groundwater level plots

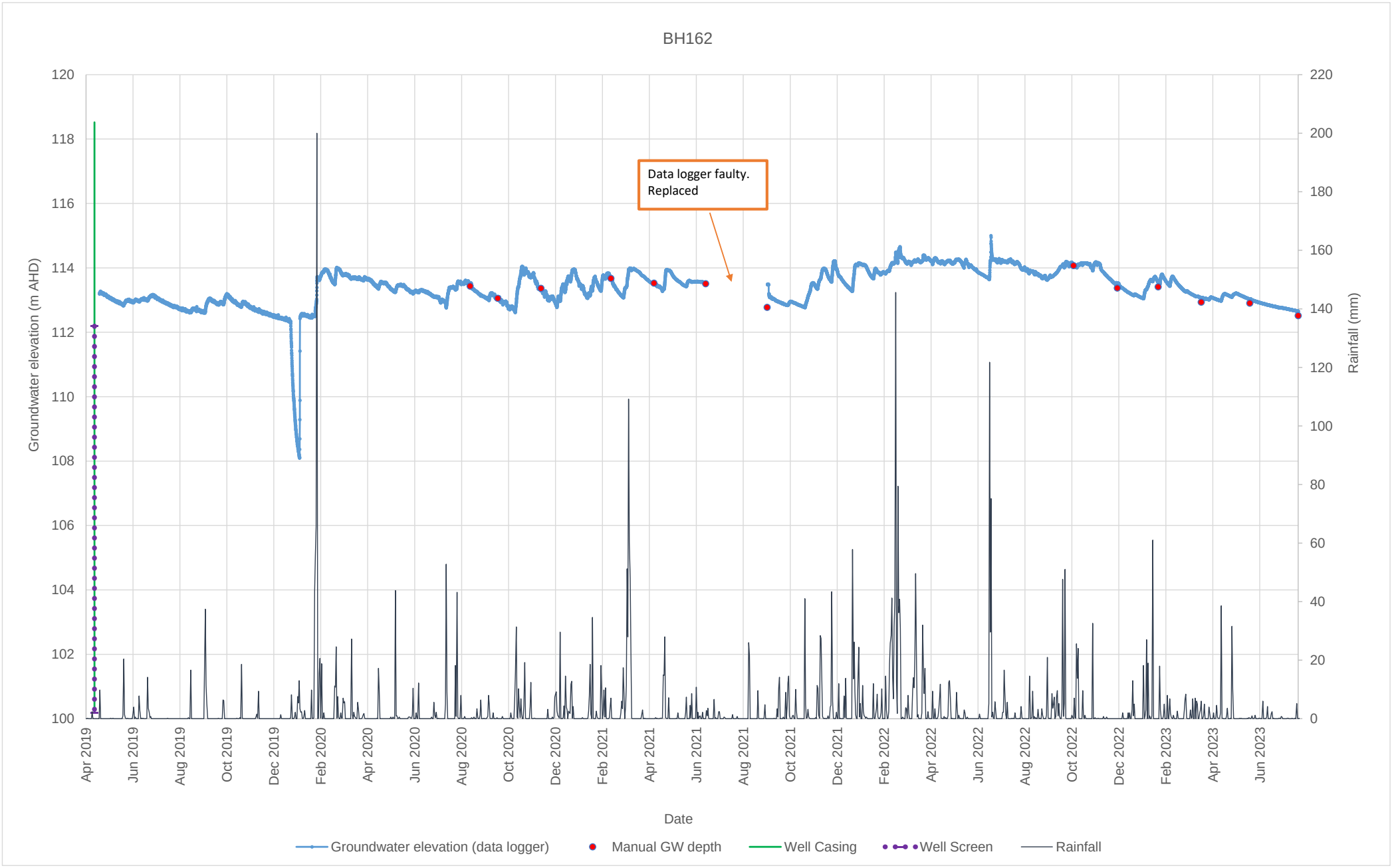

BH104 / BH104R
Groundwater elevation (m AHD)
Rainfall (mm)
Date
Data logger lost in well
Data logger replaced in new well
Groundwater elevation (data logger)
Manual GW Depth
Well Casing (BH104R)
Well Screen (BH104R)
Rainfall

