



Central Station Main Works

Final Groundwater Monitoring Report (October 2022 to May 2023)

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Glossary of Terms and Abbreviations

Abbreviation	Description
AGJV	Aurecon & GHD Design Joint Venture
ADWG	Australian Drinking Water Guidelines
AHD	Australian Height Datum
ANZECC & ARMCANZ	Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ)
BOD	Biological Oxygen Demand
BTEXN	Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene
CBD	Central Business District
CGWMP	Construction Groundwater Monitoring Plan
CSM	Central Station Main Works
COPC	Contaminants of Potential Concern
DO	Dissolved Oxygen
EC	Electrical Conductivity
GILs	Groundwater Investigation Levels
HSL	Health Screening Level
LOR	Laing O'Rourke
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environmental Protection Measure
NHMRC	National Health and Medical Research Council
NRAR	Natural Resources Access Regulator
OCP	Organochlorine Pesticides
OPP	Organophosphorus Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
QA/QC	Quality Assurance/Quality Control
RSA	Rail Services Australia
RPD	Relative percentage difference
SWL	Standing Water Level
TDS	Total Dissolved Solids
TRH	Total Recoverable Hydrocarbons
TSS	Total Suspended Solids

1 Introduction

AGJV Pty Ltd (AGJV) was commissioned by Laing O'Rourke (LOR) to undertake a groundwater monitoring program for selected groundwater wells at Central Station, as part of the Sydney Metro Central Station Main (CSM) works project.

LOR has identified three separate project work areas for the CSM project, these include:

- The Metro Station Box works
- The Central Walk and Eastern Entrance
- The Sydney Yard project access area

The approximate boundaries of the CSM project areas are presented in **Figure 1, Appendix A**.

A construction groundwater management plan (CGWMP) (LOR, August 2022) has been prepared for the CSM project and approved by the Natural Resources Access Regulator (NRAR). The CGWMP includes a groundwater monitoring program to establish the pre-construction, during construction and post construction groundwater conditions. The groundwater monitoring requirements are detailed in Section 7 of the CGWMP. Section 10 of the CGWMP also requires that the groundwater monitoring program be reviewed and amended on an annual basis to ensure it remains consistent with project priorities.

The groundwater monitoring program conducted to date includes:

- Baseline monitoring period:
 - Report one: September 2018 to February 2019
- Baseline / construction monitoring period:
 - Report two: March 2019 to September 2019 (includes baseline for the deeper monitoring wells and construction for the shallow monitoring wells)
- Construction monitoring period:
 - Report three: October 2019 to March 2020
 - Report four: April 2020 to September 2020
 - Report five: October 2020 to March 2021
 - Report six: April 2021 to September 2021
 - Report seven: October 2021 to March 2022
 - Report eight: April 2022 to September 2022
 - This report has been prepared to document the ninth and final groundwater monitoring period, undertaken between October 2022 and May 2023 as part of the ongoing groundwater monitoring program for the construction phase of the project. It is noted that this report will take into consideration the previous monitoring periods to compare the current monitoring period with both the previous monitoring periods and the baseline monitoring period. This report includes the final set of groundwater and gauging data for the monitoring program with the expected completion of construction in June 2023.

1.1 Objectives

The objectives of this groundwater monitoring program are to:

- Characterise the post-baseline groundwater conditions including groundwater levels and groundwater quality within and surrounding the CSM project area during construction.

- Comply with the groundwater monitoring program outlined in the CGWMP, which has been approved by NRAR.
- Assess any impacts the construction phase of the project has had on groundwater quality and groundwater levels. Baseline data and relevant public health and environmental water quality criteria will be compared against the ongoing groundwater conditions within the project boundary to make this assessment.

1.2 Scope of work

The scope of work completed by AGJV is summarised below:

- Gauging of up to 10 monitoring wells on a monthly basis for eight months between October 2022 and May 2023. Constraints encountered, with regards to well access, during the monitoring program are discussed in **Section 2**.
- Collection and analysis of groundwater samples from the monitoring wells in from two quarters (November 2022 and February 2023) in the eight-month period. Locations that could not be accessed for sampling in February 2023 had samples collected and analysed in the March 2023 monitoring event.
- Submission of groundwater samples to National Association of Testing Authorities (NATA) accredited laboratories for chemical analysis for a range of contaminants of potential concern (COPC) including: pH, total suspended solids (TSS), total dissolved solids (TDS), heavy metals; benzene, toluene, ethylbenzene and xylene (BTEX); total recoverable hydrocarbons (TRH); polycyclic aromatic hydrocarbons (PAH); phenols; cyanide; ammonia; ferrous iron, manganese and major anions and cations (chloride, sulfate, ammonia, nitrate, sodium, calcium, potassium and magnesium).
- Collection of groundwater depth data from data loggers located in five monitoring wells (CSM_BH02, CSM_BH04, CSM_BH06, SRT_BH047 and CSM_BH10S).
- Preparation of this report.

1.3 Limitations

AGJV's limitations to the assessment are provided in **Section 9**.

The table presented in **Table B1, Appendix B** outlines the groundwater monitoring wells accessed throughout this monitoring period. Whilst **Table B1** indicates that although the number of functioning groundwater monitoring wells used throughout this monitoring period have remained relatively stable, three wells were destroyed between October 2020 to March 2021 due to their location within the construction footprint. This has the potential to limit characterisation of construction impacts against baseline conditions for these wells and has created data gaps to the east and south of the monitoring area.

Three new wells were installed between April 2021 to September 2021 to address these data gaps.

In addition, in January 2022, four of the five wells targeting the gasworks were destroyed through construction works. The remaining well targeting the gasworks was destroyed in July 2022. This has the potential to limit the monitoring of contaminant migration in the gasworks area.

Furthermore, in October 2022 groundwater well CSM_BH08 targeting the deep aquifer to the north-west of the site was confirmed destroyed as part of ongoing construction works in the area.

Further to this, the number of wells sampled differs to that presented in Table-7.1 of the CGWMP (LOR, August 2022) and is outlined in **Section 2.4**.

2 Status of groundwater monitoring program

2.1 Groundwater monitoring between September 2018 and September 2022

The groundwater data collected between September 2018 and September 2022 are presented in the following reports:

- AGJV. (June 2019). *Sydney Metro - Central Station Main Works - Groundwater Baseline Monitoring (September 2018 to February 2019) - SMCSWCSM-DJV-EW-00-COR-GE-000001*. Sydney: Aurecon GHD Joint Venture.
- AGJV. (January 2020). *Sydney Metro - Central Station Main Works - Groundwater Baseline Monitoring (April 2019 to September 2019) - SMCSWCSM-DJV-EW-00-PLN-GE-000003*. Sydney: Aurecon GHD Joint Venture.
- AGJV. (June 2020). *Sydney Metro - Central Station Main Works – Ongoing Groundwater Monitoring (October 2019 to March 2020) - SMCSWCSM-DJV-EW-00-PLN-GE-000233*. Sydney: Aurecon GHD Joint Venture.
- AGJV. (December 2020). *Sydney Metro - Central Station Main Works – Ongoing Groundwater Monitoring (April to September 2020) - SMCSWCSM-DJV-EW-00-PLN-GE-000234*. Sydney: Aurecon GHD Joint Venture.
- AGJV (May 2021). *Sydney Metro - Central Station Main Works – Ongoing Groundwater Monitoring (October 2020 to March 2021) - SMCSWCSM-DJV-EW-00-REP-GE-000235*. Sydney: Aurecon GHD Joint Venture.
- AGJV (January 2022). *Sydney Metro – Central Station Main Works – Ongoing Groundwater Monitoring (April 2021 to September 2021) - SMCSWCSM-DJV-EW-00-REP-GE-000236*. Sydney: Aurecon GHD Joint Venture.
- AGJV (June 2022). *Sydney Metro – Central Station Main Works – Ongoing Groundwater Monitoring (October 2022 to March 2022) - SMCSWCSM-DJV-EW-00-REP-GE-000237*. Sydney: Aurecon GHD Joint Venture.
- AGJV (December 2022). *Sydney Metro – Central Station Main Works – Ongoing Groundwater Monitoring (April 2022 to September 2022) - SMCSWCSM-DJV-EW-00-REP-GE-000238*. Sydney: Aurecon GHD Joint Venture.

2.2 Overview of the groundwater program

The groundwater baseline monitoring program for CSM commenced in September 2018, as per the CGWMP. The first six monthly baseline monitoring period was completed in February 2019 (AGJV, June 2019) and due to a number of constraints six shallow monitoring wells were available post baseline monitoring.

The second six monthly monitoring period was completed between April 2019 and September 2019 (AGJV, January 2020). During March 2019 five deep monitoring wells and an additional two shallow monitoring wells were installed. Therefore, the report represents the baseline monitoring for the deep monitoring wells as only shallow construction activities had begun and the construction phase for the shallow monitoring wells. Of note, a tunnel boring machine (TBM) passed through the site during this monitoring period.

In addition to this, LOR uncovered a former gasholder which was identified during heritage excavation and piling works at the south-western corner of the Metro Box footprint in April 2019. Five additional

groundwater monitoring wells were installed by ADE in April and August 2019 in the vicinity of the former gasholder to assess the potential groundwater impacts. GASW_BH7 and GASW_BH10 are positioned within the gasworks former gasholder, GASW_BH23 and GASW_BH25A are within the former gasholder footprint and GASW_BH11 is outside the former gasholder footprint. These monitoring wells were incorporated into the ongoing groundwater monitoring program from June 2019 (GASW_BH7, GASW_BH10 and GASW_BH11) and September 2019 onwards (GASW_BH23 and GASW_BH25A). It should be noted that the latter two shallow monitoring wells (GASW_BH23 and GASW_BH25A) are unlikely to be representative of the broader shallow groundwater aquifer, given the gasholder structure (brick wall and concrete / puddle clay base) may act as an aquitard.

There have been six six-monthly monitoring reports to date documenting groundwater conditions during the construction phase of the project:

- Report 3: October 2019 to March 2020 (AGJV, June 2020)
- Report 4: April 2020 to September 2020 (AGJV, December 2020)
- Report 5: October 2020 to March 2021 (AGJV, May 2021)
- Report 6: April 2021 to September 2021 (AGJV, March 2022)
- Report 7: October 2021 to March 2022 (AGJV, June 2022)
- Report 8: April 2022 to September 2022 (AGJV, December 2022)

A number of constraints have been encountered throughout the current and previous monitoring periods in relation to availability, access and condition of monitoring wells. Monitoring wells have been destroyed and new monitoring wells have been installed. These are discussed in this report and the AGJV reports mentioned above, and are summarised in **Table B1, Appendix B**.

2.3 Analytical suite changes

Analysis of polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs) and organophosphorus pesticides (OPPs) was conducted between September 2018 and June 2020. These analytes have not been included in the analytical scope since June 2020 due to the consistent absence of detections. In December 2019, cyanide and polycyclic aromatic hydrocarbons (PAH) compounds were analysed as trace rather than standard detection limits to improve the clarity of assessment for these analytes.

There were no changes to the analytical suite during this monitoring period.

2.4 CGWMP monitoring wells amendments

Due to the destruction and replacement of monitoring wells as the construction progresses, the following variations in Table 2-1 of sampling locations throughout the project entirety are noted as compared to those listed in **Table 7.1** of the latest CGWMP (LOR, August 2022):

Table 2-1 – Summary of monitoring wells removed from the monitoring program

Monitoring wells removed from the monitoring program	Targeted aquifer	Status
CSM_BH05	Deep aquifer	Destroyed (August 2019)
SRT_BH063	Shallow aquifer	Destroyed (February 2020)
SRT_CBH001	Shallow aquifer	Destroyed (December 2018)
SRT_CHH007	Shallow aquifer	Destroyed (October 2018)
SRT_CBH015	Shallow aquifer	Destroyed (January 2020)

Monitoring wells removed from the monitoring program	Targeted aquifer	Status
SRT_CBH017	Shallow aquifer	Destroyed (February 2020)
SRT_BH039	Deep aquifer	Destroyed (November 2018)
SRT_BH048	Shallow aquifer	Destroyed (December 2018)
SRT_BH053	Deep aquifer	Destroyed (December 2018)
SRT_BH059	Shallow aquifer	Destroyed (January 2021)
SRT_BH064	Shallow aquifer	Destroyed (October 2018)
SRT_BH082	Shallow aquifer	Destroyed (December 2018)
CSM_BH09S	Shallow aquifer	Destroyed (January 2021)
CSM_BH11S	Shallow aquifer	Destroyed (March 2021)
GASW_BH7	Shallow aquifer	Destroyed (January 2022)
GASW_BH11	Shallow aquifer	Destroyed (January 2022)
GASW_BH23A	Shallow aquifer	Destroyed (January 2022)
GASW_BH25A	Shallow aquifer	Destroyed (January 2022)
GASW_BH10	Deep aquifer	Destroyed (July 2022)
CSM_BH08	Deep aquifer	Destroyed (October 2022)

The following Table 2-2 shows the monitoring wells that have been added to the monitoring program throughout the entirety of the project.

Table 2-2 - Summary of monitoring wells added to the monitoring program

Monitoring wells added to the monitoring program	Targeted aquifer	Status
GASW_BH7 – since destroyed (see Table 7.1 above)	Shallow aquifer	Sampled from June 2019, Became dry from April 2020. Monitoring well targeting gasworks.
GASW_BH10 - since destroyed (see Table 7.1 above)	Deep aquifer	Sampled from June 2019. Monitoring well targeting gasworks.
GASW_BH11 – since destroyed (see Table 7.1 above)	Shallow aquifer	Sampled from June 2019. Monitoring well targeting gasworks.
GASW_BH23A – since destroyed (see Table 7.1 above)	Shallow aquifer	Sampled from September 2019. Monitoring well targeting gasworks.
GASW_BH25A – since destroyed (see Table 7.1 above)	Shallow aquifer	Sampled from September 2019. Monitoring well targeting gasworks.
CSM_BH11S -since destroyed (see Table 7.1 above)	Shallow aquifer	Installed prior to September 2020 monitoring event. Dry well, water was not encountered. Monitoring well providing coverage to the north east
SRT_BH050	Shallow aquifer	Sampled from March 2020. Monitoring well providing coverage to the west.
SRT_BH052	Shallow aquifer	Sampled from October 2018. Monitoring well providing coverage to the north west.
CSM_BH12S	Shallow aquifer	Sampled from April 2021. New well providing coverage to the south of metro box (replacement of destroyed CSM-BH09S).
CSM_BH14S	Shallow aquifer	Sampled from September 2021. New well providing coverage to the south west of CSM

Monitoring wells added to the monitoring program	Targeted aquifer	Status
		project area (replacement of destroyed shallow wells on suburban platforms).
CSM_BH13	Deep aquifer	Sampled from September 2021. New well providing coverage to the west of CSM project area (replacement of destroyed SRT_BH063)

2.5 Construction works

The construction of the Metro box works (MBW) has being undertaken in stages:

- Enabling works: the demolition of the platforms and preparation earthworks.
- MBW excavation works commenced with piling works, including perimeter piles and plunge columns, to support the MBW excavation.
- MBW excavation.
- Installation of metro infrastructure and final fit out of Metro Station.

MBW excavations occurred over several stages within the MBW footprint. The MBW excavation was supported by the perimeter in-situ bored piles, which during the MBW excavation works were exposed at the excavation walls and the excavation wall was subsequently shotcreted to stabilise and secure the excavation walls. MBW excavation works were completed in May 2021. A program of works undertaken is presented in Table 2-3.

Table 2-3 – Construction program of works

Stage of works	Date commenced	Date completed
Enabling works	17 October 2018	13 December 2018
Piling works	10 December 2018	15 August 2019
MBW excavation works	11 February 2019	21 May 2021
Installation of metro infrastructure and final fit out of Metro Station	February 2019 (alongside MBW excavation works)	On-going

AGJV noted that the tunnel boring machines passed beneath the CSM project excavation during July and August 2019. The TBM would have been at depths of 15 to 20 m below ground level (top of invert of tunnels is -0.6 RL). The TBM movement had significant impact on the groundwater levels and is further discussed in the AGJV (January 2020) report and **Section 5.3**.

The MBW designs have been amended due to the discovery of the gasworks area, and resultant human health risk assessment (AGJV, 2020a). The revised designed included:

- A partial cut off structure which included increasing the shotcrete liner from 150 mm thickness to 250 mm with inclusion of a waterproof admixture and steel fibres to manage crack control. The expected extent of this works was proposed to be at least two shotcrete panels beyond the visually assessed extent of contaminated fill and the full depth of the pile retention wall (underside of the Concourse Floor Slab).
- A sika waterproof liner located over the internal side of the shotcrete liner and tapped in place to reduce further seepage.
- Drainage separation works that included preferential drainage of groundwater from behind the shotcrete walls using slotted pipe.

3 Basis for assessment

3.1 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:

- Consultants Reporting on Contaminated Land: Contaminated Land Guidelines, NSW EPA (NSW EPA, 2020).
- NSW EPA Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (NSW EPA, 2015).
- National Environment Protection (Assessment of Site Contamination) Amendment Measure (No.1) (NEPM), National Environment Protection Council - NEPC (NEPC, 2013).
- Guidelines for Managing Risks in Recreational Water, National Health and Medical Research Council (NHMRC, 2008).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand (ANZECC & ARMCANZ, 2000a).

3.2 On-site human health screening levels

The NEPM Health Screening Levels (HSLs) for petroleum hydrocarbons for commercial / industrial land use in sand (NEPC, 2013) have been adopted (HSL D). This criterion was adopted to characterise the risk posed to CSM construction workers and future metro infrastructure users and operation / maintenance workers from potential hydrocarbon vapour intrusion from potentially impacted groundwater. AGJV noted that NEMP HSLs are more stringent than other published screening criteria for petroleum hydrocarbons (i.e. CRC CARE guidelines for intrusive maintenance workers via vapour intrusion and direct contact pathways).

Recreational guidelines, in reference to National Health and Medical Research Council (NHMRC, 2008) have been used as a conservative screening tool for on-site intrusive maintenance workers coming into direct contact with groundwater. These guidelines are associated with incidental ingestion of water and are generally based on incidental consumption of 200 millilitres (mL) of impacted water per day, as opposed to two litres (L) per day which the Australian Drinking Water Guidelines (ADWG) (version 3.6 Updated March 2021) are based on (NHMRC, 2011). As stated in the NEPM (NEPC, 2013), recreational criteria have been adopted by applying a multiplication factor of ten to ADWG health-based criteria (NHMRC, 2011).

On this basis, criteria are expected to be more representative of the type of exposure that will occur to construction and maintenance workers during construction and operation of the project. Commercial users of the metro/commuters have not been considered as it is assumed these receptors will not come into contact with the groundwater.

3.3 Off-site human health

No potable water abstractions have been identified in hydraulic connection with groundwater beneath the CSM. The project area is also supplied by reticulated town water. Therefore, drinking water guidelines have not been considered for off-site human health receptors.



The nearest ecological receptor is located approximately one kilometre (km) north-west of the CSM (Cockle Bay and Blackwattle Bay). Potentially impacted groundwater has the potential to attenuate across this distance, however groundwater will be treated before being discharged into these Bay's during dewatering activities. These water bodies are primarily associated with recreational boating and potential fishing activities only, and as such, recreational criteria, in reference to NHMRC (2008) and ADWG (NHMRC, 2011), have been adopted.

3.4 Ecological criteria

Based on the site hydrogeology and client-supplied information, treated groundwater from the project will be discharged to the aquatic systems of Cockle Bay and/or Blackwattle Bay located approximately 1 km north-west of the project area. As such, NEPM Groundwater Investigation Levels (GILs) for protection of marine water ecosystems have been adopted (NEPC, 2013). GILs comprise screening criteria outlined in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000a). It is noted that the ANZECC & ARMCANZ has since been updated (ANZG, 2018), and therefore, the ANZG (2018) guidelines have been adopted.

3.5 Aggressivity assessment criteria

The exposure classification criteria for concrete piles and steel piles presented in Australian Standard AS 2159-2009 *Piling – Design and installation* (Standards Australia, 2009) have been selected for assessing aggressivity of the groundwater.

3.6 Ochre potential assessment criteria

The criteria adopted for the assessment of ochre formation were based on Stuyt, Dierickx & Martinez Beltran (2005), and focused on ferrous iron concentrations in groundwater. These criteria state:

- Ferrous iron concentrations less than 1 mg/L indicate that ochre formation potential is negligible.
- Ferrous iron concentrations between 1 and 5 mg/L indicate that ochre formation potential is small.
- Ferrous iron concentrations between 5 and 10 mg/L indicate that ochre formation potential is moderate.
- Ferrous iron concentrations between 10 and 25 mg/L indicate that ochre formation potential is high.
- Ferrous iron concentrations more than 25 mg/L indicate that ochre formation potential is very high.

3.7 Groundwater drawdown

The groundwater-related management and mitigation measures in Chatswood to Sydenham Environmental Impact Statement (EIS) and Revised Environmental Mitigation Measures (REMM), as stated in the REMM (AGJV, 2020), include:

REMM GWG1	A detailed geotechnical model for the project would be developed and progressively updated during design and construction. The detailed geotechnical model would include: ▪ Assessment of the potential for damage to structures, services, basements and other sub-surface elements through settlement or strain ▪ Predicted changes to groundwater levels, including at nearby water supply works. Where building damage risk is rated as moderate or higher (as per the CIRIA 1996 risk-based criteria), a structural assessment of the affected buildings / structures would be carried out and specific measures implemented to address the risk of damage. With each progressive update of the geotechnical model the potential for exceedance of the following target changes to groundwater levels would be reviewed: ▪ Less than 2.0 metres – general target. ▪ Less than 4.0 metres – where deep building foundations present. ▪ Less than 1.0 metre – residual soils. ▪ Less than 0.5 metre – residual soils (Blues Point) (fill / Aeolian sand). Where a significant exceedance of target changes to groundwater levels are predicted at surrounding land uses and nearby water supply works, an appropriate groundwater monitoring program would be developed and implemented. The program would aim to confirm no adverse impacts on groundwater levels or to appropriately manage any impacts. Monitoring at any specific location would be subject to the status of the water supply work and agreement with the landowner. The geotechnical model and groundwater monitoring program would be developed in consultation with the Department of Primary Industries (Water).
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This report includes an assessment of groundwater drawdown related to CSM works in **Section 5.3**.

4 Field investigation

4.1 Groundwater sampling dates

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

- Event 49 – 7 October 2022 (Gauging only)
- Event 50 – 2 to 4 November 2022
- Event 51 – 8 December 2022 (Gauging only)
- Event 52 – 13 January 2023 (Gauging only)
- Event 53 – 13 to 14 February 2023
- Event 54 – 15 March 2023 (Gauging of all locations and sampling of locations that could not be monitored in February 2023 due to access restrictions)
- Event 55 – 19 April 2023 (Gauging only)
- Event 56 – 23 May 2023 (Gauging only)

4.2 Groundwater monitoring well status

The groundwater monitoring wells sampled during the monitoring program are presented in **Table B1, Appendix B**. The location of these monitoring wells is displayed in **Figure 1, Appendix A**.