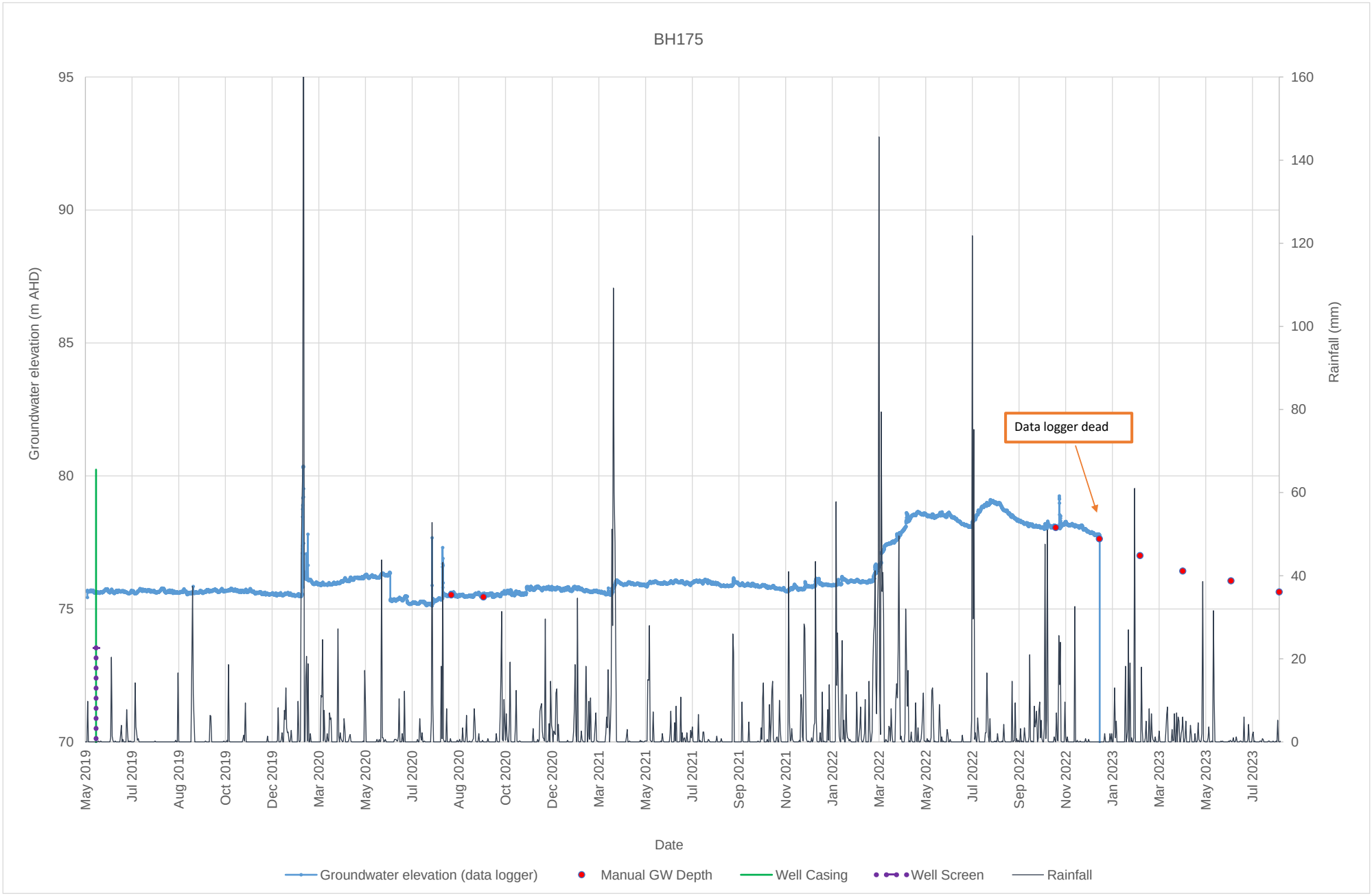

BH107 / BH107R
Groundwater elevation (m AHD)
Rainfall (mm)
96
94
92
90
88
86
84
82
80
160
140
120
100
80
60
40
20
0
Data logger relocated into replacement well
Jul 2020
Aug 2020
Oct 2020
Dec 2020
Mar 2021
May 2021
Jul 2021
Sep 2021
Nov 2021
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Date
Groundwater elevation (data logger)
Manual GW Depth
Well Casing (BH107R)
Well Screen (BH107R)
Rainfall

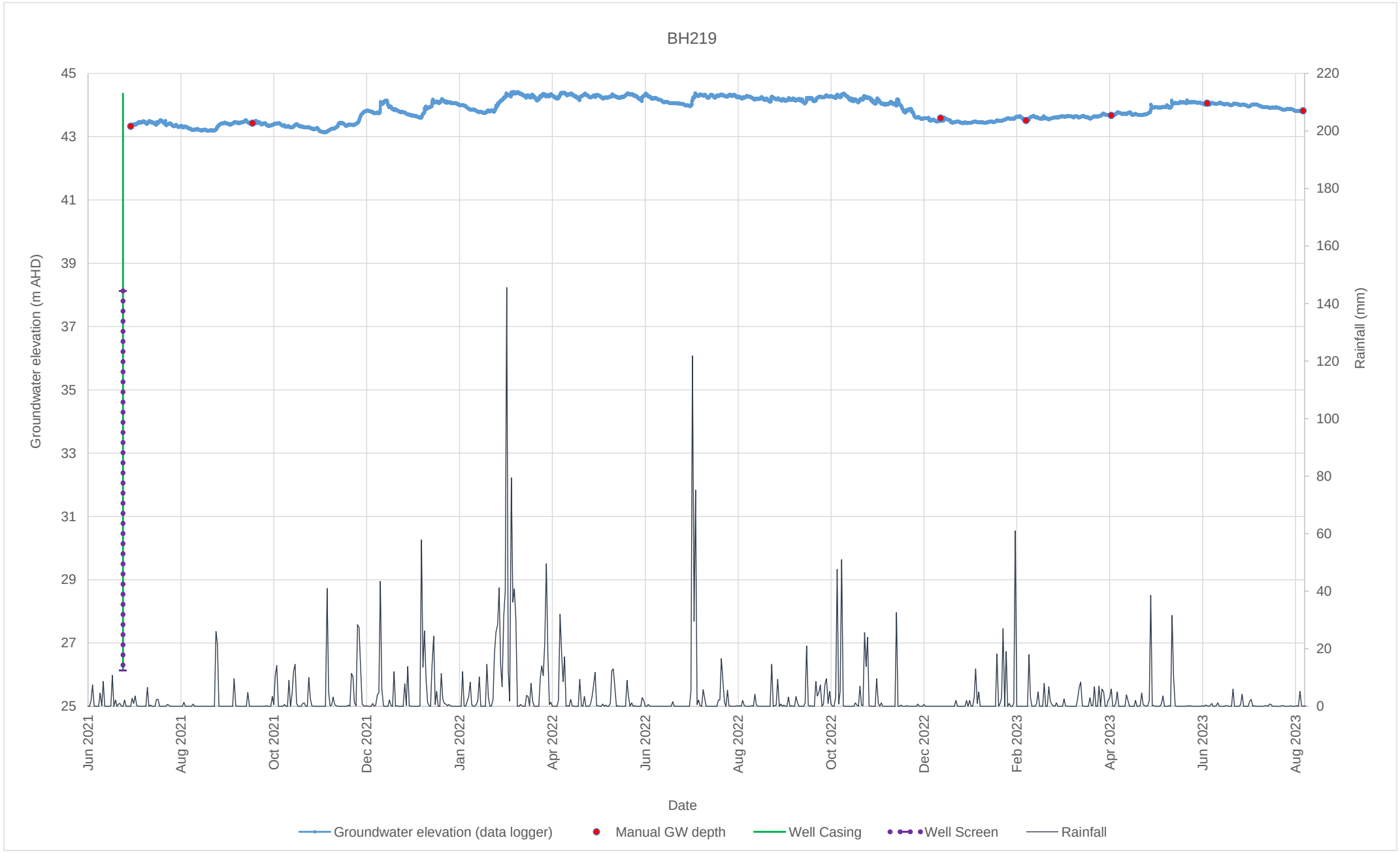

BH112 / BH112R
Groundwater elevation (m AHD)
Rainfall (mm)
Date
Data logger removed
Data logger relocated into replacement well
85
83
81
79
77
75
73
71
69
67
65
160
140
120
100
80
60
40
20
0
Jul 2020
Aug 2020
Oct 2020
Dec 2020
Mar 2021
May 2021
Jul 2021
Sep 2021
Nov 2021
Jan 2022
Mar 2022
May 2022
Jul 2022
Sep 2022
Nov 2022
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Groundwater elevation (data logger)
Manual GW Depth
Well Casing (BH112R)
Well Screen (BH112R)
Rainfall


BH145
Groundwater elevation (m AHD)
Rainfall (mm)
120
115
110
105
100
95
90
160
140
120
100
80
60
40
20
0
Data logger removed
27/06/2020
26/08/2020
25/10/2020
24/12/2020
22/02/2021
23/04/2021
22/06/2021
21/08/2021
20/10/2021
19/12/2021
17/02/2022
18/04/2022
17/06/2022
16/08/2022
15/10/2022
14/12/2022
12/02/2023
Date
Groundwater elevation (data logger)
Manual GW Depth
Well Casing
Well Screen
Rainfall


BH145R
Groundwater elevation (m AHD)
Rainfall (mm)
Data logger installed
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
Date
Groundwater elevation (data logger)
Manual GW Depth
Well Casing
Well Screen