One well was destroyed during the current monitoring period due to ongoing construction adjacent to Central Station. This well targeted the deep aquifer in the north-west corner of the site:

- CSM_BH08, sampled from June 2019. Destroyed in October 2022.

4.3 Groundwater level gauging and monitoring methodology

The method used to gauge the monitoring wells is described below:

- Prior to gauging the standing water level (SWL) within each well, monitoring wells were left to stand for approximately five minutes to stabilise with atmospheric conditions.
- The depth of the SWL, depth of well and non-aqueous phase liquids (NAPL), if present, was measured at each monitoring well using an electronic interface probe (IP). All measurements were recorded from the top of the well casing.

During this monitoring period, data loggers present within the following wells were used to measure groundwater levels across the monitoring period:

- CSM_BH10S, a shallow monitoring well on Eddy Avenue.
- SRT_BH047, a shallow monitoring well on platforms 6/7.
- CSM_BH02, a deep monitoring well on platforms 10/11.
- CSM_BH04, a deep monitoring well on Eddy Avenue.
- CSM_BH06, a deep monitoring well on Ambulance Avenue.

The groundwater levels at these monitoring wells are graphed in **Appendix C**.

4.4 Groundwater sampling methodology

Representative groundwater samples were collected from monitoring wells using the following sampling techniques:

- Each well was purged using low-flow sampling techniques (peristaltic pump or low-flow bladder pump) with dedicated Teflon-free, low-density polyethylene (LDPE) tubing. The pump inlet tube was placed in the well screen at each location, with length of tubing within each well recorded.
- Field parameters (pH, electrical conductivity (EC), oxygen reduction potential (ORP), dissolved oxygen (DO) and temperature) were measured and recorded during purging to ensure that extracted groundwater was representative of the surrounding groundwater conditions. When field parameters reached equilibrium, i.e. consecutive measurements within 10% of each other for EC, ORP, DO and pH, groundwater was deemed representative of conditions and samples were collected.
- Visual and olfactory observations were recorded, in particular, the absence or presence of a hydrocarbon sheen or odour recorded during purging.
- Retrieved groundwater samples were immediately placed into laboratory-supplied bottles suitable for requested analyses.
- Sample bottles were filled directly from the pump with a minimal amount of air contact, with vials for volatile organic analysis filled completely to minimise headspace. Samples that were to be analysed for dissolved metals were field filtered with a dedicated filter prior to placing the sample into the sample bottle.
- The containers were labelled with the project number, sample identification, date collected and sampler's initials.
- Following the collection of each sample, the bottles were placed immediately into ice-filled coolers for preservation prior to and during transportation to a National Association of Testing Authorities (NATA) accredited laboratory.
- Samples were accompanied with chain of custody documentation to the primary laboratory and were submitted within holding times appropriate for the analysis required.
- Dedicated disposable sampling equipment (i.e. tubing, bailers, filters, nitrile gloves etc.) were disposed of after each well. Reusable sampling equipment (i.e. interface probe) was decontaminated using a mixture of laboratory-supplied phosphorus-free detergent solution and potable water, and rinsed with potable tap water between each sampling location.

Calibration certificates for equipment used throughout the monitoring program are provided in **Appendix D**. Groundwater purging sheets documenting the sampling procedure at each groundwater well are included in **Appendix E**.

4.5 Groundwater analysis

The analytical schedule for groundwater is presented in **Table B3, Appendix B**. In summary the primary groundwater samples were analysed as follows:

- Eight heavy metals (arsenic, cadmium, chromium, copper, mercury, nickel, lead, zinc).
- Ferrous iron and manganese.
- Total recoverable hydrocarbons (TRH) and TRH with silica gel clean up.
- Benzene, toluene, ethylbenzene, xylene, naphthalene (BTEXN).
- Phenols.
- Trace polycyclic aromatic hydrocarbons (PAH).
- Trace cyanide.

- 
- Ammonia.
 - Total dissolved solids (TDS) and total suspended solids (TSS).
 - pH
 - Anions and cations.

Field intra- and inter-laboratory duplicate samples were collected and submitted for laboratory analysis for heavy metals, TRH, BTEXN and trace PAH during each monitoring event. Trip blanks and trip spike samples were submitted with each batch of samples and were analysed for BTEX and volatile TRH. One rinsate sample was collected per monitoring event from reusable equipment and analysed for heavy metals.

Analysis of groundwater samples were undertaken by NATA accredited laboratories (Eurofins-MGT and ALS Environmental) for the required analysis.

It should be noted that due to a laboratory error, samples collected in February 2023 were incorrectly analysed for weak acid dissociative cyanide instead of total cyanide. In addition, samples were also incorrectly analysed for total manganese concentrations instead of filtered manganese concentrations. The correct analysis was requested on the COC and the samples were out of holding time before they could be re-analysed. Weak acid dissociative cyanide results are not comparable to the total cyanide results which have been collected in previous monitoring rounds and therefore the incorrect analysis and analytical results for cyanide and manganese for February 2023 will not be further discussed in this report.

5 Monitoring results

5.1 Introduction

The primary aim of this section is to present the findings of the current monitoring period (October 2022 to May 2023) as compared to the baseline monitoring periods.

5.2 Field observations

During sampling, no visual signs of contamination (such as an odour or sheen) were observed.

Field observations are summarised in **Table B5, Appendix B**. The groundwater purging sheets are included in **Appendix E**.

5.3 Groundwater levels and trends

5.3.1 Gauging results – shallow aquifer monitoring wells

The groundwater gauging data for shallow wells is presented in **Table B4, Appendix B**.

The depth to groundwater in the shallow groundwater aquifer ranged between 2.41 metres below the top of casing (mbTOC) in SRT_BH050 (February 2023) and 6.195 mbTOC in SRT_BH052 (May 2023). The groundwater elevations of the shallow aquifer range between 11.393 mAHD in CSM_BH10S (January 2023) and 20.299 in CSM_BH14S (October 2022).

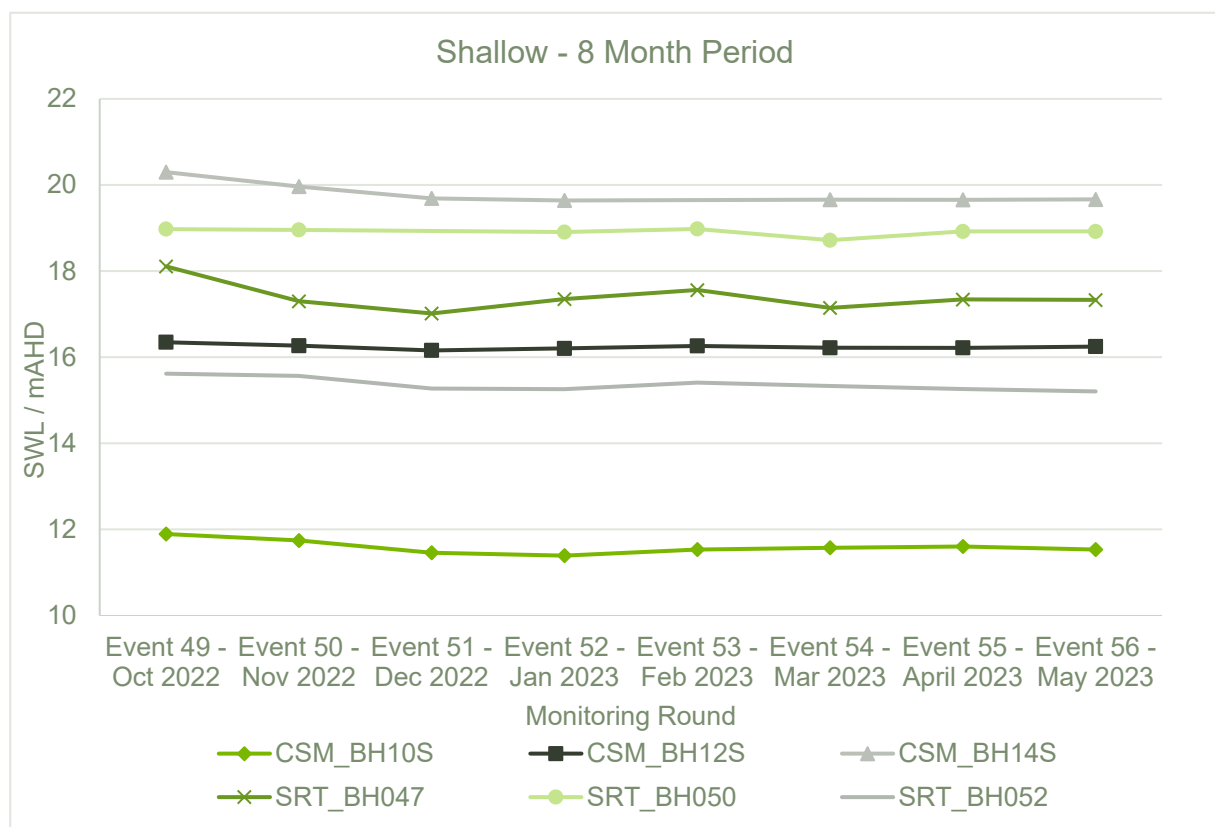


Figure 1 Standing water level – Shallow aquifer monitoring wells

As presented in Figure 1, most monitoring wells remained stable throughout the monitoring period.

The inferred shallow aquifer groundwater flow direction is presented in **Figure 2, Appendix A** and appears to flow broadly to the north-east and south-east.

5.3.2 Gauging results – deep aquifer monitoring wells

The groundwater gauging data for deep wells is presented in **Table B4, Appendix B**.

The depth to groundwater in the deeper groundwater aquifer ranged between 21.140 mbTOC in CSM_BH04 (March 2023) and 24.630 mbTOC in CSM_BH06 (March 2023). As presented in Figure 2 below, the groundwater elevation of the deep aquifer ranged between -5.766 mAHd in CSM_BH04 (October 2022) and 3.787 mAHd in CSM_BH13 (December 2022).

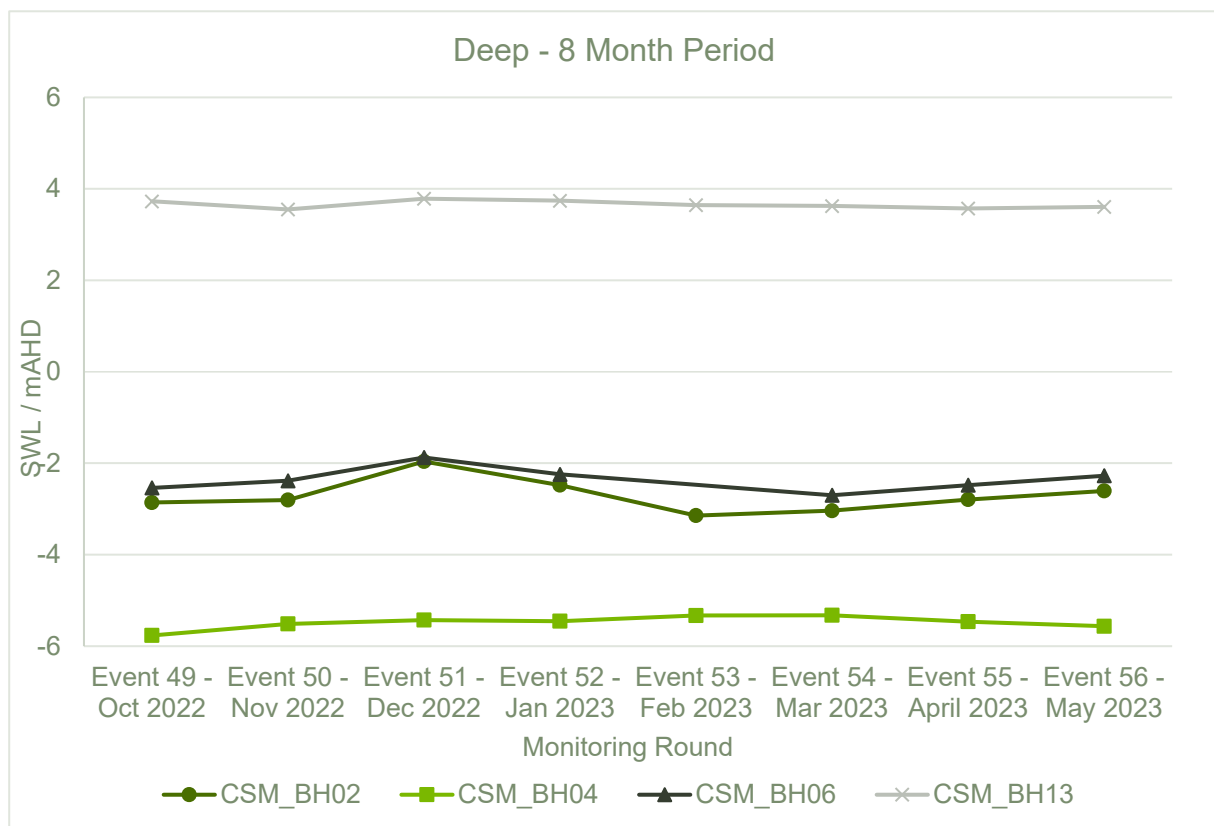


Figure 2 - Standing water level (m AHD) – All deep aquifer monitoring wells

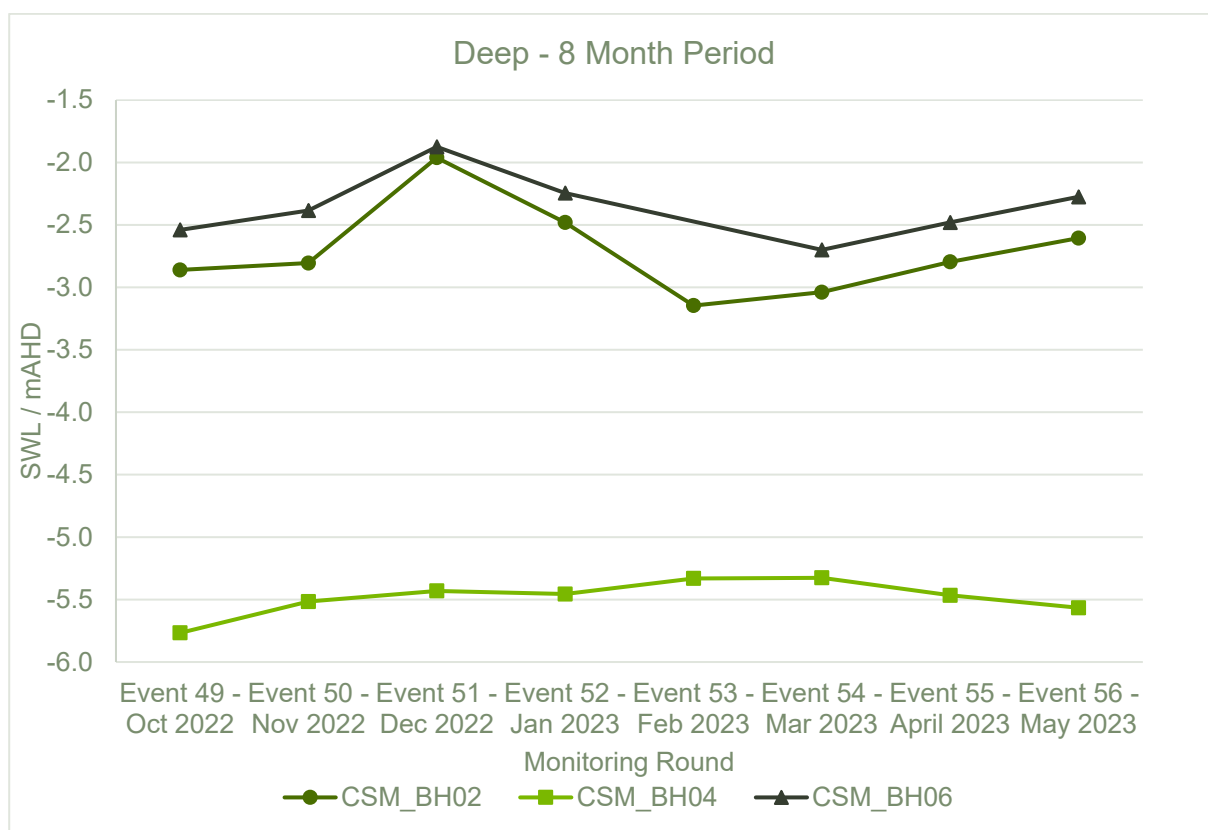


Figure 3 - Standing water level (m AHD) – Deep aquifer monitoring wells excluding CSM_BH13 to highlight increaseAs presented in Figure 3, groundwater elevation was variable through the monitoring period. Wells CSM_BH02, CSM_BH04 and CSM_BH06 were all observed to increase during the current monitoring period, while CSM_BH13 remained relatively stable. The groundwater level in CSM_BH02 and CSM_BH06 peaked in December 2022 which was not observed in CSM_BH04 and CSM_BH13.

Groundwater levels at CSM_BH04 have remained lower than the other deeper bores and this is discussed further in Section 5.3.3.2. The groundwater level observed in the well CSM_BH13 appears to be significantly higher compared to the other deep wells nearby, with an approximate 5.6 metre difference in water level from nearby CSM_BH06 observed December 2022. Over the October 2022 to May 2023 period, the groundwater elevation increased in CSM_BH04, remained relatively stable in CSM_BH13, and fluctuated in CSM_BH02 and CSM_BH04. The groundwater elevation in CSM_BH02 and CSM_BH04 in May 2023 were similar to observed levels in October 2022 despite the fluctuations over the monitoring period.

The inferred deep aquifer groundwater flow direction is presented in **Figure 3, Appendix A** and is broadly to the north to north-west.

5.3.3 Data loggers

The groundwater levels recorded by groundwater data loggers are presented with the daily rainfall data from Bureau of Meteorology Sydney Botanic Gardens weather station (066006) in Appendix C. The rapid decline and recovery in groundwater elevations at the time of manual gauging are associated with groundwater sampling works and do not reflect the background groundwater conditions.

5.3.3.1 CSM_BH02

CSM_BH02 is a deep monitoring well screened within sandstone.

Groundwater levels at CSM_BH02 generally ranged between -2.91 and -1.54 m AHD by data logger during the current monitoring period. The data logger was installed in August 2019 after the TBM went through. From March to May 2021, the groundwater levels dropped below the data logger level and the groundwater levels were not recorded. The data logger level was readjusted during the May 2021 monitoring event.

During the current monitoring period, groundwater levels were observed to have increased significantly from the lowest level recorded in May 2021 to around approximately -1.54 m AHD on 10 January 2023. Groundwater levels have not returned to the levels observed before the abrupt drop in December 2020. This is likely due to the continued de-watering activities associated with the Metro Box groundwater sump causing groundwater drawdown in this well and the surrounding aquifer. These dewatering activities may include the changes at the Basement 4 pumping station that is managed by another contractor.

Groundwater levels peaked in the current monitoring period on 10 January 2023 at -1.47 m AHD, followed by a sharp decrease until 31 January 2023 where the groundwater levels returned to previously stabilised conditions around -2.60 m AHD. This is likely due to ongoing de-watering activities associated with the Metro Box excavation, as a similar drawdown was observed in CSM_BH06 for the same time-period. It is noted that groundwater levels since 31 January 2023 have recovered at a similar rate to the recovery observed prior to the abrupt decrease on 10 January 2023.

The groundwater levels did not respond to rainfall events indicating a limited connection with rainfall directly on the site. Previous monitoring rounds prior to the reduced groundwater levels caused by the metro box excavation did not record a connection between the deep monitoring well and rainfall events. However, potential changes to site conditions including increase rainfall in the previous year and dewatering activities due to the metro box may be impacting on the groundwater levels observed during this monitoring event.

5.3.3.2 CSM_BH04

CSM_BH04 is a deep monitoring well screened within sandstone.

The groundwater levels at CSM_BH04 generally ranged between -5.862 and -5.209 m AHD by data logger during the current monitoring period.

The groundwater levels have not recovered to the levels prior to the TBM in 2019. The groundwater level remains approximately 2 to 3 m lower than initial groundwater levels. This well is located to the north near Eddy Avenue and has a well depth of 35 m. There are two potential possibilities as to the groundwater levels not recovering after the TBM. They include:

- After the TBM moved through the grouting may have been incomplete in one of the sections and has become a conduit to the geological structure (dyke) located to the north of Eddy Avenue.
- The cross passage (XP21) located approximately 90 m to the north may be extracting groundwater from the area with CSM_BH04 within the cone of depression. The construction of the cross passages is likely to create a sink and be unlined for large period. The cross passage was constructed between 30 August 2019 and 16 November 2019 and the groundwater levels start to stabilise around this time.

Groundwater levels at CSM_BH04 do not generally respond to rainfall events indicating a reduced connection with rainfall on site, however a slight increase in groundwater level was observed on 3 July 2022, corresponding with a significant rainfall event. Groundwater levels have generally increased from October 2022 onwards.

5.3.3.3 CSM_BH06

CSM_BH06 is a deep monitoring well screened within sandstone.

The groundwater levels at CSM_BH06 ranged between -3.053 and -1.512 m AHD during the current monitoring period. From February to May 2021, the groundwater levels dropped below the data logger level and the groundwater levels were not recorded. The data logger level was readjusted during the May 2021 monitoring event.

The groundwater levels have not returned to the levels observed prior to the abrupt drop following the December 2020 monitoring event. This is likely due to de-watering activities associated with the Metro Box excavation causing groundwater drawdown in this well. These dewatering activities may include the changes at the Basement 4 pumping station that is managed by another contractor. However, de-watering from the sumps of the Metro Box will continue in perpetuity and therefore groundwater levels will not return to the observed levels prior to construction.

Groundwater levels at CSM_BH06 peaked on 10 January 2023 at -1.512 m AHD with a significant decrease to approximately -3.249 m AHD on 31 January 2023. A similar response in groundwater level was observed in CSM_BH02, indicating this drawdown could potentially be caused by an increase in the ongoing de-watering activities. Since the abrupt decrease in groundwater level which stabilised on 31 January 2023, the groundwater level was measured in May 2023 at -2.275 m AHD, which is similar to the groundwater level observed in November 2022.

The groundwater levels in the current monitoring period and in monitoring rounds prior to the metro box excavation have not shown response to large rainfall events, indicating a limited connection with rainfall directly on the site.

5.3.3.4 CSM_BH10S

CSM_BH10S is a shallow well with the well screened within residual soil (clayey sand and sandy clay).

The data logger was retrieved from SRT-CBH017 prior to being destroyed, and relocated to CSM_BH10S, where it has been recording data since January 2020.

The groundwater levels at CSM_BH10S generally ranged between 11.285 and 12.032 m AHD during the current monitoring period. The groundwater levels at CSM_BH10S have responded to rainfall events, as conveyed through a spike on 7 October 2022, 31 January and 22 February 2023, coinciding with a series of rainfall events since January 2020.

There did not appear to be a clear fall in groundwater elevations associated with ongoing excavation of the Metro Box to the top of bedrock and therefore there is a limited hydraulic connection between the shallow and deeper aquifers.

5.3.3.5 SRT_BH047

SRT_BH047 is a shallow monitoring well with the well screened across sandstone and laminate / residual soil.

The groundwater levels at SRT_BH047 generally ranged between 16.435 and 18.206 m AHD during the current monitoring period. The groundwater levels at SRT_BH047 have responded to rainfall events, as conveyed through a spike on 7 October 2022 and 22 February 2023, coinciding with a series of rainfall events since data logger measurement began in January 2018.

5.3.4 Assessment of groundwater drawdown

The following groundwater monitoring well locations have been selected for assessment given that these monitoring wells have been gauged or installed with a data logger across a relatively long period of time (i.e. a minimum six months) and on the boundary of the Central Station footprint. These wells are considered to represent the groundwater levels of the surrounding areas.

These groundwater monitoring locations are shown in **Figure 1, Appendix A**.

Graphs showing the groundwater levels retrieved from data loggers and obtained during sampling events by gauging are included in **Appendix C**. Graphs showing the groundwater levels obtained during all sampling events by gauging are included in **Appendix C**.

Table 5-1 – Assessment of groundwater drawdown at selected monitoring wells

Well ID	Location	Well depth and targeting aquifer	Monitoring period	Data source	Monitoring findings
CSM_BH02	On the southern end of platforms 10 and 11, and immediately west of Metro Box footprint	35 m targeting aquifer with sandstone	August 2019 to May 2023	Gauging / Data logger	Groundwater levels ranged between -2.910 and -1.540 m AHD by data logger (excluding sampling response) and between -3.146 and -1.961 m AHD by gauging during the current monitoring period. The groundwater levels at CSM_BH02 between December 2020 and May 2021 decreased by over 6.0 m. Groundwater levels were relatively stable at CSM_BH02 prior to December 2020. The groundwater levels at CSM_BH02 were only available from the data logger from the end of August 2019. Data before that was lost due to the significant decline of groundwater levels likely caused by undermining of the TBM and technical issues with the data logger. Based on the manual available data, groundwater levels at CSM_BH02 had steadily recovered following impact by the TBM. Groundwater levels during the current monitoring period increased by approximately 1.4 m and have not recovered to the groundwater levels observed prior to the abrupt drop in December 2020, likely due to the ongoing dewatering activities associated with the ongoing draining of the Metro Box. The peak groundwater level measurement in the current monitoring period of -1.540 m AHD on 11 January 2023 was followed by a sharp decrease to -3.245 on 31 January 2023 where the groundwater level stabilised. A similar trend is observed in CSM_BH06, and it is

Well ID	Location	Well depth and targeting aquifer	Monitoring period	Data source	Monitoring findings
					potentially due to an increase in dewatering activities in the Metro Box excavation. These dewatering activities may include the changes at the Basement 4 pumping station that is managed by another contractor.
CSM_BH04	On Eddy Avenue and north of Metro Box footprint and Central Station footprint	35 m targeting aquifer with sandstone	April 2019 to May 2023	Gauging / Data logger	Groundwater levels ranged between -5.862 and -5.209 m AHD by data logger (excluding sampling response) and between -5.766 and -5.326 m AHD by gauging during the current monitoring period. Groundwater levels had a slight increase during the current monitoring period. Groundwater levels were relatively stable at CSM_BH04 at the start of the monitoring period until the tunnel boring machine moved through CSM project area in July 2019, resulting in groundwater drawdown of approximately 7 m (data logger). Groundwater levels have steadily recovered, however remain approximately 2-3 m lower than initial groundwater levels measured in April 2019. It is noted that the sharp decrease in groundwater level observed in CSM_BH02 and CSM_BH06 in January 2023 was not observed in CSM_BH04. This is potentially due to the location of the dewatering activities in the Metro Box excavation and distance of CSM_BH04 from this area to the north of site.
CSM_BH06	On Institute Drive East of Metro Box footprint and south of Central Walk footprint	35 m targeting aquifer with sandstone	April 2019 to May 2023	Gauging / Data logger	Groundwater levels at CSM_BH06 were relatively stable at the start of the monitoring period until the TBM moved through CSM project area in July 2019 which resulted drawdown of groundwater level of about 3 m. Groundwater levels had steadily recovered until a sharp decline in groundwater levels by approximately 5.0 m that occurred after the December 2020 event. The groundwater levels have not

Well ID	Location	Well depth and targeting aquifer	Monitoring period	Data source	Monitoring findings
					recovered to the level prior to December 2020, likely due to the ongoing dewatering activities associated with the Metro Box. Groundwater levels ranged between -3.053 and -1.512 m AHD by data logger (excluding sampling response) and between -2.700 and -1.875 m AHD by gauging during the current monitoring period. The groundwater levels during the current monitoring period, according to data logger information, increased to a maximum of -1.512 m AHD on 11 January 2023, and decreased to -3.053 m AHD on 31 January 2023, and increased in May 2023 to a similar groundwater elevation observed in November 2022. A similar trend for the current monitoring period is observed in CSM_BH02, as discussed earlier in this table, and is potentially due to ongoing dewatering activities in the Metro Box excavation.
SRT_BH047	On platforms 6 / 7 west of Metro Box footprint	7 m / aquifer between residual soil and bedrock sandstone	September 2018 to May 2023	Gauging / Data logger	Groundwater levels ranged between 16.435 and 18.206 m AHD by data logger (excluding sampling response) and between 17.015 and 18.110 m AHD by gauging during the current monitoring period. The groundwater levels at SRT_BH047 fluctuated by approximately 1.8 m during the current monitoring period. Groundwater levels responded to rainfall. For the overall monitoring period, groundwater level has increased less than 1 m and is likely due to the increase in rainfall.
SRT_BH052	On platforms 6 / 7 west of Metro Box footprint	8 m / aquifer with sandstone	October 2018 to May 2023	Gauging	Groundwater levels ranged between 15.205 and 15.620 m AHD during the current monitoring period, and 15.03 and 16.4 m AHD during the entire monitoring period. Fluctuations were

Well ID	Location	Well depth and targeting aquifer	Monitoring period	Data source	Monitoring findings
					less than 0.5 m during the current monitoring period. Groundwater level increase during the overall monitoring period was less than 1 m and is likely due to the increase in rainfall.
CSM_BH10S	On Eddy Avenue and north of Metro Box footprint and Central Station footprint	10 m / aquifer within residual soil	April 2019 to May 2023	Gauging / Datalogger from January 2020	Groundwater levels ranged between 11.285 and 12.032 m AHD (excluding sampling response) by data logger and between 11.393 and 11.893 m AHD by gauging during the current monitoring period. The groundwater levels during the current monitoring period, according to data logger information, increased by approximately 0.8 m. Groundwater levels at this monitoring location remained relatively stable between 11.5 – 12.5 m AHD, while fluctuations were observed less than 1 m throughout the entire monitoring period after the initial monitoring point.

Based on the information presented in Table 5-1, groundwater within the shallow aquifer in wells surrounding Central Station / CSM footprint suggested a drawdown of generally less than 2.5 m. Groundwater levels in the deep aquifer within bedrock in wells surrounding Central Station / CSM project footprint suggested a drawdown of approximately 5 m since December 2020.

During this current monitoring period groundwater levels in the deep aquifer showed recovery. However, at wells CSM_BH02 and CSM_BH06, data logger information indicates that the recovery peaked on 11 January 2023, with a sharp decline in groundwater level until 31 January 2023. From groundwater level gauging data at CSM_BH13, a slight decrease of approximately 0.1 m is observed between the January and February 2023 rounds. The groundwater level in CSM_BH04 shows consistent recovery over the monitoring period. The sharp drawdown in wells observed at CSM_BH02 and CSM_BH06 in January 2023 is potentially indicative of an increase in the ongoing dewatering activities in the Metro Box excavation.

The groundwater levels in the shallow aquifer during this current monitoring period remained relatively stable with minor fluctuation. An increase in groundwater level with rainfall events at shallow wells SRT_BH047 and CSM_BH10S, which contain data loggers, was observed on 7 October 2022 and 22 February 2023. This suggests that rainfall events have an impact on the groundwater level in the shallow aquifer.

Based on these, AGJV consider that the groundwater drawdown by CSM works is within the acceptable range stated in Section 3.7 of this report.

5.3.5 Review of groundwater drawdown – MCoA requirement

An assessment of the observed groundwater levels against the model predictions for the site, and the Ministerial Condition of Approval (MCoA) requirements (**Section 3.7**). The model predictions are detailed in the Hydrogeological Inflow Assessment Report ref SMCSWCSM-DJV-EW-00-REP-GE-000202 of 23 January 2019. In general, the modelled drawdowns in the residual soils show that drawdown is predicted as less than 4 m with the 2 to 4 m drawdown zone extending up to around 25 m from the edge of the excavation (and within the Central Station site). Drawdown of the track area is limited to between 0.5 and 1 m, other than a small zone immediately to the northwest and east, above a dyke zone, with up to 2 m of drawdown.

5.3.5.1 Assessment of Observed Groundwater levels

Groundwater drawdown in the deep aquifer is not expected to have any impact on the adjacent structures.

The monitored groundwater movements for the shallow aquifer, shown below in **Appendix C**, are relevant to the MCoA requirements and hence are assessed here.

The assessments are given in Table 5-2 below:

Table 5-2 – Assessed groundwater movements against MCoA criteria

Well No	Baseline groundwater level (mAHD) *	Final groundwater level (mAHD)	Monitored drawdown (m)	Remarks
CSM_BH09S	16.734	15.947	0.787	Satisfying MCoA
CSM_BH10S	11.573	11.533	0.04	Satisfying MCoA
CSM_BH12S	15.821	16.246	no drawdown	Satisfying MCoA
CSM_BH14S	20.344	19.644	0.7	Satisfying MCoA
GASW_BH11	15.668	13.388	2.28	Nearby wells GASW23 and 25A recorded limited drawdown of less than 1m. The majority of the drawdown (2.17m) in GASW_BH11 occurred between two readings of 16 March 2020 and 16 April 2020 indicating the recorded drawdown may be exaggerated
GASW_BH23	16.907	16.31	0.597	Satisfying MCoA
GASW_BH25A	17.071	17.786	no drawdown	Satisfying MCoA
GASW_BH7	16.93	15.81	1.12	Satisfying MCoA
SRT_BH047	16.45	17.33	no drawdown	Satisfying MCoA
SRT_BH050	19.055	18.92	0.135	Satisfying MCoA
SRT_BH052	16.445	15.205	1.24	Satisfying MCoA
SRT_BH059	19.81	17.925	1.885	Satisfying MCoA

*where no baseline monitoring was carried out, the 1st reading has been taken as baseline reading.

5.3.5.2 Conclusions

It is assessed that the monitored groundwater drawdown satisfies MCoA requirements. Further, it is noted that the associated ground movement monitoring carried out at CSM site has recorded no adverse impacts to adjacent structures. As the monitored groundwater has shown being stabilised, and the recorded drawdown is very limited across the CSM works area and its zone of influence, there is unlikely any ongoing risk of damage.

5.4 Field measured groundwater quality parameters

The field measured groundwater quality parameters are summarised in **Table B5, Appendix B**. The field purging sheets are included in **Appendix E**.

The measured temperature, electrical conductivity and pH at monitoring well locations were relatively consistent across the monitoring period. It is noted that the oxidation / reduction potential fluctuated across the monitoring period and was similar in shallow and deep monitoring wells. Dissolved oxygen in the majority of wells was higher in the November 2022 round than the February and March 2023 sampling rounds, though this could be attributed to equipment sensitivity. The electrical conductivity at all locations was generally indicative of fresh water.

5.5 Laboratory analytical results

The results have been discussed separately relative to the adopted criteria in the following sections. The laboratory results are presented in **Table B2 and Table B3, Appendix B** and the laboratory reports are provided in **Appendix F**.

The following section discusses the laboratory analytical results during the current monitoring period (October 2022 to May 2023), relative to the adopted criteria. All monitoring data from the current and previous monitoring periods are included in **Table B2, Appendix B**. Monitoring data from the current monitoring period only are presented in **Table B3, Appendix B**, and discussed below.

5.5.1 Human health and ecological screening criteria

Heavy Metals

Copper and zinc had multiple exceedances of the adopted ecological screening criterion in all sampling locations, with exception of CSM_BH10S and SRT_BH052 which reported no heavy metal exceedances. Copper had exceedances in at least one monitoring period in the remaining wells. Zinc exceedances were reported in both monitoring rounds for the remaining wells, with exception of CSM_BH02 which reported an exceedance for one monitoring round only.

Total Cyanide

Total cyanide results were obtained for all locations in the November 2022 round and the three wells CSM_BH06, CSM_BH12S and CSM_BH14S sampled in March 2023, which were not sampled due to access restraints in the February 2023 round. Due to a laboratory error, total cyanide results are not available for samples collected and analysed in February 2023, as discussed in Section 4.5.

In the November 2022 monitoring round all locations reported a total cyanide concentration in exceedance of the adopted ecological screening criterion for total cyanide, with exception of CSM_BH04 which reported a total cyanide concentration below the LOR. In the March 2023 monitoring round, only CSM_BH14S reported a detection of total cyanide which was at the LOR and therefore in exceedance of the adopted criterion.

TRH, BTEXN and PAH

All groundwater samples submitted for analysis reported concentrations of TRH fractions with silica gel clean-up were below the laboratory limit of reporting. Reported detections above the limit of reporting were noted only in the November 2022 round for TRH fractions without silica gel clean-up. These include fractions C6 to C10 (3 detections) and >C10 to C16 (1 detection) in four wells across the project area. These wells were CSM_BH02, CSM_BH13, CSM_BH14S for TRH F1 less BTEX and were all below the adopted screening criteria. SRT_BH050 had a detection for >C10 to C16 less naphthalene at the laboratory detection limit.

All samples analysed over the current monitoring period for analysis reported concentrations of BTEX below the laboratory limit of reporting.

Locations CSM_BH02, CSM_BH04, CSM_BH13, SRT_BH047 and SRT_BH052 in the November 2022 monitoring round reported low concentrations of various PAH compounds, which were below the adopted ecological criterion. These detections included naphthalene and was reported in locations CSM_BH04, CSM_BH13, SRT_BH047 and SRT_BH052, which were all below the adopted screening criteria. Fluoranthene and pyrene were reported at low concentrations in CSM_BH02. There were no detections of PAH in samples collected in the February and March 2023 monitoring rounds.

The majority of samples in the November 2022 round that reported TRH detection also reported detections of various PAH compounds. There were no detections of these compounds in the February and March 2023 sampling events, suggesting these results are an anomaly.

Phenols

All groundwater samples submitted for analysis reported concentrations of phenols below the laboratory detection limit.

Ammonia

All groundwater samples reported concentrations of ammonia below the LOR, with exception of SRT_BH047 which reported a low concentration of 0.03 mg/L. There were no exceedances of the adopted ecological criteria (0.91 mg/L).

5.5.2 Comparison to baseline conditions

The 20th and 80th percentiles of cyanide, ammonia, copper, manganese, nickel, zinc, benzene, TRH (F1), TRH (F2) fraction, TDS and pH (lab) were calculated for the entire construction period. The 20th percentile is the value (or score) below which 20% of the observations are found. Equivalently, 80% of the observations are found above the 20th percentile. Table 5-3 presents percentiles for the entire construction monitoring program against the baseline (shallow from September 2018 to February 2019 and deep from April to September 2019). The **BOLD** numbers on the tables show where the percentiles have exceeded the baseline percentiles.

The results from the three sampling events in the current monitoring period (November 2022, February 2023 and March 2023) are displayed in Table 5-3, with results below the 20th percentile in blue and above 80th percentile in orange of the baseline data. February and March 2023 results are combined as all locations were only sampled once across the two events.

The new well CSM_BH12S is located near the destroyed well CSM_BH09S and targets the same aquifer. Hence the percentiles for CSM_BH12S has been compared to the baseline percentiles for CSM_BH09S, although slight variations could be expected.

Three additional wells have been included in the percentile calculations in the previous monitoring period and have no baseline monitoring period. Two of these wells, CSM_BH13 and CSM_BH14S, are relatively new and have been sampled since September 2021. SRT_BH050 has either been dry or not enough water in the well to sample since February 2020 when it was first added to the monitoring program.

Table 5-3 – 20th and 80th percentiles of COPCs at monitoring well locations

Cyanide (Total)							
Adopted guideline:	On-site health: N/A						
	Off-site ecological: 0.004 mg/L						
	Off-site health: 0.8 mg/L						
Site ID	Current monitoring period (mg/L)		Construction period (mg/L)			Monitoring period Baseline (mg/L)	
	Nov 2022	Feb/Mar 2023 ¹	N*	20th %ile	80th %ile	20th %ile	80th %ile
CSM_BH02	0.0080	-	34	0.0020	0.0031	0.0025	0.0050
CSM_BH04	0.0020	-	34	0.0020	0.0031	0.0025	0.0025
CSM_BH06	0.0120	0.0020	33	0.0020	0.0025	0.0025	0.0025
CSM_BH10S	0.0070	-	40	0.0020	0.0025	0.0025	0.0025
CSM_BH12S	0.0060	0.0020	16	0.0020	0.0020	0.0025	0.0025
CSM_BH13	0.0120	-	11	0.0020	0.0040	NA	NA
CSM_BH14S	0.0080	0.0040	11	0.0020	0.0020	NA	NA
SRT_BH047	0.0200	-	40	0.0020	0.0025	0.0025	0.0025
SRT_BH050	0.0200	-	14	0.0020	0.0040	NA	NA
SRT_BH052	0.0220	-	40	0.0020	0.0025	0.0025	0.0025

¹ Due to a laboratory error, total cyanide results are not available for samples collected and analysed in February 2023 (See Section 4.5).

Ammonia							
Adopted guideline:	On-site health: N/A						
	Off-site ecological: 0.91 mg/L						
	Off-site health: N/A						
Site ID	Current monitoring period (mg/L)		Construction period (mg/L)			Monitoring period Baseline (mg/L)	
	Nov 2022	Feb/Mar 2023	N*	20th %ile	80th %ile	20th %ile	80th %ile
CSM_BH02	0.005	0.005	34	0.005	0.054	0.005	0.050
CSM_BH04	0.005	0.005	34	0.005	0.094	0.005	0.005
CSM_BH06	0.005	0.005	33	0.005	0.070	0.005	0.020
CSM_BH10S	0.005	0.005	40	0.005	0.060	0.005	0.005
CSM_BH12S	0.005	0.005	16	0.020	0.090	0.040	0.100
CSM_BH13	0.005	0.005	11	0.005	0.030	NA	NA
CSM_BH14S	0.005	0.005	11	0.005	0.005	NA	NA
SRT_BH047	0.030	0.005	40	0.005	0.042	0.005	0.005
SRT_BH050	0.005	0.005	13	0.005	0.068	NA	NA
SRT_BH052	0.005	0.005	40	0.005	0.046	0.005	0.005

Copper (Filtered)							
Adopted guideline:	On-site health: N/A						
	Off-site ecological: 0.0013 mg/L						
	Off-site health: 20 mg/L						
Site ID	Current monitoring period (mg/L)		Construction period (mg/L)			Monitoring period Baseline (mg/L)	
	Nov 2022	Feb/Mar 2023	N*	20th %ile	80th %ile	20th %ile	80th %ile
CSM_BH02	0.0020	0.0005	34	0.0005	0.0034	0.0005	0.0005
CSM_BH04	0.0020	0.0020	34	0.0005	0.0030	0.0005	0.0030
CSM_BH06	0.0010	0.0060	33	0.0020	0.0186	0.0005	0.0096
CSM_BH10S	0.0005	0.0005	40	0.0005	0.0032	0.0010	0.0030
CSM_BH12S	0.0020	0.0005	16	0.0005	0.0005	0.0005	0.0020
CSM_BH13	0.0010	0.0005	11	0.0010	0.0030	NA	NA
CSM_BH14S	0.0040	0.0005	11	0.0005	0.0010	NA	NA
SRT_BH047	0.0120	0.0020	40	0.0010	0.0050	0.0064	0.0204
SRT_BH050	0.0130	0.0020	18	0.0024	0.0160	NA	NA
SRT_BH052	0.0010	0.0005	40	0.0005	0.0060	0.0120	0.0630

Manganese (Filtered)							
Adopted guideline:	On-site health: N/A						
	Off-site ecological: N/A						
	Off-site health: 5 mg/L						
Site ID	Current monitoring period (mg/L)		Construction period (mg/L)			Monitoring period Baseline (mg/L)	
	Nov 2022	Feb/Mar 2023 ¹	N*	20th %ile	80th %ile	20th %ile	80th %ile
CSM_BH02	0.0180	-	34	0.0530	0.3540	0.2000	0.3300
CSM_BH04	0.3000	-	34	0.3460	0.4700	0.3000	0.4400
CSM_BH06	0.7100	0.2000	33	0.2840	0.4460	0.2100	0.2800
CSM_BH10S	0.4800	-	40	0.4780	0.5800	0.4300	0.5100
CSM_BH12S	0.7400	0.5800	16	0.5300	0.6800	0.6400	0.7900
CSM_BH13	0.3800	-	11	0.4700	0.5400	NA	NA
CSM_BH14S	0.0030	0.0650	11	0.0025	0.0120	NA	NA
SRT_BH047	0.0110	-	40	0.0025	0.0250	0.0010	0.0080
SRT_BH050	0.0140	-	15	0.0170	0.0252	NA	NA
SRT_BH052	0.0240	-	40	0.0025	0.0202	0.0140	0.0320

¹ Due to a laboratory error, the incorrect test was conducted for manganese analysis on all February 2023 samples, giving total concentrations of manganese instead of filtered concentrations.