Rainfall


BH162
Data logger faulty.
Replaced
Groundwater elevation (m AHD)
Rainfall (mm)
120
118
116
114
112
110
108
106
104
102
100
220
200
180
160
140
120
100
80
60
40
20
0
Apr 2019
Jun 2019
Aug 2019
Oct 2019
Dec 2019
Feb 2020
Apr 2020
Jun 2020
Aug 2020
Oct 2020
Dec 2020
Feb 2021
Apr 2021
Jun 2021
Aug 2021
Oct 2021
Dec 2021
Feb 2022
Apr 2022
Jun 2022
Aug 2022
Oct 2022
Dec 2022
Feb 2023
Apr 2023
Jun 2023
Date
Groundwater elevation (data logger)
Manual GW depth
Well Casing
Well Screen
Rainfall


BH175
Groundwater elevation (m AHD)
Rainfall (mm)
95
90
85
80
75
70
160
140
120
100
80
60
40
20
0
Data logger dead
May 2019
Jul 2019
Aug 2019
Oct 2019
Dec 2019
Mar 2020
May 2020
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
Date
Groundwater elevation (data logger)
Manual GW Depth
Well Casing
Well Screen
Rainfall


BH219
Groundwater elevation (m AHD)
Rainfall (mm)
45
43
41
39
37
35
33
31
29
27
25
220
200
180
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
Date
Groundwater elevation (data logger)
Manual GW depth
Well Casing
Well Screen
Rainfall

ghd.com

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