Nickel (Filtered)							
Adopted guideline:	On-site health: N/A						
	Off-site ecological: 0.07 mg/L						
	Off-site health: 0.2 mg/L						
Site ID	Current monitoring period (mg/L)		Construction period (mg/L)			Monitoring period Baseline (mg/L)	
	Nov 2022	Feb/Mar 2023	N*	20th %ile	80th %ile	20th %ile	80th %ile
CSM_BH02	0.0005	0.0020	34	0.0070	0.0270	0.0060	0.0120
CSM_BH04	0.0080	0.0080	34	0.0106	0.0492	0.0100	0.0290
CSM_BH06	0.0020	0.0120	33	0.0078	0.0424	0.0122	0.0200
CSM_BH10S	0.0005	0.0020	40	0.0018	0.0020	0.0020	0.0020
CSM_BH12S	0.0220	0.0120	16	0.0090	0.0220	0.0060	0.0090
CSM_BH13	0.0050	0.0060	11	0.0110	0.0340	NA	NA
CSM_BH14S	0.0005	0.0005	11	0.0005	0.0005	NA	NA
SRT_BH047	0.0010	0.0020	40	0.0009	0.0042	0.0020	0.0048
SRT_BH050	0.0005	0.0010	18	0.0014	0.0054	NA	NA
SRT_BH052	0.0005	0.0010	40	0.0005	0.0020	0.0040	0.0080

Zinc (Filtered)							
Adopted guideline:	On-site health: N/A						
	Off-site ecological: 0.008 mg/L						
	Off-site health: N/A						
Site ID	Current monitoring period (mg/L)		Construction period (mg/L)			Monitoring period Baseline (mg/L)	
	Nov 2022	Feb/Mar 2023	N*	20th %ile	80th %ile	20th %ile	80th %ile
CSM_BH02	0.0100	0.0025	34	0.0096	0.0374	0.0070	0.0110
CSM_BH04	0.0370	0.0110	34	0.0176	0.0822	0.0025	0.1000
CSM_BH06	0.0120	0.0600	33	0.0260	0.0898	0.0410	0.0732
CSM_BH10S	0.0025	0.0025	40	0.0025	0.0116	0.0060	0.0110
CSM_BH12S	0.0750	0.0470	16	0.0310	0.0940	0.0360	0.0480
CSM_BH13	0.0200	0.0090	11	0.0080	0.0430	NA	NA
CSM_BH14S	0.0025	0.0025	11	0.0025	0.0025	NA	NA
SRT_BH047	0.0250	0.0160	40	0.0025	0.0342	0.0066	0.0374
SRT_BH050	0.0130	0.0150	18	0.0094	0.0372	NA	NA
SRT_BH052	0.0060	0.0060	40	0.0025	0.0156	0.0060	0.0860

Benzene							
Adopted guideline:	On-site health (vapour intrusion): 5000 µg/L						
	Off-site ecological: 700 µg/L						
	Off-site health: 10 µg/L						
Site ID	Current monitoring period (ug/L)		Construction period (ug/L)			Monitoring period Baseline (ug/L)	
	Nov 2022	Feb/Mar 2023	N*	20th %ile	80th %ile	20th %ile	80th %ile
CSM_BH02	0.5	0.5	34	0.5	0.5	0.5	0.5
CSM_BH04	0.5	0.5	34	0.5	0.5	0.5	0.5
CSM_BH06	0.5	0.5	33	0.5	0.5	0.5	0.5
CSM_BH10S	0.5	0.5	40	0.5	0.5	0.5	0.5
CSM_BH12S	0.5	0.5	16	0.5	0.5	0.5	0.5
CSM_BH13	0.5	0.5	11	0.5	0.5	NA	NA
CSM_BH14S	0.5	0.5	11	0.5	0.5	NA	NA
SRT_BH047	0.5	0.5	40	0.5	0.5	0.5	0.5
SRT_BH050	0.5	0.5	17	0.5	0.5	NA	NA
SRT_BH052	0.5	0.5	40	0.5	0.5	0.5	0.5

TRH F1							
Adopted guideline:	On-site health (vapour intrusion): 6000 µg/L						
	Off-site ecological: n/a						
	Off-site health: n/a						
Site ID	Current monitoring period (ug/L)		Construction period (ug/L)			Monitoring period Baseline (ug/L)	
	Nov 2022	Feb/Mar 2023	N*	20th %ile	80th %ile	20th %ile	80th %ile
CSM_BH02	20	10	34	10	10	10	10
CSM_BH04	10	10	33	10	10	10	10
CSM_BH06	10	10	33	10	10	10	10
CSM_BH10S	10	10	40	10	10	10	10
CSM_BH12S	10	10	16	10	10	10	10
CSM_BH13	30	10	11	10	10	NA	NA
CSM_BH14S	30	10	11	10	30	NA	NA
SRT_BH047	10	10	40	10	10	10	10
SRT_BH050	10	10	17	10	10	NA	NA
SRT_BH052	10	10	40	10	10	10	10

TRH F2							
Adopted guideline:	On-site health (vapour intrusion): Non limiting						
	Off-site ecological: n/a						
	Off-site health: n/a						
Site ID	Current monitoring period (ug/L)		Construction period (ug/L)			Monitoring period Baseline (ug/L)	
	Nov 2022	Feb/Mar 2023	N*	20th %ile	80th %ile	20th %ile	80th %ile
CSM_BH02	25	25	34	25	25	25	25
CSM_BH04	25	25	33	25	25	25	25
CSM_BH06	25	25	33	25	25	25	25
CSM_BH10S	25	25	40	25	25	25	25
CSM_BH12S	25	25	16	25	25	25	50
CSM_BH13	25	25	11	25	25	NA	NA
CSM_BH14S	25	25	11	25	25	NA	NA
SRT_BH047	25	25	40	25	25	25	25
SRT_BH050	50	25	17	25	25	NA	NA
SRT_BH052	25	25	40	25	25	25	25

TDS							
Adopted guideline:	On-site health: N/A						
	Off-site ecological: N/A						
	Off-site health: N/A						
Site ID	Current monitoring period (mg/L)		Construction period (mg/L)			Monitoring period Baseline (mg/L)	
	Nov 2022	Feb/Mar 2023	N*	20th %ile	80th %ile	20th %ile	80th %ile
CSM_BH02	400	250	34	272	560	434	562
CSM_BH04	310	310	34	242	310	248	318
CSM_BH06	570	720	33	452	580	470	600
CSM_BH10S	150	180	39	150	194	148	246
CSM_BH12S	450	430	16	310	380	390	460
CSM_BH13	690	540	11	530	640	NA	NA
CSM_BH14S	100	210	11	110	150	NA	NA
SRT_BH047	110	100	39	140	294	262	360
SRT_BH050	160	140	10	138	162	NA	NA
SRT_BH052	200	160	39	190	270	246	282

pH (Lab)							
Adopted guideline:	On-site health: N/A						
	Off-site ecological: N/A						
	Off-site health: N/A						
Site ID	Current monitoring period (pH units)		Construction period (pH units)			Monitoring period Baseline (pH units)	
	Nov 2022	Feb/Mar 2023	N*	20th %ile	80th %ile	20th %ile	80th %ile
CSM_BH02	6.8	6.7	34	6.8	7.9	7.8	8.1
CSM_BH04	5.9	6.3	34	6.4	7.2	6.7	7.5
CSM_BH06	6.6	7.4	33	6.6	7.4	7.1	8
CSM_BH10S	5.8	5.7	39	5.9	6.7	6.1	6.6
CSM_BH12S	6.1	7.1	16	6.5	7.5	6.6	6.9
CSM_BH13	6.9	6.3	11	6.8	7.5	NA	NA
CSM_BH14S	7.3	7.1	11	7.1	7.5	NA	NA
SRT_BH047	5.8	5.8	39	6.5	7.7	7.7	8.1
SRT_BH050	4.9	4.9	11	4.7	5.2	NA	NA
SRT_BH052	5.8	6.0	39	6.6	7.6	7.7	7.9

Cyanide

All cyanide percentiles for the construction monitoring period are below the adopted ecological and human health criteria. In the current monitoring period, reported cyanide concentrations in November 2022 were in exceedance of the 80th baseline percentile and ecological criteria in the majority of monitoring locations. CSM_BH13, CSM_BH14S and SRT_BH050 which do not have baseline percentiles for comparison, reported cyanide concentrations in the current monitoring period in exceedance of the 80th percentile for the construction monitoring period. CSM_BH04 reported an exceedance of the 20th percentile concentration for the baseline, though this can be attributed to the change in the laboratory limit of reporting from 0.005 mg/L to 0.004 mg/L since the baseline monitoring period was completed.

Ammonia

The ammonia concentrations in all samples analysed in the current monitoring period reported no exceedances of the baseline percentiles, with exception of slight exceedances in CSM_BH12S and SRT_BH047. CSM_BH12S reported exceedances of the baseline in both sampling events at the 20th percentile, whilst SRT_BH047 reported an exceedance of the baseline in one sampling event at the 80th percentile.

Calculated percentiles of ammonia concentrations over the construction monitoring period for the majority of sampling locations were in exceedance of the 80th baseline percentile. Despite these exceedances, there have been no ammonia concentrations reported above the ecological criteria for ammonia (0.91 mg/L) throughout the construction monitoring period.

Metals

Concentrations of copper, nickel, manganese and zinc in the current monitoring period are higher than the 80th percentile of the baseline monitoring period for a number of wells. There are exceedances in the adopted ecological criteria for copper (0.0013 mg/L), nickel (0.07 mg/L) zinc (0.008 mg/L) in various wells.

Copper concentrations in exceedance of the adopted ecological criteria were reported in at least one sampling event in all locations, with exception of CSM_BH10S, CSM_BH13 and SRT_BH052. Exceedances of the construction monitoring period percentiles compared to the at the baseline 80th percentile were reported in CSM_BH02, CSM_BH06 and CSM_BH10S, and at the 20th baseline percentile in CSM_BH10S, SRT_BH047 and SRT_BH052.



Elevated nickel concentrations in exceedance of the adopted ecological criteria were reported in both sampling events for CSM_BH12S, which in addition was also in exceedance of the baseline 80th percentile concentration. The majority of wells reported nickel concentrations for at least one sampling event below the baseline 20th percentile concentration, with exception of CSM_BH13, CSM_BH14S and SRT_BH050 which have no baseline data for comparison. For the construction monitoring period in comparison to the baseline, exceedances at the 80th percentile were reported in CSM_BH02, CSM_BH04 and CSM_BH12S, and at the 20th percentile for CSM_BH06, CSM_BH10S, SRT_BH047 and SRT_BH052.

Manganese concentrations reported in the current monitoring period are higher than the baseline at the 80th percentiles across wells CSM_BH06 and SRT_BH047. CSM_BH02 and CSM_BH12S reported lower concentrations than the baseline monitoring period in one sampling round, as indicated by the lower values reported at the 20th percentile. For the construction monitoring period, exceedances at the 80th percentile compared to the baseline were reported in CSM_BH02, CSM_BH04, CSM_BH06, CSM_BH10S and SRT_BH047, and at the 20th percentile in CSM_BH02, CSM_BH12S and SRT_BH052. There are no exceedances of the adopted criteria for manganese concentrations.

Elevated zinc concentrations in exceedance of the adopted ecological criteria were reported in CSM_BH02 in November 2022 and CSM_BH04, CSM_BH06, CSM_BH12S, CSM_BH14S, SRT_BH047 and SRT_BH050 in both sampling events. For the construction monitoring period compared to the baseline, exceedances at both the 20th and 80th percentile were reported in CSM_BH06, CSM_BH10S and CSM_BH12S. In addition, an exceedance of the 80th percentile was reported in CSM_BH02 and at the 20th percentile in SRT_BH047 and SRT_BH052.

Benzene, TRH F1, TRH F2

There are no exceedances of the adopted ecological and human health criteria for benzene, TRH F1 and TRH F2. Benzene, TRH F1 and TRH F2 have no exceedances of the baseline 80th percentiles and therefore there has been no change due to the construction works.

Total dissolved solids (TDS)

TDS has shown a decrease in concentrations for this current monitoring period when compared to the baseline monitoring period in CSM_BH02, SRT_BH047 and SRT_BH052. CSM_BH06 reported TDS concentrations in exceedance of the baseline at the 80th percentile concentration. For the construction monitoring period, the majority of wells with baseline data reported exceedances of TDS concentrations at the 20th percentile.

pH (Lab)

The pH levels have shown a decrease in the majority of wells in the construction monitoring period, noting CSM_BH13, CSM_BH14S and SRT_BH050 have no baseline data for comparison.

pH remained consistent during this monitoring period with exception of CSM_BH06 and CSM_BH12S, which saw an increase in pH of 0.8 and 1.0 respectively between the November 2022 and February/March 2023 monitoring events. All monitoring wells with baseline data for comparison reported exceedances at the baseline 20th percentile for at least one monitoring event. A lowering of the pH (more acidic) can encourage the solubility of heavy metals and may explain the fluctuations in metal concentrations. For the construction monitoring period, a similar trend is observed with exceedances of the baseline 20th percentile reported in all wells with baseline data. In addition, exceedances of the baseline 80th percentile in the construction monitoring period are reported in CSM_BH10S and CSM_BH12S.

SRT_BH050 has usually been dry in previous monitoring periods and hence there is no available baseline data to compare to. It should be noted that the pH is much lower than the other platform wells, SRT_BH047 and SRT_BH052 which have shown a decrease in pH compared to the baseline monitoring period.

5.5.3 Aggressivity

Concentrations of sulfate, chloride and pH have been compared against the adopted aggressivity criteria and displayed in **Table B6 and Table B7, Appendix B**. The results have remained mostly consistent and suggest that existing groundwater may present a non-aggressive to moderate risk to concrete structures intersecting groundwater. The reported groundwater quality is expected to be non-aggressive to steel piles with the exception at SRT_BH050, where groundwater presents a non-aggressive to mild risk to steel structures due to the lower pH at this area. For concrete piles, the majority of wells present a non-aggressive to mild risk, except for CSM_BH10S and SRT_BH050 which present a mild to moderate risk to concrete structures.

This dataset for the project was compared to the values used in the Durability Assessment Design Report (Document number SMCSWCSM-DJV-NC-00-REP-EN-000114; Revision E) date 26 March 2020. An analysis of the new data is provided in Table 5-4.

Table 5-4 – Assessment of aggressivity

Parameters	Earlier 2020 Durability Report mean (and Range)	New data, mean (and range)	Any Difference Between Earlier and New Data?	Effect on Durability
Ammonia, mg/L	0.11 (0.01-5.2)	0.093 (0.01 – 5.45)	No material difference	No effect
Sulfate, mg/L	69 (5-940)	58 (2.1 - 940)	No material difference	No effect
Electrical Conductivity, μ S/cm	595.9 (7.95-6800)	537(3.67-4286). Used the field value.	No material difference	No effect
Chlorides, mg/L	34 (7.9-130)	95 (7-5000). Refer Note 1 below.	No material difference, except Note 1 below	No effect. Refer Note 1 below
pH	6.79 (5.0-12.1)	6.2(3.9-12.07). Used the field value. Refer Note 2 below	Yes. Refer Note 2 below	Potentially yes. Refer Note 2 below

Note 1, on Chlorides. Only 1 out of 613 analytical results reported has high concentration of 5,000 mg/L. The mean is 95 mg/L with no other value >1,000 mg/L which could have some durability effect. It is noted that the borehole GASW-BH25A (on 12/7/2021) had reported 5,000 mg/L chloride whereas the same bore hole at other monitoring dates had chloride values <100 mg/L. We consider this as anomaly (may be a measurement error), hence this high result can be ignored. If the collected sample (on 12/7/2021).

Note 2: on pH. The new data has suggested lower pH values compared with what was used in the Durability Report. Mean has reduced from 6.79 to 6.2. However, this reduced value will not change the Durability assessment. Note that a pH value less than 5.5 may have potential durability concern. AGJV have made a brief analysis of the pH results for the 570 field pH values reported in Table 5-5.

Table 5-5 – Assessment of pH

pH Value Range	Approximately number of test results (and % of total 570)	Exposure class assumed for concrete, in 2020 Durability Report. AS5100.5/ AS219	Potential exposure class, based on new data. AS5100.5/ AS219. Soil condition A is assumed	Comments
<4.0	4 (0.7%)	B1 (Mild)	C2/very severe	The amount of data (0.7%) may be considered insignificant (outlier)
4-4.5	7 (1.22%)	B1 (Mild)	C1/Severe	The amount of data (1.22%) may be considered insignificant (outlier)
4.5-5.0	10 (1.75%)	B1 (Mild)	B2/Moderate	The amount of data (1.75%) may be considered insignificant (outlier)
5.0-5.5	67 (11.7%)	B1 (Mild)	B2/Moderate	The amount of data (11.7%) may be considered significant. The soil type for the bore holes concerned can be classed as “B” (low permeable – mostly clay and sandstone), then we can consider the low pH values are of no material effect. Elements below ground water level are likely to be affected

5.5.4 Precipitation (Formation of Ochre)

Ferrous iron and manganese were analysed in groundwater samples and results are included in **Table B3, Appendix B**.

Ferrous iron concentrations ranged from below the laboratory reporting limits (0.05 mg /L) to a maximum concentration of 9.2 mg/L at CSM_BH13. Comparison of the current monitoring period results against the criteria outlined in **Section 3.6** indicate ochre formation as:

- A negligible potential (<1 mg/L) in the majority of wells
- A small potential (1 to 5 mg/L) in CSM_BH02 and CS_BH04
- A moderate potential (5 to 10 mg/L) in CSM_BH12S and CSM_BH13

Manganese concentrations ranged from less than the laboratory reporting limit (0.005 mg/L) to 1.3 mg/L (not field filtered) at CSM_BH12S.

5.5.5 Summary of statistical analysis

Overall, there has been no major changes in the COPC concentrations due to construction.



6 Quality assurance and quality control assessment results

6.1 Field program

As part of the AGJV QA/QC program, one intra-laboratory duplicate and one inter-laboratory duplicate sample was analysed during the November 2022 and February 2023 monitoring events. In addition, one intra-laboratory duplicate was analysed in March 2023 as sampling was undertaken at three monitoring locations not accessible in the February 2023 sampling event. Duplicate samples were analysed for heavy metals, TRH, BTEXN and PAH. It is noted that for some results, reported concentrations were below the laboratory limit of reporting and as a result, it was not possible to calculate relative percentage difference (RPD's) for these samples. For analytes with detected concentrations all RPDs were within the acceptable range, as shown in **Table B8, Appendix B**.

One rinsate sample was collected during each monitoring round and analysed for heavy metals. Concentrations of all rinsate samples collected during this monitoring period were below the laboratory limit of reporting. Overall, these results indicate that cross contamination of samples did not occur.

One set of water trip blank and trip spikes were analysed as part of each monitoring event during the current monitoring period. Concentrations of the trip blank samples were reported below the laboratory limit of reporting. The results of the trip spike have been reviewed by AGJV and were found to be within the acceptable criteria (70-130%).

The rinsate, trip spike and trip blank analytical results are summarised in **Table B9, Appendix B**. Laboratory analytical reports are included in **Appendix F**.



6.2 Laboratory program

Holding times

Laboratory analytes were all extracted within the laboratory's required holding times for chemical analysis for the November 2022 and March 2023 sampling events, as presented on laboratory reports in **Appendix F**.

In the February 2023 event, there were holding time exceedances for the majority of analytes with a seven-day holding time. The analysis for these analytes were generally one to two weeks overdue. Samples were delivered on time to the laboratory at completion of the monitoring event, with holding time exceedances therefore at fault of the laboratory. These holding time exceedances are not expected to impact the usability of the results as analytical data from the November 2022 and March 2023 events are consistent with previous monitoring events, indicating no major changes in groundwater chemistry due to the construction activities.

Laboratory program

The NATA certified laboratories used for this assessment (Eurofins Sydney and Australian Laboratory Services) undertook their own quality assurance and quality control procedures for sample analysis. AGJV has reviewed the internal laboratory control data provided within the laboratory reports, which are attached as **Appendix F**. It is noted comments have been provided by the laboratory where a failure result was reported in laboratory QA/QC procedures.

6.3 Discussion

The results of the QA/QC program are considered to provide an acceptable degree of confidence in the analytical program completed. Overall, the analytical data set is considered valid and acceptable for assessing the groundwater contamination status of the site.

7 Findings, conclusions and recommendations

7.1 Findings and conclusions

In accordance with the objectives detailed in **Section 1.1** of this report, and based on the information contained within this monitoring program, the following findings are noted (subject to the limitations outlined in **Section 9**).

Due to the destruction and replacement of monitoring wells as the construction progressed, a number of monitoring wells to the east, west and south, and additionally wells targeting gasworks, were destroyed as compared to the monitoring wells listed in **Table 7.1** of the latest CGWMP (LOR, August 2022).

The groundwater elevation data, as presented in **Section 5.3.4**, suggests there are two distinct aquifers at the site, located in the overlying unconsolidated materials (the shallow aquifer) and within the Hawkesbury Sandstone (the deep aquifer). This statement is supported by the following evidence:

- A difference greater than 5 m in groundwater elevations between the shallow and deeper aquifers.
- A difference in response to rainfall events between wells screened within the shallow and deep aquifers. Shallow wells displayed an immediate response to rainfall events, whereas deep wells displayed a delayed and smaller response.

Groundwater flow direction within the shallow aquifer system is toward the north-east and south-east. It appears this is generally consistent with the general fall in topography and towards harbour areas. Groundwater flow direction in the deeper aquifer appears to be to the north-west.

The groundwater elevation data also indicates that groundwater drawdown in the shallow and deeper aquifer at the boundary of the CSM project area are compliant and within the acceptable range specified in the project EIS and REMM (AGJV, 2020). The excessive drawdown in the deep aquifer has started to recover following the conclusion of the excavation of the Metro Box. The de-watering from the sumps of the drained Metro Box will continue in perpetuity and therefore groundwater levels will not return to the observed levels prior to construction.

AGJV has assessed that the monitored groundwater drawdown satisfies MCoA requirements. Further, it is noted that the associated ground movement monitoring carried out at CSM site has recorded no adverse impacts to adjacent structures. As the monitored groundwater has shown being stabilised, and the recorded drawdown is very limited across the CSM works area and its zone of influence, there is unlikely any ongoing risk of damage.

The groundwater quality sampling results suggest the following:

- pH concentrations have shown decrease over the construction monitoring period compared to the baseline monitoring period, with exceedances below the 20th percentile reported in the majority of wells. This may be due to older (higher pH) groundwater migrating with the drawdown at the MBW.
- Concentrations of copper, manganese, nickel and zinc have decreased during this monitoring period and have exceeded the baseline percentiles in groundwater at some wells. However, they are fluctuating and with increasing spikes which may be due to the lowering of pH as older groundwater is migrating with the drawdown of the groundwater at the MBW.
- Ammonia concentrations have remained relatively stable during this monitoring period compared against the baseline. The slight change may have been caused by the changes in the groundwater regime due to the construction works. However, the current levels are well below the ecological screening criterion.

- TRH (without silica gel clean-up) results were detected above the laboratory limit of reporting in groundwater samples across four monitoring wells in the November 2022 round.
- Similar to the TRH detections as above, PAHs were reported in five of wells across the monitoring program for the November 2022 event. These include low concentrations of fluoranthene, naphthalene and pyrene. Historically (September 2018 to March 2023) these analytes have returned concentrations at some of these locations on rare occasion at very low concentrations.
- There is a negligible to moderate potential for ochre formation throughout the site. There is moderate potential for ochre formation at CSM_BH12S and CSM_BH13, with maximum ferrous iron concentrations reported at 8.8 mg/L and 9.2 mg/L respectively.
- The reported groundwater quality is expected to be non-aggressive to steel piles with the exception at SRT_BH050, where groundwater presents a non-aggressive to mild risk to steel structures due to the lower pH at this area. For concrete piles, the majority of wells present a non-aggressive to mild risk, except for CSM_BH10S and SRT_BH050 which present a mild to moderate risk to concrete structures.
- There does not appear to be an ongoing emergence of groundwater quality impacts associated with the construction works. This is understandable given that groundwater flow is directed into excavation, where it is being collected and treated.

Overall, there has been no major changes in the COPC concentrations due to construction. Condition E107 of the Ministers conditions of approval have been met as to maintain the NSW Water Quality Objectives.

7.2 Recommendations

Based on the findings of this final groundwater monitoring period and consideration of findings from the previous monitoring periods, AGJV recommend:

- Sydney Metro should provide groundwater monitoring results to the contractor of the operational water treatment plant for the treatment of groundwater when required.
- The conditions of approval for the project require an operational environmental management plan (OEMP) for groundwater management. This will need to be prepared by the contractor of the water treatment plant.

With completion of construction expected in June 2023, further monitoring and factual reporting is not required. This report covers the final monitoring period (October 2022 to May 2023) for the monitoring program.

8 References

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9 Limitations

It is noted that AGJV does not rely on any data collected and reported by other consultants.

This report has been prepared by AGJV for LOR and may only be used and relied on by LOR for the purpose agreed between AGJV and LOR as set out in section 1 of this report.

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The services undertaken by AGJV 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 this report. AGJV 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 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.

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Appendices

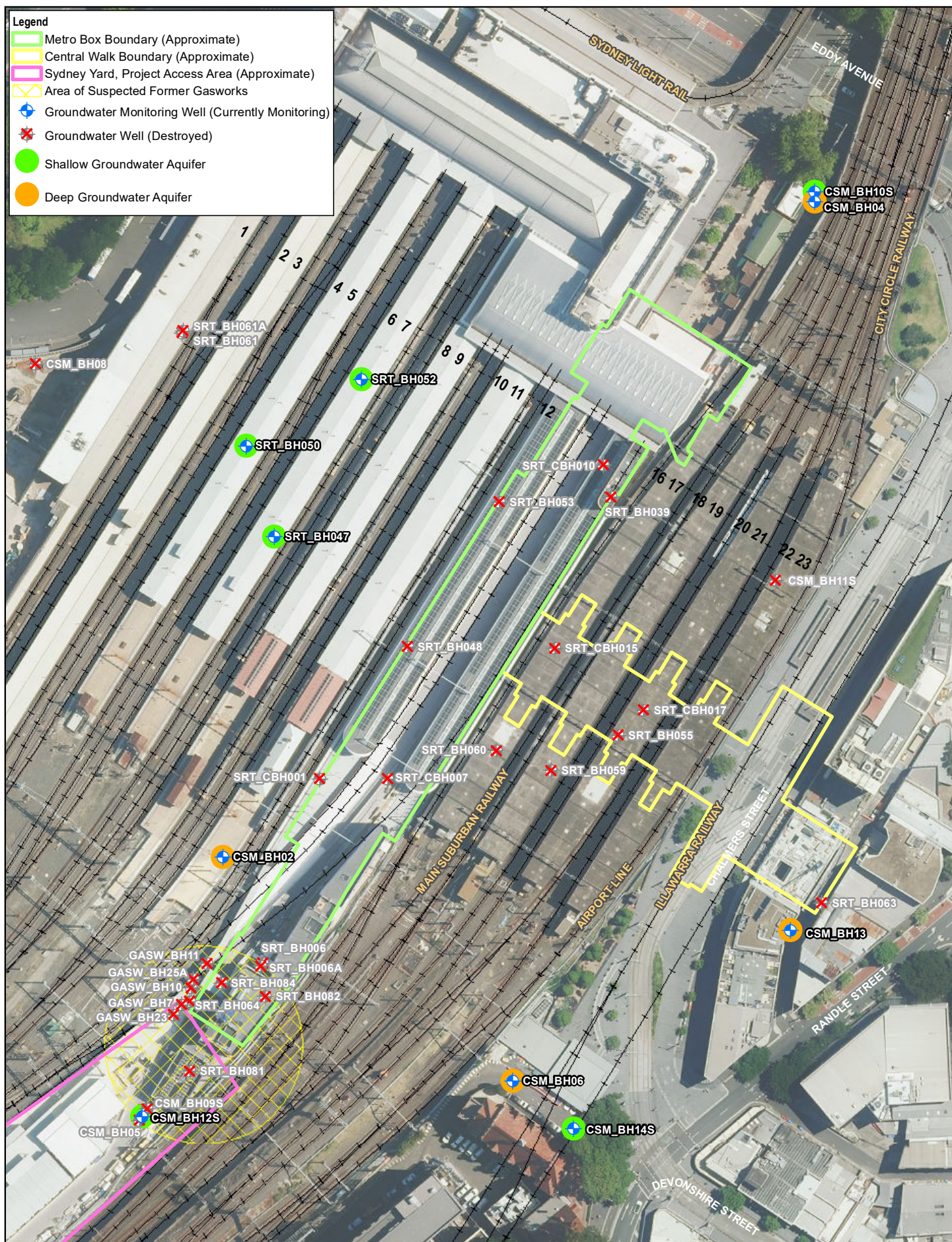
AGJV



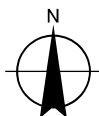
Appendix A

Figures





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Metres



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

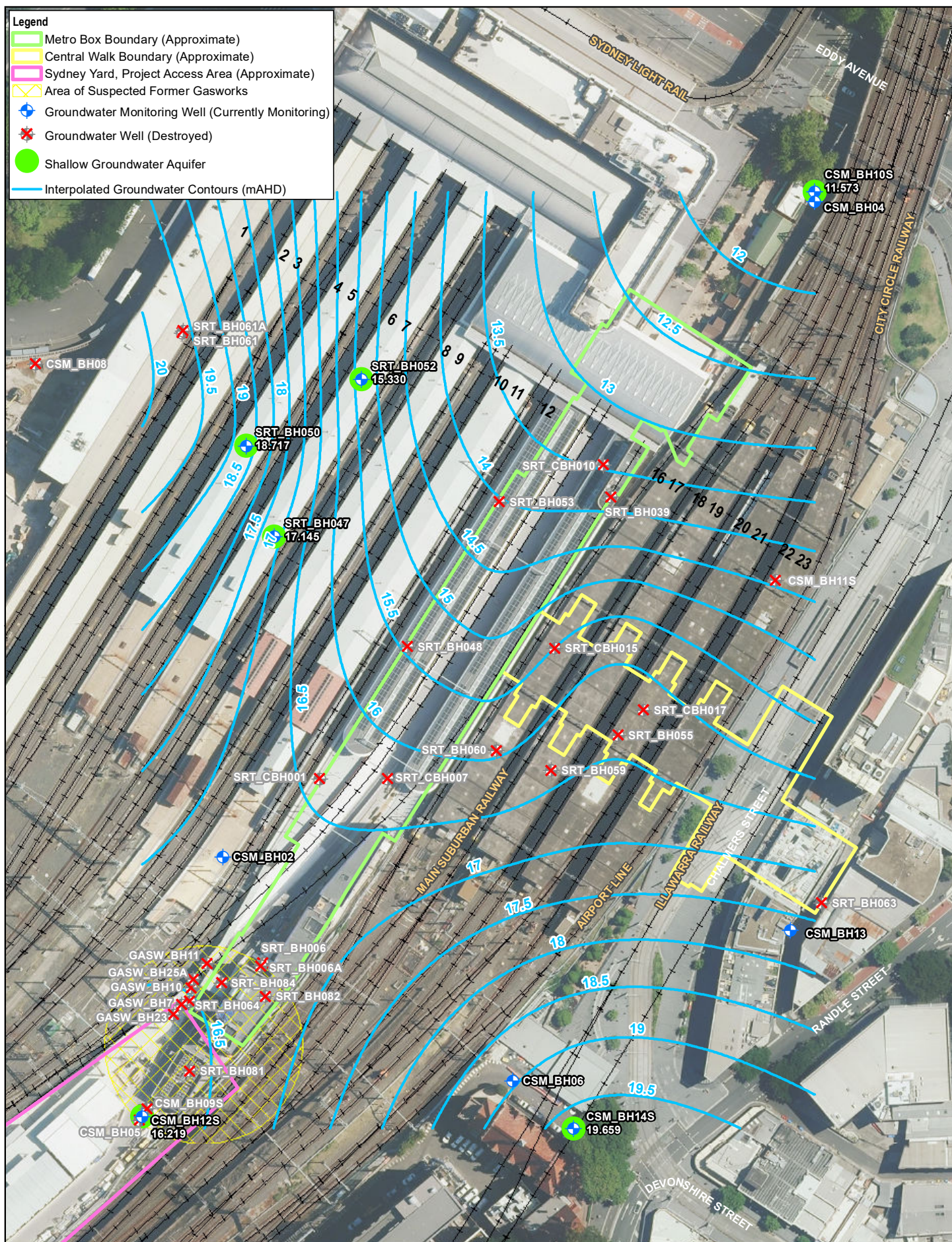
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Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Project No. 21-27234
Revision No. -
Date 23/03/2023

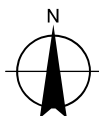
**Monitoring Well Locations
(March 2023)**

Figure 1



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

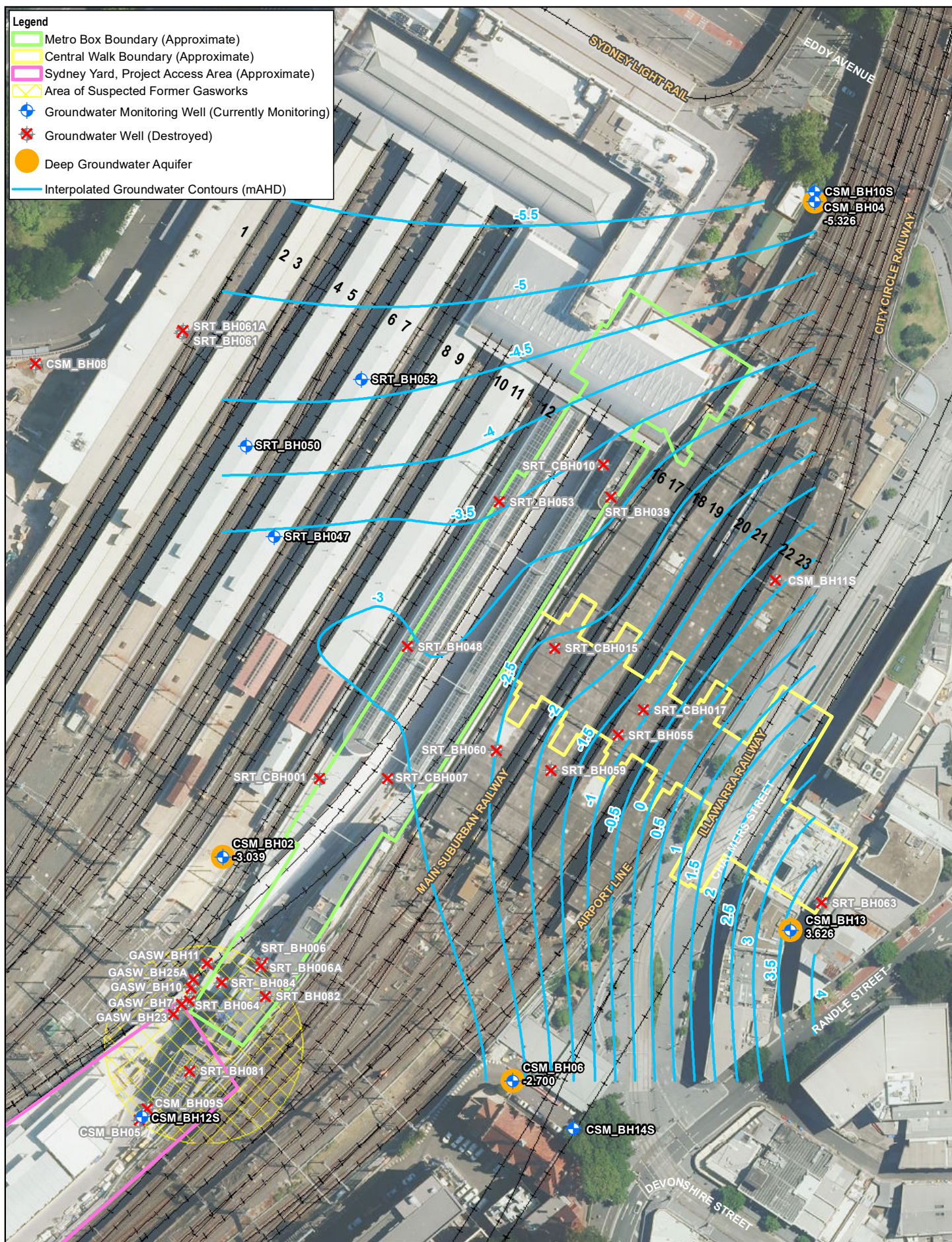


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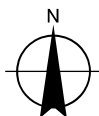
Laing O'Rourke
Central Station Main Works
Groundwater Monitoring
**Interpolated Groundwater
Contours - March 2023
(Shallow Aquifer)**

Project No. 21-27234
Revision No. -
Date 23/03/2023

Figure 2



Paper Size ISO A4
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Metres



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

AGJV

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring
**Interpolated Groundwater
Contours - March 2023
(Deep Aquifer)**

Project No. 21-27234
Revision No. -
Date 23/03/2023

Figure 3



Appendix B

Tables





Appendix B
Table B1 - Summary of Monitoring Well Status During Monitoring Program - September 2018 to May 2023

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Well ID	Approx. Location	Targeted Aquifer	Datalogger	Event 1 Sept 2018	Event 2 Oct 2018	Event 3 Nov 2018	Event 4 Dec 2018	Event 5 Jan 2019	Event 6 Feb 2019	Event 7 April 2019	Event 8 May 2019	Event 9 June 2019	Event 10 July 2019	Event 11 Aug 2019	Event 12 Sept 2019	Round 13 Oct 2019	Round 14 Nov 2019	Round 15 Dec 2019
SRT_BH006	Sydney Yard	Deep		Not Found / Destroyed														
SRT_BH006A	Sydney Yard	Shallow		Not Found / Destroyed														
SRT_BH039	Track 15	Deep		Sampled	Sampled	Destroyed												
SRT_BH047	Platform 6/7	Shallow	Logger + Baro	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
SRT_BH048	Platform 12/13	Shallow		Sampled	Sampled	Sampled	Destroyed											
SRT_BH050	Platform 4/5	Shallow																
SRT_BH052	Platform 6/7	Shallow		Covered by Hoarding	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
SRT_BH053	Platform 12/13	Deep		Sampled	Sampled	Covered by Hoarding	Destroyed											
SRT_BH055	Platform 20/21	Shallow		Dry														
SRT_BH059	Platform 18/19	Shallow			Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
SRT_BH060	Platform 16/17	Shallow																
SRT_BH063	Offsite Randle Lane	Shallow		Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	No Access	No Access	No Access	No Access
SRT_BH064	Sydney Yard	Shallow		Sampled	Not Found / Destroyed													
SRT_BH081	Sydney Yard	Shallow			Not Found / Destroyed													
SRT_BH082	Sydney Yard	Shallow			Sampled	Sampled	Not Found / Destroyed											
SRT_BH084	Sydney Yard	Shallow		Not Found / Destroyed														
SRT_CBH001	Platform 12/13	Shallow		Sampled	Sampled	Sampled	Destroyed											
SRT_CBH007	Platform 14/15	Shallow		Sampled	Destroyed													
SRT_CBH015	Platform 16/17	Shallow		Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
SRT_CBH017	Platform 20/21	Shallow	Logger	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH02	Platform 10/11	Deep	Logger							Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH04	Eddy Ave Driveway	Deep	Logger							Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH05	Sydney Yard	Deep								Sampled	Sampled	Sampled	Sampled	Destroyed				
CSM_BH06	Institute Drive	Deep	Logger							Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH08	Ambulance Ave	Deep								Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH09S	Sydney Yard	Shallow								Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH10S	Eddy Ave Driveway	Shallow	Logger							Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH11S	Platform 22	Shallow																
CSM_BH12S	Sydney Yard	Shallow																
CSM_BH13	Randle Lane	Deep																
CSM_BH14S	Institute Drive	Shallow																
GASW_BH7	Sydney Yard Gasworks	Shallow										Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
GASW_BH10	Sydney Yard Gasworks	Deep										Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
GASW_BH11	Sydney Yard Gasworks	Shallow										Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
GASW_BH23	Sydney Yard Gasworks	Shallow													Sampled	Sampled	Sampled	Sampled
GASW_BH25A	Sydney Yard Gasworks	Shallow													Sampled	Sampled	Sampled	Sampled

	Well Sampled
	Not Sampled
	Not scheduled / available for sampling
	Grab sample taken / Dry



Appendix B
Table B1 - Summary of Monitoring Well Status During Monitoring Program - September 2018 to May 2023

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Well ID	Approx. Location	Targeted Aquifer	Datalogger	Round 16 Jan 2020	Round 17 Feb 2020	Round 18 Mar 2020	Round 19 Apr 2020	Round 20 May 2020	Round 21 Jun 2020	Round 22 Jul 2020	Round 23 Aug 2020	Round 24 Sept 2020	Round 25 Oct 2020	Round 26 Nov 2020	Round 27 Dec 2020	Round 28 Jan 2021
SRT_BH006	Sydney Yard	Deep														
SRT_BH006A	Sydney Yard	Shallow														
SRT_BH039	Track 15	Deep														
SRT_BH047	Platform 6/7	Shallow	Logger + Baro	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
SRT_BH048	Platform 12/13	Shallow														
SRT_BH050	Platform 4/5	Shallow			No Sample	Grab Sampled	Grab Sampled	DRY	Grab Sampled	Grab Sampled	Grab Sampled	DRY	DRY	Grab Sampled	Grab Sampled	DRY
SRT_BH052	Platform 6/7	Shallow		Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
SRT_BH053	Platform 12/13	Deep														
SRT_BH055	Platform 20/21	Shallow			Destroyed											
SRT_BH059	Platform 18/19	Shallow		Sampled	Sampled	Sampled	Sampled	Sampled	Grab Sampled	Sampled	Sampled	Sampled	Grab Sampled	Grab Sampled	No Access	Destroyed
SRT_BH060	Platform 16/17	Shallow			No Sample	Grab Sampled	Grab Sampled	Destroyed								
SRT_BH063	Offsite Randle Lane	Shallow		No Access	Destroyed											
SRT_BH064	Sydney Yard	Shallow														
SRT_BH081	Sydney Yard	Shallow														
SRT_BH082	Sydney Yard	Shallow														
SRT_BH084	Sydney Yard	Shallow														
SRT_CBH001	Platform 12/13	Shallow														
SRT_CBH007	Platform 14/15	Shallow														
SRT_CBH015	Platform 16/17	Shallow		Destroyed												
SRT_CBH017	Platform 20/21	Shallow	Logger	Sampled	Destroyed											
CSM_BH02	Platform 10/11	Deep	Logger	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH04	Eddy Ave Driveway	Deep	Logger	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH05	Sydney Yard	Deep														
CSM_BH06	Institute Drive	Deep	Logger	No Access	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH08	Ambulance Ave	Deep		Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH09S	Sydney Yard	Shallow		Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Destroyed
CSM_BH10S	Eddy Ave Driveway	Shallow	Logger	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH11S	Platform 22	Shallow										DRY	DRY	DRY	DRY	DRY
CSM_BH12S	Sydney Yard	Shallow														
CSM_BH13	Randle Lane	Deep														
CSM_BH14S	Institute Drive	Shallow														
GASW_BH7	Sydney Yard Gasworks	Shallow		Sampled	Sampled	Sampled	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
GASW_BH10	Sydney Yard Gasworks	Deep		Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
GASW_BH11	Sydney Yard Gasworks	Shallow		Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled
GASW_BH23	Sydney Yard Gasworks	Shallow		Sampled	Sampled	Sampled	Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Sampled	Grab Sampled	Grab Sampled	Sampled
GASW_BH25A	Sydney Yard Gasworks	Shallow		Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Grab Sampled	Sampled	Sampled	Sampled	Sampled

	Well Sampled
	Not Sampled
	Not scheduled / available for sampling
	Grab sample taken / Dry



Appendix B
Table B1 - Summary of Monitoring Well Status During Monitoring Program - September 2018 to May 2023

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Well ID	Approx. Location	Targeted Aquifer	Datalogger	Round 29 Feb 2021	Round 30 Mar 2021	Round 31 Apr 2021	Round 32 May 2021	Round 33 Jun 2021	Round 34 Jul 2021	Round 35 Aug 2021	Round 36 Sept 2021	Round 37 Oct 2021	Round 38 Nov 2021	Round 39 Dec 2021	Round 40 Jan 2022
SRT_BH006	Sydney Yard	Deep													
SRT_BH006A	Sydney Yard	Shallow													
SRT_BH039	Track 15	Deep													
SRT_BH047	Platform 6/7	Shallow	Logger + Baro	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
SRT_BH048	Platform 12/13	Shallow													
SRT_BH050	Platform 4/5	Shallow		Grab Sampled	Grab Sampled	Grab Sampled	DRY	DRY	Grab Sampled	DRY	DRY	DRY	Grab Sampled	Grab Sampled	Grab Sampled
SRT_BH052	Platform 6/7	Shallow		Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
SRT_BH053	Platform 12/13	Deep													
SRT_BH055	Platform 20/21	Shallow													
SRT_BH059	Platform 18/19	Shallow													
SRT_BH060	Platform 16/17	Shallow													
SRT_BH063	Offsite Randle Lane	Shallow													
SRT_BH064	Sydney Yard	Shallow													
SRT_BH081	Sydney Yard	Shallow													
SRT_BH082	Sydney Yard	Shallow													
SRT_BH084	Sydney Yard	Shallow													
SRT_CBH001	Platform 12/13	Shallow													
SRT_CBH007	Platform 14/15	Shallow													
SRT_CBH015	Platform 16/17	Shallow													
SRT_CBH017	Platform 20/21	Shallow	Logger												
CSM_BH02	Platform 10/11	Deep	Logger	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH04	Eddy Ave Driveway	Deep	Logger	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH05	Sydney Yard	Deep													
CSM_BH06	Institute Drive	Deep	Logger	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH08	Ambulance Ave	Deep		Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH09S	Sydney Yard	Shallow													
CSM_BH10S	Eddy Ave Driveway	Shallow	Logger	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH11S	Platform 22	Shallow		DRY	Destroyed										
CSM_BH12S	Sydney Yard	Shallow				Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH13	Randle Lane	Deep									Sampled	Sampled	Sampled	Sampled	Sampled
CSM_BH14S	Institute Drive	Shallow									Sampled	Sampled	Sampled	Sampled	Sampled
GASW_BH7	Sydney Yard Gasworks	Shallow		DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	Destroyed
GASW_BH10	Sydney Yard Gasworks	Deep		Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled
GASW_BH11	Sydney Yard Gasworks	Shallow		Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	Grab Sampled	No Access	No Access	Destroyed
GASW_BH23	Sydney Yard Gasworks	Shallow		Sampled	Sampled	Sampled	Sampled	Grab Sampled	Sampled	Grab Sampled	Sampled	Sampled	Sampled	Sampled	Destroyed
GASW_BH25A	Sydney Yard Gasworks	Shallow		Sampled	Sampled	Sampled	Sampled	Grab Sampled	Sampled	Sampled	Sampled	Sampled	No Access	No Access	Destroyed

	Well Sampled
	Not Sampled
	Not scheduled / available for sampling
	Grab sample taken / Dry



Appendix B
Table B1 - Summary of Monitoring Well Status During Monitoring Program - September 2018 to May 2023

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Well ID	Approx. Location	Targeted Aquifer	Datalogger	Round 41 Feb 2022	Round 42 Mar 2022	Round 43 Apr 2022	Round 44 May 2022	Round 45 Jun 2022	Round 46 Jul 2022	Round 47 Aug 2022	Round 48 Sept 2022	Round 49 Oct2022	Round 50 Nov 2022	Round 51 Dec 2022	Round 52 Jan 2023	Round 53 Feb 2023	Round 54 Mar 2023	Round 55 Apr 2023	Round 56 May 2023
SRT_BH006	Sydney Yard	Deep																	
SRT_BH006A	Sydney Yard	Shallow																	
SRT_BH039	Track 15	Deep																	
SRT_BH047	Platform 6/7	Shallow	Logger + Baro	Sampled	Sampled	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Gauged	Gauged	Gauged	Gauged
SRT_BH048	Platform 12/13	Shallow																	
SRT_BH050	Platform 4/5	Shallow		Grab Sampled	Grab Sampled	Gauged	Grab Sampled	Gauged	Gauged	Grab Sampled	Gauged	Gauged	Grab Sampled	Gauged	Gauged	Grab Sampled	Gauged	Gauged	Gauged
SRT_BH052	Platform 6/7	Shallow		Sampled	Sampled	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Gauged	Gauged	Gauged	Gauged
SRT_BH053	Platform 12/13	Deep																	
SRT_BH055	Platform 20/21	Shallow																	
SRT_BH059	Platform 18/19	Shallow																	
SRT_BH060	Platform 16/17	Shallow																	
SRT_BH063	Offsite Randle Lane	Shallow																	
SRT_BH064	Sydney Yard	Shallow																	
SRT_BH081	Sydney Yard	Shallow																	
SRT_BH082	Sydney Yard	Shallow																	
SRT_BH084	Sydney Yard	Shallow																	
SRT_CBH001	Platform 12/13	Shallow																	
SRT_CBH007	Platform 14/15	Shallow																	
SRT_CBH015	Platform 16/17	Shallow																	
SRT_CBH017	Platform 20/21	Shallow	Logger																
CSM_BH02	Platform 10/11	Deep	Logger	Sampled	Sampled	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Gauged	Gauged	Gauged	Gauged
CSM_BH04	Eddy Ave Driveway	Deep	Logger	Sampled	Sampled	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Gauged	Gauged	Gauged	Gauged
CSM_BH05	Sydney Yard	Deep																	
CSM_BH06	Institute Drive	Deep	Logger	Sampled	Sampled	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	No Access	Sampled	Gauged	Gauged
CSM_BH08	Ambulance Ave	Deep		Sampled	Sampled	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Destroyed							
CSM_BH09S	Sydney Yard	Shallow																	
CSM_BH10S	Eddy Ave Driveway	Shallow	Logger	Sampled	Sampled	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Gauged	Gauged	Gauged	Gauged
CSM_BH11S	Platform 22	Shallow																	
CSM_BH12S	Sydney Yard	Shallow		Sampled	Sampled	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	No Access	Sampled	Gauged	Gauged
CSM_BH13	Randle Lane	Deep		Sampled	Sampled	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Gauged	Gauged	Gauged	Gauged
CSM_BH14S	Institute Drive	Shallow		Sampled	Sampled	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	Sampled	Gauged	Gauged	No Access	Sampled	Gauged	Gauged
GASW_BH7	Sydney Yard Gasworks	Shallow																	
GASW_BH10	Sydney Yard Gasworks	Deep		Grab Sampled	Grab Sampled	Gauged	Grab Sampled	Gauged	Destroyed										
GASW_BH11	Sydney Yard Gasworks	Shallow																	
GASW_BH23	Sydney Yard Gasworks	Shallow																	
GASW_BH25A	Sydney Yard Gasworks	Shallow																	

	Well Sampled
	Not Sampled
	Not scheduled / available for sampling
	Grab sample taken / Dry

Station Code	Sample Date	Field ID	Sample Type	-	-	-	<0.005	-	<10	110	-	-	-	9.2	11	2.7	61	51	44	0.05	<0.02	<0.001	<0.0002	<0.001	<0.001	<0.001	0.2	<0.0001	0.012	0.006	1.6	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
CSM_BH02	16-Apr-19	CSM_BH02	Normal	-	-	-	<0.005	-	<10	110	-	-	-	9.2	11	2.7	61	51	44	0.05	<0.02	<0.001	<0.0002	<0.001	<0.001	<0.001	0.2	<0.0001	0.012	0.006	1.6	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	14-May-19	CSM_BH02	Normal	8.5	410	3300	0.005	-	<10	240	-	-	-	43	26	3.2	64	68	38	0.12	<0.02	<0.001	<0.0002	<0.001	<0.001	<0.001	0.55	<0.0001	0.012	0.01	1.4	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	06-Jun-19	CSM_BH02	Normal	7.8	470	970	<0.005	-	<10	290	-	-	-	48	36	6.6	110	150	35	0.04	<0.02	0.001	<0.0002	<0.001	<0.001	<0.001	0.33	<0.0001	0.009	0.016	0.9	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	60	60	200	100	360	200	<100	<100	-	-	-	-	<20	60	200	200	460
	30-Jul-19	CSM_BH02	Normal	8	550	42400	0.092	-	<10	350	-	-	-	50	43	5.8	120	500	24	<0.01	<0.02	<0.001	<0.0002	<0.001	<0.001	<0.001	0.13	<0.0001	0.004	0.007	<0.05	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	29-Aug-19	CSM_BH02	Normal	7.9	610	64000	<0.005	-	<10	320	-	-	-	49	40	5.7	120	190	25	<0.01	<0.02	<0.001	<0.0002	<0.001	0.002	<0.001	0.24	<0.0001	0.006	0.007	<0.05	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	26-Sep-19	CSM_BH02	Normal	7.8	440	3100	<0.005	-	<10	310	-	-	-	44	37	4.8	110	160	31	0.03	0.06	0.002	<0.0002	<0.001	<0.001	<0.001	0.26	<0.0001	0.015	0.011	1.2	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	17-Oct-19	CSM_BH02	Normal	7.9	530	4400	<0.005	-	<10	290	-	-	-	48	39	5.7	120	500	28	0.06	0.04	0.002	<0.0002	<0.001	0.01	<0.001	0.33	<0.0001	0.028	0.048	1.2	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	13-Nov-19	CSM_BH02	Normal	7.9	620	4600	<0.005	-	<10	330	-	-	-	50	42	5.5	120	520	29	0.02	0.03	0.002	<0.0002	<0.001	<0.001	<0.001	0.29	<0.0001	0.025	0.01	1.8	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	17-Dec-19	CSM_BH02	Normal	8.1	290	2800	<0.004	-	<10	380	-	-	-	33	30	5	78	150	34	0.02	0.16	<0.001	<0.0002	<0.001	<0.001	<0.001	0.19	<0.0001	0.009	0.012	0.68	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	21-Jan-20	CSM_BH02	Normal	4.8	560	2200	<0.004	-	<10	320	-	-	-	41	37	11	120	180	28	0.02	<0.02	0.002	<0.0002	<0.001	<0.001	<0.001	0.26	<0.0001	0.027	0.01	1.3	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	25-Feb-20	CSM_BH02	Normal	8.3	540	1600	<0.004	-	<10	290	-	-	-	49	37	10	100	190	34	0.09	0.04	<0.001	<0.0002	<0.001	0.002	<0.001	0.12	<0.0001	0.021	0.008	0.01	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	260	260	300	100	560	300	<100	<100	-	-	-	-	<20	260	300	<100	560
	18-Mar-20	CSM_BH02	Normal	7	870	1800	0.008	-	<10	310	-	-	-	43	39	7.2	110	150	32	0.05	0.04	<0.001	<0.0002	<0.001	0.009	<0.001	0.091	<0.0001	0.009	0.041	<0.5	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	14-Apr-20	CSM_BH02	Normal	6.6	490	2000	<0.004	-	<10	380	-	-	-	63	51	8.6	150	190	28	0.05	<0.02	<0.001	<0.0002	<0.001	0.002	<0.001	0.09	<0.0001	0.004	0.015	<0.05	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	19-May-20	CSM_BH02	Normal	7.5	660	1600	<0.004	-	<10	410	-	-	-	44	38	5.1	110	150	29	0.03	0.09	0.001	<0.0002	<0.001	0.01	<0.001	0.63	<0.0001	0.014	0.035	1.4	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	18-Jun-20	CSM_BH02	Normal	7.4	470	1000	0.004	-	<10	390	-	-	-	<5	<5	<5	11	160	29	0.03	<0.02	0.002	<0.0002	<0.001	<0.001	<0.001	0.35	<0.0001	0.023	0.008	3.9	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
		QC02	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002	<0.0002	<0.001	0.003	<0.001	-	<0.0001	0.025	0.032	-	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	15-Jul-20	CSM_BH02	Normal	6.4	1000	1600	0.02	-	<10	270	<20	270	-	-	38	37	7.4	110	160	32	<0.01	-	0.003	<0.0002	<0.001	<0.001	<0.001	0.3	<0.0001	0.027	0.016	3.6	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100	
	18-Aug-20	CSM_BH02	Normal	6.9	350	980	<0.004	-	<10	240	-	-	-	26	19	<5	53	47	37	<0.01	0.03	<0.001	<0.0002	<0.001	0.006	0.002	0.13	<0.0001	0.013	0.046	0.09	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
	14-Sep-20	CSM_BH02	Normal	7.9	420	1100	<0.004	-	<10	240	<20	240	200	35	28	<5	92	85	34	0.05	-	0.001	<0.0002	<0.001	0.003	<0.001	0.49	<0.0001	0.019	0.014	2.6	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
		QC02	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002	<0.0002	<0.001	0.002	<0.001	-	<0.0001	0.02	0.014	-	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100		
27-Oct-20	CSM_BH02	Normal	7.1	300	2800	<0.004	-	<10	240	<20	240	230	41	32	7.1	86	110	46	<0.01	-	<0.001	<0.0002	<0.001	0.005	<0.001	0.04	<0.0001	0.007	0.024	<0.5	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	80	<100	<100	<100			
19-Nov-20	CSM_BH02	Normal	7.8	490	1000	<0.004	-	<10	260	-	-	-	18	28	11	98	120	31	<0.01	0.08	0.001	<0.0002	<0.001	0.003	<0.001	0.044	<0.0001	0.004	0.022	<0.5	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100			
23-Dec-20	CSM_BH02	Normal	6.6	190	980	<0.004	-	<10	140	-	-	-	12	14	1	56	44	38	<0.01	0.05	<0.001	<0.0002	<0.001	<0.001	<0.001	0.36	<0.0001	0.009	0.015	<0.5	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100			
27-Jan-21	CSM_BH02	Normal	7.1	330	740	0.01	-	<10	160	<20	160	240	36	36	<5	62	51	45	<0.01	-	<0.001	<0.0002	<0.001	<0.001	<0.001	0.13	<0.0001	0.003	0.015	<0.05	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<100			
	QC02	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.0002	0.002	<0.001	<0.001	-	<0.0001	0.003	0.011	-	<1	<1	<1	<1	<2	<3	-	<10	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<							

Station Code	Sample Date	Field ID	Sample Type																																																																																
CSM_BH04	25-May-21	CSM BH04	Normal	6.8	280	1200	<0.004	-	<-10	98	<-20	98	84	8.6	15	<-5	66	94	32	0.08	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.4	<-0.0001	0.057	0.064	5.3	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	-	<-20	<-50	<-100	<-100	<-100																												
	25-May-21	QC02	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<-0.001	<-0.0001	<-0.001	<-0.001	<-0.001	-	<-0.0001	0.059	0.059	-	<-1	<-2	<-2	<-2	<-2	<-2	<-1	<-5	<-20	<-20	<-100	<-100	<-100	<-50	<-100	<-100	-	<-20	<-50	<-100	<-100	<-100																														
	15-Jun-21	CSM BH04	Normal	6.6	290	1300	<0.004	-	<-10	100	<-20	100	85	8.2	16	2.7	68	74	43	0.03	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.4	<-0.0001	0.025	0.054	6.2	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	50	50	100	<-100	<-100	150	<-100	<-100	100	<-20	60	100	<-100	160																												
	15-Jun-21	QC01	Field_D	-	-	-	-	-	<-10	100	<-20	100	85	8.2	16	2.7	68	74	43	0.03	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.4	<-0.0001	0.026	0.057	-	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	100	<-20	<-50	<-100	<-100	<-100																										
	12-Jul-21	CSM-BH04	Normal	7.8	280	350	<0.004	-	<-10	120	<-20	120	79	8	14	2.8	72	66	38	0.1	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.37	<-0.0001	0.041	0.031	10	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	12-Jul-21	QC01	Field_D	-	-	-	-	-	<-10	120	<-20	120	79	8	14	2.8	72	66	38	0.1	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.37	<-0.0001	0.042	0.03	-	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	09-Aug-21	CSM BH04	Normal	7.3	290	390	<0.004	-	<-20	88	<-20	88	85	11	14	6.2	69	76	38	0.06	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.47	<-0.0001	0.036	0.036	3.7	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	09-Aug-21	QC01	Field_D	-	-	-	-	-	<-20	88	<-20	88	85	11	14	6.2	69	76	38	0.06	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.47	<-0.0001	0.038	0.041	-	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	28-Sep-21	CSM BH04	Normal	6.5	260	460	<0.004	-	<-10	88	<-20	88	81	7.3	15	2.5	73	78	38	<-0.1	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.47	<-0.0001	0.039	0.017	3.9	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	27-Oct-21	CSM BH04	Normal	7.2	80	6400	0.004	-	<-10	87	<-20	87	100	10	19	2.5	69	90	34	0.04	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.47	<-0.0001	0.031	0.015	3.7	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	23-Nov-21	CSM BH04	Normal	7	280	510	<0.004	-	<-10	110	<-20	110	62	6.1	11	2.9	68	63	50	0.04	-	<-0.001	<-0.0002	<-0.001	0.001	<-0.001	0.7	<-0.0001	0.014	0.046	1.6	<-1	<-1	<-1	<-1	<-2	<-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																												
	14-Dec-21	CSM BH04	Normal	7.6	140	1300	0.005	-	<-10	92	<-20	92	95	10	17	2.8	55	87	22	0.05	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.39	<-0.0001	0.01	0.23	6.8	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	18-Jan-22	CSM BH04	Normal	6.5	260	1200	<0.004	-	<-10	120	<-20	120	120	13	21	6	69	72	28	0.03	-	<-0.001	<-0.0002	<-0.001	0.002	<-0.001	0.35	<-0.0001	0.051	0.008	3.2	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	18-Jan-22	QC02	Interlab_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<-0.001	<-0.0001	<-0.001	<-0.001	<-0.001	-	<-0.0001	0.052	0.01	-	<-1	<-2	<-2	<-2	<-2	<-2	<-1	<-5	<-20	<-20	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																											
	09-Feb-22	CSM BH04	Normal	6.8	260	1100	<0.004	-	<-10	100	<-20	100	92	9.1	17	3.3	72	93	32	0.01	-	0.003	0.0003	0.003	0.003	0.003	0.4	<-0.0001	0.1	0.081	4.6	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																											
	16-Mar-22	CSM BH04	Normal	6.7	260	330	<0.004	-	<-10	120	<-20	120	76	8.2	13	2.9	69	71	36	<0.001	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.41	<-0.0001	0.027	0.13	3.3	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	19-May-22	CSM BH04	Normal	6.4	310	320	0.004	-	<-10	120	<-20	120	73	6.9	13	2.7	66	63	39	<0.001	-	<-0.001	<-0.0002	<-0.001	0.003	<-0.001	0.39	<-0.0001	0.069	0.04	2.1	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	18-Aug-22	CSM BH04	Normal	6.6	270	130	<0.004	-	<-10	670	<-20	670	86	8	16	3.4	71	65	34	<0.001	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.4	<-0.0001	0.056	0.027	0.11	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	03-Nov-22	CSM BH04	Normal	5.9	310	460	<0.004	-	<-10	100	<-20	100	100	9.6	19	3.8	70	71	39	<0.001	-	<-0.001	<-0.0002	<-0.001	0.002	<-0.001	0.3	<-0.0001	0.008	0.037	3.6	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	13-Feb-23	CSM BH04	Normal	6.3	310	210	-	<-0.005	<-10	84	<-20	84	75	7.4	14	3	59	53	35	<0.001	-	<-0.001	<-0.0002	<-0.001	0.002	<-0.001	-	<-0.0001	0.008	0.011	2.5	<-1	<-1	<-1	<-1	<-2	<-3	-	-	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																												
	13-Feb-23	QC01	Field_D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<-0.001	<-0.0002	<-0.001	<-0.001	<-0.001	-	<-0.0001	0.008	0.011	-	<-1	<-1	<-1	<-1	<-2	<-3	-	-	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																											
	CSM_BH05	17-Apr-19	CSM BH05	Normal	-	-	-	<-0.005	-	<-10	230	-	-	-	30	23	6	140	130	78	<-0.01	<-0.02	0.002	<-0.0002	<-0.001	<-0.001	<-0.001	0.36	<-0.0001	0.011	0.011	1.1	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	900	200	1100	<-50	<-100	<-100	-	<-20	<-50	400	400	900																											
		13-May-19	CSM BH05	Normal	8.2	560	620	<-0.005	-	<-10	220	-	-	-	33	29	6.2	130	190	54	<-0.01	<-0.02	0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.37	<-0.0001	0.008	0.027	0.99	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																											
		11-Jun-19	CSM BH05	Normal	7.4	520	110	<-0.005	-	<-10	240	-	-	-	44	39	8	150	220	50	<-0.01	<-0.02	0.001	<-0.0002	<-0.001	0.001	<-0.001	0.44	<-0.0001	0.005	0.023	<-0.5	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																											
		29-Jul-19	CSM BH05	Normal	7.2	500	930	0.025	-	<-10	170	-	-	-	28	30	6.3	120	160	50	<-0.01	<-0.02	0.001	<-0.0002	<-0.001	<-0.001	<-0.001	0.45	<-0.0001	0.011	0.024	1	<-1	<-1	<-1	<-1	<-2	<-3	-	<-10	<-20	<-20	<-50	<-50	<-100	<-100	<-100	<-50	<-100	<-100	<-100	<-100	<-100	<-100	<-100	<-100																											
		18-Apr-19	CSM BH06	Normal	-	-	-	<-0.005	-	<-10	180	-	-	-	42	31	5.6	110	180	29	<-0.001	0.03	<-0.001	<-0.0002	<-0.001	0.009	<-0.001	0.28	<-0.0001</																																																						

[illegible]

- #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 4.42
- #3: Cyanide as un-ionised HCN, measured as [CN].
- #4: Ammonia as total ammonia, measured as [NH3-N] at pH 8.
- #5: In absence of total Cr guideline, Cr (VI) guideline has been adopted.
- #6: Not limiting: Derived water HSL exceeds water solubility limit
- #7: To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction

#1 Reported Analyte LOR is higher than Requested Analyte LOR

[illegible]

[illegible]

[illegible]

[illegible][illegible]

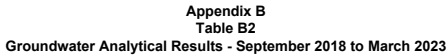
[illegible]

[illegible]

ADWG 2011 Recreational (v3.7 updated 2022)
ANZG (2018) - MW - 95% species protection (updated 1/10/2021)
NZPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand
2-4m
4-8m
>8m

[illegible]

[illegible]

[illegible][illegible]

*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: Cyanide as un-ionised HCN, measured as [CN].

#4:Ammonia as total ammonia, measured as [NH₃-N] at pH 8.

#5: In absence of total Cr guideline, Cr (VI) guideline has been adopted.

#6: Not limiting: Derived water HSL exceeds water solubility limit

#7: To obtain F1 subtract the sum of BTEX concentrations from the

17.16 Obtain Γ by subtracting the sum of STEX concentrations from the SO_4^{2-} STX fraction:

Data Comments

#1 Reported Analyte LOR is higher than Requested Analyte LOR

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

* 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: Cyanide as un-ionised HCN, measured as [CN].

#4: Ammonia as total ammonia, measured as [NH3-N] at pH 8.

#5: In absence of total Cr guideline, Cr (VI) guideline has been adopted.

#6: Not limiting: Derived water HSL exceeds water solubility limit

#7: To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

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[illegible][illegible]

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[illegible][illegible][illegible]

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:Cyanide as un-ionised HCN, measured as [CN]

#4:Ammonia as total ammonia, measured as [NH3-N] at pH 8.

#5:In absence of total Cr guideline, Cr (VI) guideline has been adopted.

#6:Not limiting: Derived water HSL exceeds water solubility limit

#7:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

#1 Reported Analyte LOR is higher than Requested Analyte LOR



Appendix B
Table B3
Groundwater Analytical Results - October 2022 to March 2023

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

	Inorganics			Cyanide		Acidity & Alkalinity					Major Ions						Nutrients	Metals										Iron speciation	BTEXN							
	pH (Lab)	Total Dissolved Solids	Total Suspended Solids	Cyanide (Total)	Cyanide (WAD)	Alkalinity (Carbonate as CaCO3)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Hardness as CaCO3	Calcium	Magnesium	Potassium	Sodium	Chloride	Sulfate	Ammonia as N	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Manganese	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	Ferrous Iron	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Naphthalene (BTEXN suite)
EQL	pH units	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	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
ADWG 2011 Recreational (v3.7 updated 2022)	0.1	10	5	0.004	0.005	10	20	20	20	1	0.5	0.5	0.5	0.5	1	2	0.01	0.001	0.0002	0.001	0.001	0.001	0.005	0.005	0.0001	0.001	0.005	0.05	1	1	1	1	2	3	1	10
ANZG (2018) - MW - 95% species protection (updated 1/10/2021)				0.004 ^{#2}													0.91 ^{#3}	0.1	0.02	0.001	0.0013	0.0044		5	0.0004	0.07	0.008		700	180	80			6000		70
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																				
2-4m																													5000	NL ^{#5}	NL ^{#5}			NL ^{#5}		NL ^{#5}
4-8m																													5000	NL ^{#5}	NL ^{#5}			NL ^{#5}		NL ^{#5}
>8m																													5000	NL ^{#5}	NL ^{#5}			NL ^{#5}		NL ^{#5}

Location Code	Sample Date	Field ID	Sample Type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Statistical Summary																																					
Number of Results	20	20	20	13	7	20	20	20	20	20	20	20	20	20	20	20	20	20	25	25	25	25	25	7	13	25	25	25	20	25	25	25	25	25	2	13	
Number of Detects	20	20	19	10	0	0	14	0	14	20	20	20	20	20	20	20	1	1	0	1	13	0	7	12	0	17	17	13	0	0	0	0	0	0	0	0	
Minimum Concentration	4.9	100	<5	<0.004	<0.005	<10	<20	<20	<20	29	1.5	3	0.5	13	8.9	2.7	<0.01	<0.001	<0.0001	<0.001	<0.001	<0.001	0.016	<0.005	<0.0001	<0.001	<0.005	<0.05	<1	<1	<1	<1	<2	<2	<1	<5	
Minimum Detect	4.9	100	13	0.004	ND	20	ND	20	ND	20	29	1.5	3	0.5	13	8.9	2.7	0.03	0.001	ND	0.001	0.001	ND	0.016	0.011	ND	0.001	0.006	0.05	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	7.4	720	1800	0.022	<0.005	<10	250	<20	250	250	52	38	5.7	130	220	180	0.03	0.001	<0.0002	0.001	0.013	<0.001	1.3	0.74	<0.0001	0.022	0.075	9.2	<1	<2	<2	<2	<2	<3	<1	<10	
Maximum Detect	7.4	720	1800	0.022	ND	ND	250	ND	250	250	52	38	5.7	130	220	180	0.03	0.001	ND	0.001	0.013	ND	1.3	0.74	ND	0.022	0.075	9.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	6.3	309	279	0.0096	0.0025	5	73	10	73	87	15	12	3.1	64	72	42	0.0063	0.00052	0.000096	0.0005	0.0022	0.0005	0.43	0.27	0.00005	0.0044	0.017	2.1	0.5	0.54	0.54	0.54	1	1.5	4.6		
Median Concentration	6.2	230	91	0.008	0.0025	5	62.5	10	62.5	55.5	8.5	6.8	3	56.5	43.5	28	0.005	0.0005	0.0001	0.0005	0.001	0.0005	0.46	0.2	0.00005	0.002	0.011	0.18	0.5	0.5	0.5	1	1.5	0.5	5		
Standard Deviation	0.72	198	479	0.0071	0	0	66	0	66	70	14	11	1.6	45	77	40	0.0056	0.0001	0.000014	0.0001	0.0034	0	0.46	0.28	0	0.0055	0.02	3.4	0	0.14	0.14	0.14	0	0.14	0.94		



Appendix B
Table B3
Groundwater Analytical Results - October 2022 to March 2023

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

	TRH - NEPM 2013							TRH - NEPM 2013 - SG Cleanup				TRH - NEPM 1999				TRH - NEPM 1999 - SG Cleanup				PAHs - standard 16																				
	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)	>C10-C16 SG Cleanup	>C16-C34 SG Cleanup	>C34-C40 SG Cleanup	>C10-C40 (sum) SG Cleanup	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	C10-C14 SG Cleanup	C15-C28	C29-C36 SG Cleanup	C10-C36 (sum) SG Cleanup	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[<i>b</i> + <i>j</i>]fluoranthene	Benzo(<i>k</i>)fluoranthene	Benzo(<i>g</i> , <i>h</i> , <i>i</i>)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3- <i>c,d</i>)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc		
EQI	20	20	50	50	100	100	100	50	100	100	100	20	50	100	100	100	50	100	100	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	0.05
ADWG 2011 Recreational (v3.7 updated 2022)																																								
ANZG (2018) - MW - 95% species protection (updated 1/10/2021)																																								
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																																								
2-4m	6000 ^{#6}		NL ^{#5}																																					
4-8m	6000 ^{#6}		NL ^{#5}																																					
>8m	7000 ^{#6}		NL ^{#5}																																					

Location Code	Sample Date	Field ID	Sample Type	20	20	<50	<50	<100	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<100	<0.01	<0.01	<0.01	<0.04	<0.04	<0.04	<0.04	<0.01	<0.04	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.09	-						
CSM_BH02	03-Nov-22	CSM BH02	Normal																																														
	13-Feb-23	CSM BH02	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	-				
	13-Feb-23	QC02	Interlab D	<20	<20	<100	<100	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<50	<50	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05						
CSM_BH04	03-Nov-22	CSM BH04	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	-		
	13-Feb-23	CSM BH04	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	-		
		QC01	Field D	<20	<20	<50	<50	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<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	<0.01	<0.01	-			
CSM_BH06	04-Nov-22	CSM BH06	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	-			
	15-Mar-23	CSM BH06	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	-			
CSM_BH10S	02-Nov-22	CSM BH10S	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	-		
		QC01	Field D	<20	<20	<50	<50	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<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	<0.01	<0.01	-			
	13-Feb-23	CSM BH10S	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	-		
CSM_BH12S	02-Nov-22	CSM BH12S	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	-		
	15-Mar-23	CSM BH12S	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	-		
		QC03	Field D	<20	<20	<50	<50	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<100	<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	<0.01	-			
CSM_BH13	04-Nov-22	CSM BH13	Normal	30	30	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<100	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	0.04	<0.01	<0.02	0.04	<0.01	<0.02	0.04	<0.01	-				
	14-Feb-23	CSM BH13	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	-		
CSM_BH14S	02-Nov-22	CSM BH14S	Normal	30	30	<50	<50	<100	<100	<100	<50	<100	<100	<100	20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	<0.01	-	
	02-Nov-22	QC02	Interlab D	<20	<20	<100	<100	<100	<100	<100	-	-	-	-	<20	<50	<100	<50	<50	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05					
	15-Mar-23	CSM BH14S	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	<0.01	-	
SRT_BH047	02-Nov-22	SRT BH047	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	<0.01	-	
	13-Feb-23	SRT BH047	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	-		
SRT_BH050	02-Nov-22	SRT BH050	Normal	<20	<20	50	50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	<0.01	-	
	13-Feb-23	SRT BH050	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	<0.01	-	
SRT_BH052	02-Nov-22	SRT BH052	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	<0.01	<0.01	-
	13-Feb-23	SRT BH052	Normal	<20	<20	<50	<50	<100	<100	<100	<50	<100	<100	<100	<20	<50	<100	<100	<100	<50	<100	<100	<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	<0.01	<0.01	<0.01	<0.01	<0.01	-



Appendix B
Table B3
Groundwater Analytical Results - October 2022 to March 2023

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

	PAHs - extended					Phenols - Halogenated										Phenols - Non-Halogenated										Herbicides	SVOCs
	2-methylnaphthalene	3-methylcholanthrene	7,12-dimethylbenz(a)anthracene	Benzo(e)pyrene	Perylene	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	tetrachlorophenols	Phenols(halogenated) - Lab Calc	Phenol	2-Nitrophenol	2-Methylphenol (o-Cresol)	3,4-Methylphenol (m,p-cresol)	2,4-Dimethylphenol	2,4-Dinitrophenol	4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexyl phenol	4-Nitrophenol	Cresol Total	Phenols (Total Non Halogenated)	Dinoseb	Coronene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	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	0.1	0.1	0.1		0.1	3	3	10	10	3	10	30	10	3	3	10	3	6	3	30	30	100	30	10	100	100	0.1
ADWG 2011 Recreational (v3.7 updated 2022)						3000	2000		200			100															
ANZG (2018) - MW - 95% species protection (updated 1/10/2021)											22			400													
NEPM 2013 Table 1A(4) HSL D Comm/Ind GW for Vapour Intrusion, Sand																											
2-4m																											
4-8m																											
>8m																											

Location Code	Sample Date	Field ID	Sample Type	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
CSM_BH02	03-Nov-22	CSM BH02	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
	13-Feb-23	CSM BH02	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
	13-Feb-23	QC02	Interlab D	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	
CSM_BH04	03-Nov-22	CSM BH04	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
	13-Feb-23	CSM BH04	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
		QC01	Field D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CSM_BH06	04-Nov-22	CSM BH06	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
	15-Mar-23	CSM BH06	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
CSM_BH10S	02-Nov-22	CSM BH10S	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
		QC01	Field D	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
	13-Feb-23	CSM BH10S	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
CSM_BH12S	02-Nov-22	CSM BH12S	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
	15-Mar-23	CSM BH12S	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
		QC03	Field D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CSM_BH13	04-Nov-22	CSM BH13	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
	14-Feb-23	CSM BH13	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
CSM_BH14S	02-Nov-22	CSM BH14S	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
	02-Nov-22	QC02	Interlab D	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	
	15-Mar-23	CSM BH14S	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
SRT_BH047	02-Nov-22	SRT BH047	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
	13-Feb-23	SRT BH047	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
SRT_BH050	02-Nov-22	SRT BH050	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
	13-Feb-23	SRT BH050	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
SRT_BH052	02-Nov-22	SRT BH052	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-
	13-Feb-23	SRT BH052	Normal	-	-	-	-	-	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	-

Statistical Summary																													
Number of Results	2	2	2	2	2	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	2
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.1	<0.1	<0.1	<0.1	<0.1	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	<100	<0.1	
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<0.1	<0.1	<0.1	<0.1	<0.1	<3	<3	<10	<10	<3	<10	<10	<30	<10	<3	<10	<3	<6	<3	<30	<30	<100	<30	<10	<100	<100	<100	<0.1	
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration						1.5	1.5	5	5	1.5	5	5	15	5	1.5	5	1.5	3	1.5	15	15	50	15	5	50	50	50	50	
Median Concentration	0.05	0.05	0.05	0.05	0.05	1.5	1.5	5	5	1.5	5	5	15	5	1.5	5	1.5	3	1.5	15	15	50	15	5	50	50	50	50	0.05
Standard Deviation						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

*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:Cyanide as un-ionised HCN, measured as [CN].

#3:Ammonia as total ammonia, measured as [NH3-N] at pH 8.

#4:In absence of total Cr guideline, Cr (VI) guideline has been adopted.

#5:Not limiting: Derived water HSL exceeds water solubility limit

#6:To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.



Appendix B
Table B4 - Groundwater Gauging for October 2022 to March 2023 monitoring period

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Well ID	Sampling Event	SWL (mbTOC)	BOC (mbTOC)	Elevation of well (m)	SWL (m AHD)	Shallow or Deep?	Date Measured	Lithology (mAHD)	Well screen (mAHD)	Lithology (mbgl)	Well screen (mbgl)
CSM_BH02	Event 49 - Oct 2022	24.285	32.535	21.424	-2.861	Deep	07/10/2022	14.28-14.88 concrete / fill 13.98-14.28 residual soil (20.12)-13.98 sandstone	(20.12)-(0.88)	-	-
CSM_BH02	Event 50 - Nov 2022	24.230	32.560	21.424	-2.806	Deep	03/11/2022				
CSM_BH02	Event 51 - Dec 2022	23.385	32.650	21.424	-1.961	Deep	08/12/2022				
CSM_BH02	Event 52 - Jan 2023	23.905	32.795	21.424	-2.481	Deep	13/01/2023				
CSM_BH02	Event 53 - Feb 2023	24.570	32.590	21.424	-3.146	Deep	13/02/2023				
CSM_BH02	Event 54 - Mar 2023	24.463	32.535	21.424	-3.039	Deep	15/03/2023				
CSM_BH02	Event 55 - April 2023	24.220	32.500	21.424	-2.796	Deep	19/04/2023				
CSM_BH02	Event 56 - May 2023	24.030	32.475	21.424	-2.606	Deep	23/05/2023	5.91-13.91 residual (sand, clayey sand, sandy clay) (20.91)-5.91 sandstone	(20.91)-(5.91)	-	(35.00)-(20.00)
CSM_BH04	Event 49 - Oct 2022	21.580	32.705	15.814	-5.766	Deep	07/10/2022				
CSM_BH04	Event 50 - Nov 2022	21.330	32.720	15.814	-5.516	Deep	03/11/2022				
CSM_BH04	Event 51 - Dec 2022	21.245	32.675	15.814	-5.431	Deep	08/12/2022				
CSM_BH04	Event 52 - Jan 2023	21.270	32.640	15.814	-5.456	Deep	13/01/2023				
CSM_BH04	Event 53 - Feb 2023	21.145	32.630	15.814	-5.331	Deep	13/02/2023				
CSM_BH04	Event 54 - Mar 2023	21.140	32.670	15.814	-5.326	Deep	15/03/2023				
CSM_BH04	Event 55 - April 2023	21.280	32.660	15.814	-5.466	Deep	19/04/2023	19.52-20.02 fill 14.02-19.52 residual (clayey sand, sandy clay, clay) 10.02-14.02 residual / weathered shale / weathered claystone (13.02)-10.02 sandstone	(13.02)-(2.02)	-	(35.00)-(20.00)
CSM_BH04	Event 56 - May 2023	21.380	32.620	15.814	-5.566	Deep	23/05/2023				
CSM_BH06	Event 49 - Oct 2022	24.470	35.185	21.930	-2.540	Deep	07/10/2022				
CSM_BH06	Event 50 - Nov 2022	24.315	35.180	21.930	-2.385	Deep	04/11/2022				
CSM_BH06	Event 51 - Dec 2022	23.805	35.770	21.930	-1.875	Deep	08/12/2022				
CSM_BH06	Event 52 - Jan 2023	24.175	35.185	21.930	-2.245	Deep	13/01/2023				
CSM_BH06	Event 53 - Feb 2023	-	-	21.930	-	Deep	14/02/2023				
CSM_BH06	Event 54 - Mar 2023	24.630	35.180	21.930	-2.700	Deep	15/03/2023	13.68-15.68 fill 9.68-13.68 residual soil (sand) 5.68-9.68 residual soil (clayey sand and sandy clay)	(9.68)-(5.98)	-	(10.00)-(6.00)
CSM_BH06	Event 55 - April 2023	24.410	35.190	21.930	-2.480	Deep	19/04/2023				
CSM_BH06	Event 56 - May 2023	24.205	35.210	21.930	-2.275	Deep	23/05/2023				
CSM_BH10S	Event 49 - Oct 2022	3.690	9.690	15.583	11.893	Shallow	07/10/2022				
CSM_BH10S	Event 50 - Nov 2022	3.840	9.700	15.583	11.743	Shallow	02/11/2022				
CSM_BH10S	Event 51 - Dec 2022	4.125	9.685	15.583	11.458	Shallow	08/12/2022				
CSM_BH10S	Event 52 - Jan 2023	4.190	9.690	15.583	11.393	Shallow	13/01/2023				
CSM_BH10S	Event 53 - Feb 2023	4.050	9.700	15.583	11.533	Shallow	13/02/2023	-	-	-	-
CSM_BH10S	Event 54 - Mar 2023	4.010	9.696	15.583	11.573	Shallow	15/03/2023				
CSM_BH10S	Event 55 - April 2023	3.980	9.680	15.583	11.603	Shallow	19/04/2023				
CSM_BH10S	Event 56 - May 2023	4.050	9.700	15.583	11.533	Shallow	23/05/2023				
CSM_BH12S	Event 49 - Oct 2022	4.380	6.490	20.726	16.346	Shallow	07/10/2022				
CSM_BH12S	Event 50 - Nov 2022	4.460	6.510	20.726	16.266	Shallow	02/11/2022				
CSM_BH12S	Event 51 - Dec 2022	4.570	6.510	20.726	16.156	Shallow	08/12/2022				
CSM_BH12S	Event 52 - Jan 2023	4.522	6.505	20.726	16.204	Shallow	13/01/2023	-	-	-	-
CSM_BH12S	Event 53 - Feb 2023	4.465	6.500	20.726	16.261	Shallow	14/02/2023				
CSM_BH12S	Event 54 - Mar 2023	4.507	6.505	20.726	16.219	Shallow	15/03/2023				
CSM_BH12S	Event 55 - April 2023	4.510	6.510	20.726	16.216	Shallow	19/04/2023				
CSM_BH12S	Event 56 - May 2023	4.480	6.510	20.726	16.246	Shallow	23/05/2023				
CSM_BH13	Event 49 - Oct 2022	21.725	33.700	25.452	3.727	Deep	07/10/2022	-	-	-	(35.50)-(15.5)
CSM_BH13	Event 50 - Nov 2022	21.900	33.695	25.452	3.552	Deep	04/11/2022				
CSM_BH13	Event 51 - Dec 2022	21.665	33.680	25.452	3.787	Deep	08/12/2022				
CSM_BH13	Event 52 - Jan 2023	21.710	33.670	25.452	3.742	Deep	13/01/2023				
CSM_BH13	Event 53 - Feb 2023	21.807	33.670	25.452	3.645	Deep	14/02/2023				
CSM_BH13	Event 54 - Mar 2023	21.826	33.700	25.452	3.626	Deep	15/03/2023				
CSM_BH13	Event 55 - April 2023	21.880	33.680	25.452	3.572	Deep	19/04/2023				
CSM_BH13	Event 56 - May 2023	21.845	33.690	25.452	3.607	Deep	23/05/2023	-	-	-	(6.00)-(3.00)
CSM_BH14S	Event 49 - Oct 2022	2.495	5.650	22.794	20.299	Shallow	07/10/2022				
CSM_BH14S	Event 50 - Nov 2022	2.830	5.650	22.794	19.964	Shallow	02/11/2022				
CSM_BH14S	Event 51 - Dec 2022	3.105	5.635	22.794	19.689	Shallow	08/12/2022				
CSM_BH14S	Event 52 - Jan 2023	3.155	5.635	22.794	19.639	Shallow	13/01/2023				
CSM_BH14S	Event 53 - Feb 2023	-	-	22.794	-	Shallow	14/02/2023				
CSM_BH14S	Event 54 - Mar 2023	3.135	5.645	22.794	19.659	Shallow	15/03/2023				
CSM_BH14S	Event 55 - April 2023	3.140	5.640	22.794	19.654	Shallow	19/04/2023				
CSM_BH14S	Event 56 - May 2023	3.130	5.645	22.794	19.664	Shallow	23/05/2023				



Appendix B
Table B4 - Groundwater Gauging for October 2022 to March 2023 monitoring period

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Well ID	Sampling Event	SWL (mbTOC)	BOC (mbTOC)	Elevation of well (m)	SWL (m AHD)	Shallow or Deep?	Date Measured	Lithology (mAHD)	Well screen (mAHD)	Lithology (mbgl)	Well screen (mbgl)
SRT_BH047	Event 49 - Oct 2022	3.200	7.040	21.310	18.110	Shallow	07/10/2022	19.71-21.11 fill 14.18-19.71 laminite / residual soil 6.31-14.18 bedrock sandstone	(15.41)-(11.91)	2.5 - 3.0 Silty clay with sand, trace of gravel 4.0 - 4.5 Silty clay, trace of sand and gravel 6.0 - 6.9 Sandy silty clay 7.35-13.48 Sandstone	-
SRT_BH047	Event 50 - Nov 2022	4.010	7.050	21.310	17.300	Shallow	02/11/2022				
SRT_BH047	Event 51 - Dec 2022	4.295	7.050	21.310	17.015	Shallow	08/12/2022				
SRT_BH047	Event 52 - Jan 2023	3.960	7.050	21.310	17.350	Shallow	13/01/2023				
SRT_BH047	Event 53 - Feb 2023	3.750	7.010	21.310	17.560	Shallow	13/02/2023				
SRT_BH047	Event 54 - Mar 2023	4.165	7.060	21.310	17.145	Shallow	15/03/2023				
SRT_BH047	Event 55 - April 2023	3.970	7.040	21.310	17.340	Shallow	19/04/2023				
SRT_BH047	Event 56 - May 2023	3.980	7.050	21.310	17.330	Shallow	23/05/2023				
SRT_BH050	Event 49 - Oct 2022	2.415	2.740	21.390	18.975	Shallow	07/10/2022	-	-	1.5 - 2.0 Clayey sand 2.2 - 3.0 Silty clay with sand, trace of gravel 5.0 - 6.0 Silty clay, trace of sand and gravel 9.70 - 9.94 Sandstone	-
SRT_BH050	Event 50 - Nov 2022	2.435	2.760	21.390	18.955	Shallow	02/11/2022				
SRT_BH050	Event 51 - Dec 2022	DRY	2.770	21.390	-	Shallow	08/12/2022				
SRT_BH050	Event 52 - Jan 2023	2.485	2.780	21.390	18.905	Shallow	13/01/2023				
SRT_BH050	Event 53 - Feb 2023	2.410	2.770	21.390	18.980	Shallow	13/02/2023				
SRT_BH050	Event 54 - Mar 2023	2.673	2.758	21.390	18.717	Shallow	15/03/2023				
SRT_BH050	Event 55 - April 2023	2.470	2.760	21.390	18.920	Shallow	19/04/2023				
SRT_BH050	Event 56 - May 2023	2.470	2.760	21.390	18.920	Shallow	23/05/2023				
SRT_BH052	Event 49 - Oct 2022	5.780	7.925	21.400	15.620	Shallow	07/10/2022	19.55-21.40 fill 16.40-19.55 residual soil 6.08-16.40 sandstone	(16.9)-(14.2)	-	-
SRT_BH052	Event 50 - Nov 2022	5.835	7.900	21.400	15.565	Shallow	02/11/2022				
SRT_BH052	Event 51 - Dec 2022	6.130	7.885	21.400	15.270	Shallow	08/12/2022				
SRT_BH052	Event 52 - Jan 2023	6.145	7.880	21.400	15.255	Shallow	13/01/2023				
SRT_BH052	Event 53 - Feb 2023	5.992	7.920	21.400	15.408	Shallow	13/02/2023				
SRT_BH052	Event 54 - Mar 2023	6.070	7.925	21.400	15.330	Shallow	15/03/2023				
SRT_BH052	Event 55 - April 2023	6.140	7.890	21.400	15.260	Shallow	19/04/2023				
SRT_BH052	Event 56 - May 2023	6.195	7.930	21.400	15.205	Shallow	23/05/2023				

Note:
mbTOC: metres below top of casing
mbgl: metres below ground level
mAHD: metres Australian Height Datum



Appendix B

Table B5

Summary of Groundwater Field Parameters - October 2022 to May 2023

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Well ID	Sampling Event	Date Measured	SWL (mbTOC)	BOC (mbTOC)	Dissolved Oxygen (ppm)	Electrical Conductivity (us/cm)	pH	Ox-Red Potential (mV)	Temperature (°C)	Comments
CSM_BH02	Event 49 - Oct 2022	07/10/2022	24.285	32.535	-	-	-	-	-	GAUGING ONLY
CSM_BH02	Event 50 - Nov 2022	03/11/2022	24.230	32.560	2.18	682	6.26	108.3	20.3	Pale brown, very cloudy, no odour/sheen.
CSM_BH02	Event 51 - Dec 2022	08/12/2022	23.385	32.650	-	-	-	-	-	GAUGING ONLY
CSM_BH02	Event 52 - Jan 2023	13/01/2023	23.905	32.795	-	-	-	-	-	GAUGING ONLY
CSM_BH02	Event 53 - Feb 2023	13/02/2023	24.570	32.590	1.28	453	6.17	68.9	22.8	Brown, very turbid, some sediment load, no odour/sheen.
CSM_BH02	Event 54 - Mar 2023	15/03/2023	24.463	32.535	-	-	-	-	-	GAUGING ONLY
CSM_BH02	Event 55 - Apr 2023	19/04/2023	24.220	32.500	-	-	-	-	-	GAUGING ONLY
CSM_BH02	Event 56 - May 2023	23/05/2023	24.03	32.475	-	-	-	-	-	GAUGING ONLY
CSM_BH04	Event 49 - Oct 2022	07/10/2022	21.580	32.705	-	-	-	-	-	GAUGING ONLY
CSM_BH04	Event 50 - Nov 2022	03/11/2022	21.330	32.720	3.95	463.3	5.75	112.9	20.3	Pale brown, very cloudy, no odour/sheen.
CSM_BH04	Event 51 - Dec 2022	08/12/2022	21.245	32.675	-	-	-	-	-	GAUGING ONLY
CSM_BH04	Event 52 - Jan 2023	13/01/2023	21.270	32.640	-	-	-	-	-	GAUGING ONLY
CSM_BH04	Event 53 - Feb 2023	13/02/2023	21.145	32.630	1.35	416	5.32	90.2	21.4	Brown-orange, cloudy, no odour/sheen. Good recharge.
CSM_BH04	Event 54 - Mar 2023	15/03/2023	21.140	32.670	-	-	-	-	-	GAUGING ONLY
CSM_BH04	Event 55 - Apr 2023	19/04/2023	21.280	32.660	-	-	-	-	-	GAUGING ONLY
CSM_BH04	Event 56 - May 2023	23/05/2023	21.38	32.62	-	-	-	-	-	GAUGING ONLY
CSM_BH06	Event 49 - Oct 2022	07/10/2022	24.470	35.185	-	-	-	-	-	GAUGING ONLY
CSM_BH06	Event 50 - Nov 2022	04/11/2022	24.315	35.180	1.39	947	6.68	28.2	21.2	Orange-brown, very cloudy, no odour/sheen
CSM_BH06	Event 51 - Dec 2022	08/12/2022	23.805	35.770	-	-	-	-	-	GAUGING ONLY
CSM_BH06	Event 52 - Jan 2023	13/01/2023	24.175	35.185	-	-	-	-	-	GAUGING ONLY
CSM_BH06	Event 53 - Feb 2023	14/02/2023	-	-	-	-	-	-	-	Ongoing rainfall caused surface water flow continuously over the well. Well could not be
CSM_BH06	Event 54 - Mar 2023	15/03/2023	24.630	35.180	0.39	958	6.11	73.3	25.8	Clear, no odour/sheen.
CSM_BH06	Event 55 - Apr 2023	19/04/2023	24.410	35.190	-	-	-	-	-	GAUGING ONLY
CSM_BH06	Event 56 - May 2023	23/05/2023	24.205	35.21	-	-	-	-	-	GAUGING ONLY
CSM_BH10S	Event 49 - Oct 2022	07/10/2022	3.690	9.690	-	-	-	-	-	GAUGING ONLY
CSM_BH10S	Event 50 - Nov 2022	02/11/2022	3.840	9.700	1.42	237.4	5.48	108.3	20.6	Yellow-brown, some sediment, very cloudy, non-transparent, no odour/sheen.
CSM_BH10S	Event 51 - Dec 2022	08/12/2022	4.125	9.685	-	-	-	-	-	GAUGING ONLY
CSM_BH10S	Event 52 - Jan 2023	13/01/2023	4.190	9.690	-	-	-	-	-	GAUGING ONLY
CSM_BH10S	Event 53 - Feb 2023	13/02/2023	4.050	9.700	0.35	240	4.75	80.8	21.5	Pale orange tinge, slightly cloudy, no sediment, no odour/sheen. Great recharge.
CSM_BH10S	Event 54 - Mar 2023	15/03/2023	4.010	9.696	-	-	-	-	-	GAUGING ONLY
CSM_BH10S	Event 55 - Apr 2023	19/04/2023	3.980	9.680	-	-	-	-	-	GAUGING ONLY
CSM_BH10S	Event 56 - May 2023	23/05/2023	4.05	9.7	-	-	-	-	-	GAUGING ONLY
CSM_BH12S	Event 49 - Oct 2022	07/10/2022	4.380	6.490	-	-	-	-	-	GAUGING ONLY
CSM_BH12S	Event 50 - Nov 2022	02/11/2022	4.460	6.510	2.01	628	6.05	41.6	20	Red-brown tinge, clear, no odour/sheen.
CSM_BH12S	Event 51 - Dec 2022	08/12/2022	4.570	6.510	-	-	-	-	-	GAUGING ONLY
CSM_BH12S	Event 52 - Jan 2023	13/01/2023	4.522	6.505	-	-	-	-	-	GAUGING ONLY
CSM_BH12S	Event 53 - Feb 2023	14/02/2023	4.465	6.500	-	-	-	-	-	Well could not be sampled due to heavy rainfall.
CSM_BH12S	Event 54 - Mar 2023	15/03/2023	4.507	6.505	0.23	548	5.57	8.9	20.6	Clear, no odour/sheen.
CSM_BH12S	Event 55 - Apr 2023	19/04/2023	4.510	6.510	-	-	-	-	-	GAUGING ONLY
CSM_BH12S	Event 56 - May 2023	23/05/2023	4.48	6.51	-	-	-	-	-	GAUGING ONLY



Appendix B
Table B5
Summary of Groundwater Field Parameters - October 2022 to May 2023

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Well ID	Sampling Event	Date Measured	SWL (mbTOC)	BOC (mbTOC)	Dissolved Oxygen (ppm)	Electrical Conductivity (us/cm)	pH	Ox-Red Potential (mV)	Temperature (°C)	Comments
CSM_BH13	Event 49 - Oct 2022	07/10/2022	21.725	33.700	-	-	-	-	-	GAUGING ONLY
CSM_BH13	Event 50 - Nov 2022	04/11/2022	21.900	33.695	1.41	947	6.61	1.9	20.7	Brown, very cloudy, no odour/sheen.
CSM_BH13	Event 51 - Dec 2022	08/12/2022	21.665	33.680	-	-	-	-	-	GAUGING ONLY
CSM_BH13	Event 52 - Jan 2023	13/01/2023	21.710	33.670	-	-	-	-	-	GAUGING ONLY
CSM_BH13	Event 53 - Feb 2023	14/02/2023	21.807	33.670	0.8	939	5.67	75	21.2	Brown-orange, very cloudy, no sediment, no odour/sheen.
CSM_BH13	Event 54 - Mar 2023	15/03/2023	21.826	33.700	-	-	-	-	-	GAUGING ONLY
CSM_BH13	Event 55 - Apr 2023	19/04/2023	21.880	33.680	-	-	-	-	-	GAUGING ONLY
CSM_BH13	Event 56 - May 2023	23/05/2023	21.845	33.69	-	-	-	-	-	GAUGING ONLY
CSM_BH14S	Event 49 - Oct 2022	07/10/2022	2.495	5.650	-	-	-	-	-	GAUGING ONLY
CSM_BH14S	Event 50 - Nov 2022	02/11/2022	2.830	5.650	1.8	177.6	7.19	-2	20.3	Pale orange tinge, mostly clear, no sediment, no odour/sheen.
CSM_BH14S	Event 51 - Dec 2022	08/12/2022	3.105	5.635	-	-	-	-	-	GAUGING ONLY
CSM_BH14S	Event 52 - Jan 2023	13/01/2023	3.155	5.635	-	-	-	-	-	GAUGING ONLY
CSM_BH14S	Event 53 - Feb 2023	14/02/2023	-	-	-	-	-	-	-	Ongoing rainfall caused surface water flow continuously over the well. Well could not be
CSM_BH14S	Event 54 - Mar 2023	15/03/2023	3.135	5.645	0.11	319	6.48	46.5	23.7	Pale brown tinge, no sediment, no odour/sheen.
CSM_BH14S	Event 55 - Apr 2023	19/04/2023	3.140	5.640	-	-	-	-	-	GAUGING ONLY
CSM_BH14S	Event 56 - May 2023	23/05/2023	3.13	5.645	-	-	-	-	-	GAUGING ONLY
SRT_BH047	Event 49 - Oct 2022	07/10/2022	3.200	7.040	-	-	-	-	-	GAUGING ONLY
SRT_BH047	Event 50 - Nov 2022	02/11/2022	4.010	7.050	2.62	158.2	5.76	159.8	18.8	Slight yellow tinge, mostly clear, no sediment, no odour/sheen.
SRT_BH047	Event 51 - Dec 2022	08/12/2022	4.295	7.050	-	-	-	-	-	GAUGING ONLY
SRT_BH047	Event 52 - Jan 2023	13/01/2023	3.960	7.050	-	-	-	-	-	GAUGING ONLY
SRT_BH047	Event 53 - Feb 2023	13/02/2023	3.750	7.010	3.12	144	4.44	89.3	20.9	Clear, no odour/sheen. Poor recharge.
SRT_BH047	Event 54 - Mar 2023	15/03/2023	4.165	7.060	-	-	-	-	-	GAUGING ONLY
SRT_BH047	Event 55 - Apr 2023	19/04/2023	3.970	7.040	-	-	-	-	-	GAUGING ONLY
SRT_BH047	Event 56 - May 2023	23/05/2023	3.98	7.05	-	-	-	-	-	GAUGING ONLY
SRT_BH050	Event 49 - Oct 2022	07/10/2022	2.415	2.740	-	-	-	-	-	GAUGING ONLY
SRT_BH050	Event 50 - Nov 2022	02/11/2022	2.435	2.760	-	-	-	-	-	Grab sample collected due to low water volume available. No parameters recorded.
SRT_BH050	Event 51 - Dec 2022	08/12/2022	DRY	2.770	-	-	-	-	-	GAUGING ONLY
SRT_BH050	Event 52 - Jan 2023	13/01/2023	2.485	2.780	-	-	-	-	-	GAUGING ONLY
SRT_BH050	Event 53 - Feb 2023	13/02/2023	2.410	2.770	-	-	-	-	-	Grab sample collected due to lower water available. No parameters recorded.
SRT_BH050	Event 54 - Mar 2023	15/03/2023	2.673	2.758	-	-	-	-	-	GAUGING ONLY
SRT_BH050	Event 55 - Apr 2023	19/04/2023	2.470	2.760	-	-	-	-	-	GAUGING ONLY
SRT_BH050	Event 56 - May 2023	23/05/2023	2.47	2.76	-	-	-	-	-	GAUGING ONLY
SRT_BH052	Event 49 - Oct 2022	07/10/2022	5.780	7.925	-	-	-	-	-	GAUGING ONLY
SRT_BH052	Event 50 - Nov 2022	02/11/2022	5.835	7.900	4.79	282	5.73	183.8	19	Pale brown tinge, mostly clear, no sediment, no odour/sheen.
SRT_BH052	Event 51 - Dec 2022	08/12/2022	6.130	7.885	-	-	-	-	-	GAUGING ONLY
SRT_BH052	Event 52 - Jan 2023	13/01/2023	6.145	7.880	-	-	-	-	-	GAUGING ONLY
SRT_BH052	Event 53 - Feb 2023	13/02/2023	5.992	7.920	4.02	257	4.9	88	21	Clear, no odour/sheen. Poor recharge.
SRT_BH052	Event 54 - Mar 2023	15/03/2023	6.070	7.925	-	-	-	-	-	GAUGING ONLY
SRT_BH052	Event 55 - Apr 2023	19/04/2023	6.140	7.890	-	-	-	-	-	GAUGING ONLY
SRT_BH052	Event 56 - May 2023	23/05/2023	6.195	7.93	-	-	-	-	-	GAUGING ONLY



Appendix B
Table B6
Groundwater Aggressivity Comparison Table - Steel Piles

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Well ID	Date Measured	pH (Field)	pH (Lab)	Sulfate (mg/L)	Chloride (mg/L)	Soil Condition A	Soil Condition B	Aquifer
						high permeability soil (sand, gravel) that are in groundwater	low permeability soils (silt and clay) or all soils above groundwater	Table 6.4.2 C in AS2159
CSM_BH02	03/11/2022	6.26	6.8	29	93	Non-aggressive	Non-aggressive	Deep
CSM_BH02	13/02/2023	6.17	6.7	26	46	Non-aggressive	Non-aggressive	Deep
CSM_BH04	03/11/2022	5.75	5.9	39	71	Non-aggressive	Non-aggressive	Off-site deep
CSM_BH04	13/02/2023	5.32	6.3	35	53	Non-aggressive	Non-aggressive	Off-site deep
CSM_BH06	04/11/2022	6.68	6.6	27	210	Non-aggressive	Non-aggressive	Off-site deep
CSM_BH06	15/03/2023	6.11	7.4	24	220	Non-aggressive	Non-aggressive	Off-site deep
CSM_BH10S	02/11/2022	5.48	5.8	61	21	Non-aggressive	Non-aggressive	Off-site shallow
CSM_BH10S	13/02/2023	4.75	5.7	50	20	Non-aggressive	Non-aggressive	Off-site shallow
CSM_BH12S	02/11/2022	6.05	6.1	180	61	Non-aggressive	Non-aggressive	Shallow
CSM_BH12S	15/03/2023	5.57	7.1	110	65	Non-aggressive	Non-aggressive	Shallow
CSM_BH13	04/11/2022	6.61	6.9	26	220	Non-aggressive	Non-aggressive	Off-site deep
CSM_BH13	14/02/2023	5.67	6.3	20	210	Non-aggressive	Non-aggressive	Off-site deep
CSM_BH14S	02/11/2022	7.19	7.3	2.7	16	Non-aggressive	Non-aggressive	Off-site shallow
CSM_BH14S	15/03/2023	6.48	7.1	23	18	Non-aggressive	Non-aggressive	Off-site shallow
SRT_BH047	02/11/2022	5.76	5.8	20	14	Non-aggressive	Non-aggressive	Shallow
SRT_BH047	13/02/2023	4.44	5.8	15	12	Non-aggressive	Non-aggressive	Shallow
SRT_BH050	02/11/2022	-	4.9	59	13	Mild	Non-aggressive	Shallow
SRT_BH050	13/02/2023	-	4.9	35	8.9	Mild	Non-aggressive	Shallow
SRT_BH052	02/11/2022	5.73	5.8	42	41	Non-aggressive	Non-aggressive	Shallow
SRT_BH052	13/02/2023	4.9	6	17	30	Non-aggressive	Non-aggressive	Shallow



Appendix B
Table B7
Groundwater Aggressivity Comparison Table - Concrete Piles

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Well ID	Date Measured	pH (Field)	pH (Lab)	Sulfate (mg/L)	Chloride (mg/L)	Soil Condition A	Soil Condition B	Aquifer
						high permeability soil (sand, gravel) that are in groundwater	low permeability soils (silt and clay) or all soils above groundwater	Table 6.4.2 C in AS2159
CSM_BH02	03/11/2022	6.26	6.8	29	93	Mild	Non-aggressive	Deep
CSM_BH02	13/02/2023	6.17	6.7	26	46	Mild	Non-aggressive	Deep
CSM_BH04	03/11/2022	5.75	5.9	39	71	Mild	Non-aggressive	Off-site deep
CSM_BH04	13/02/2023	5.32	6.3	35	53	Mild	Non-aggressive	Off-site deep
CSM_BH06	04/11/2022	6.68	6.6	27	210	Mild	Non-aggressive	Off-site deep
CSM_BH06	15/03/2023	6.11	7.4	24	220	Mild	Non-aggressive	Off-site deep
CSM_BH10S	02/11/2022	5.48	5.8	61	21	Moderate	Mild	Off-site shallow
CSM_BH10S	13/02/2023	4.75	5.7	50	20	Moderate	Mild	Off-site shallow
CSM_BH12S	02/11/2022	6.05	6.1	180	61	Mild	Non-aggressive	Shallow
CSM_BH12S	15/03/2023	5.57	7.1	110	65	Mild	Non-aggressive	Shallow
CSM_BH13	04/11/2022	6.61	6.9	26	220	Mild	Non-aggressive	Off-site deep
CSM_BH13	14/02/2023	5.67	6.3	20	210	Mild	Non-aggressive	Off-site deep
CSM_BH14S	02/11/2022	7.19	7.3	2.7	16	Mild	Non-aggressive	Off-site shallow
CSM_BH14S	15/03/2023	6.48	7.1	23	18	Mild	Non-aggressive	Off-site shallow
SRT_BH047	02/11/2022	5.76	5.8	20	14	Mild	Non-aggressive	Shallow
SRT_BH047	13/02/2023	4.44	5.8	15	12	Mild	Non-aggressive	Shallow
SRT_BH050	02/11/2022	-	4.9	59	13	Moderate	Mild	Shallow
SRT_BH050	13/02/2023	-	4.9	35	8.9	Moderate	Mild	Shallow
SRT_BH052	02/11/2022	5.73	5.8	42	41	Mild	Non-aggressive	Shallow
SRT_BH052	13/02/2023	4.9	6	17	30	Mild	Non-aggressive	Shallow



Appendix B
Table B8

Calculated RPD of Groundwater Field Duplicate Samples

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Lab Report Number	938474	938474	RPD	964880	964880	RPD	972852	972852	RPD	938474	ES2239623	RPD	964880	ES2305429	RPD
Field ID	CSM_BH10S	QC01		CSM_BH04	QC01		CSM_BH12S	QC03		CSM_BH14S	QC02		CSM_BH02	QC02	
Sample Date	02-11-22	02-11-22		13-02-23	13-02-23		15-03-23	15-03-23		02-11-22	02-11-22		13-02-23	13-02-23	

ChemName	Units	EQL														
Metals																
Arsenic (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
Cadmium (Filtered)	mg/L	0.0002 : 0.0001 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.0001	0	<0.0002	<0.0001
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
Copper (Filtered)	mg/L	0.001	<0.001	<0.001	0	0.002	<0.001	67	<0.001	<0.001	0	0.004	<0.001	120	<0.001	<0.001
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
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
Nickel (Filtered)	mg/L	0.001	<0.001	<0.001	0	0.008	0.008	0	0.012	0.013	8	<0.001	<0.001	0	0.002	0.001
Zinc (Filtered)	mg/L	0.005	<0.005	<0.005	0	0.011	0.011	0	0.047	0.044	7	<0.005	<0.005	0	<0.005	<0.005
BTEXN																
Benzene	µg/L	1	<1	<1	0	<1	<1	0	<1	<1	0	<1	<1	0	<1	<1
Toluene	µg/L	1 : 2 (Interlab)	<1	<1	0	<1	<1	0	<1	<1	0	<1	<2	0	<1	<2
Ethylbenzene	µg/L	1 : 2 (Interlab)	<1	<1	0	<1	<1	0	<1	<1	0	<1	<2	0	<1	<2
Xylene (o)	µg/L	1 : 2 (Interlab)	<1	<1	0	<1	<1	0	<1	<1	0	<1	<2	0	<1	<2
Xylene (m & p)	µg/L	2	<2	<2	0	<2	<2	0	<2	<2	0	<2	<2	0	<2	<2
Xylene Total	µg/L	3 : 2 (Interlab)	<3	<3	0	<3	<3	0	<3	<3	0	<3	<2	0	<3	<2
Naphthalene (BTEXN suite)	µg/L	10 : 5 (Interlab)	<10	<10	0							<10	<5	0		
TRH - NEPM 2013																
F1 (C6-C10 minus BTEX)	µg/L	20	<20	<20	0	<20	<20	0	<20	<20	0	30	<20	40	<20	<20
C6-C10 Fraction	µg/L	20	<20	<20	0	<20	<20	0	<20	<20	0	30	<20	40	<20	<20
F2 (>C10-C16 minus Naphthalene)	µg/L	50 : 100 (Interlab)	<50	<50	0	<50	<50	0	<50	<50	0	<50	<100	0	<50	<100
>C10-C16 Fraction	µg/L	50 : 100 (Interlab)	<50	<50	0	<50	<50	0	<50	<50	0	<50	<100	0	<50	<100
F3 (>C16-C34 Fraction)	µg/L	100	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100
F4 (>C34-C40 Fraction)	µg/L	100	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100
>C10-C40 (Sum of Total)	µg/L	100	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100
TRH - NEPM 1999																
C6-C9 Fraction	µg/L	20	<20	<20	0	<20	<20	0	<20	<20	0	20	<20	0	<20	<20
C10-C14 Fraction	µg/L	50	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50
C15-C28 Fraction	µg/L	100	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100
C29-C36 Fraction	µg/L	100 : 50 (Interlab)	<100	<100	0	<100	<100	0	<100	<100	0	<100	<50	0	<100	<50
C10-C36 (Sum of Total)	µg/L	100 : 50 (Interlab)	<100	<100	0	<100	<100	0	<100	<100	0	<100	<50	0	<100	<50
PAHs - standard 16																
Acenaphthene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Acenaphthylene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Anthracene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Benz(a)anthracene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Benzo(a)pyrene	µg/L	0.01 : 0.05 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.05	0	<0.01	<0.05
Benzo(b+j)fluoranthene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Benzo(k)fluoranthene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Benzo(g,h,i)perylene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Chrysene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Dibenz(a,h)anthracene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Fluoranthene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Fluorene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Naphthalene-PAH	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Phenanthrene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
Pyrene	µg/L	0.01 : 0.1 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.1
PAHs (Sum of total) - Lab calc	µg/L	0.01 : 0.05 (Interlab)	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.05	0	<0.01	<0.05

*RPDs have only been considered where a concentration is greater than 1 times the EQL.

**Bold indicates high RPDs (Acceptable RPDs for each EQL multiplier range are: 200 (1-10 x EQL); 50 (10-30 x EQL); 50 (> 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



Appendix B
Table B9
Results of Rinsates, Trip Blanks and Trip Spikes

Laing O'Rourke
Central Station Main Works
Groundwater Monitoring

Lab Report Number	938474	964880	972852	938474	964880	972852	938474	964880	972852
Field ID	RB01	RB01	RB01	TRIP BLANK	TB	TRIP BLANK	TRIP SPIKE	TS	TRIP SPIKE
Sampled Date	04-11-22	14-02-23	15-03-23	02-11-22	13-02-23	15-03-23	02-11-22	13-02-23	15-03-23
Sample Type	Rinsate	Rinsate	Rinsate	Trip_B	Trip_B	Trip_B	Trip_S	Trip_S	Trip_S

ChemName	Units	EQL									
BTEXN											
Benzene	µg/L	1				<1	<1	<1	100%	120%	97%
Toluene	µg/L	1				<1	<1	<1	95%	98%	93%
Ethylbenzene	µg/L	1				<1	<1	<1	91%	90%	98%
Xylene (o)	µg/L	1				<1	<1	<1	91%	78%	96%
Xylene (m & p)	µg/L	2				<2	<2	<2	95%	100%	100%
Xylene Total	µg/L	2				<3	<3	<3	92%	87%	97%
Naphthalene (BTEXN suite)	µg/L	5				<10			110%	110%	110%
Metals											
Arsenic	mg/L	0.001	<0.001	<0.001	<0.001						
Arsenic (Filtered)	mg/L	0.001									
Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002						
Cadmium (Filtered)	mg/L	0.0001									
Chromium (III+VI)	mg/L	0.001	<0.001	<0.001	<0.001						
Chromium (III+VI) (Filtered)	mg/L	0.001									
Copper	mg/L	0.001	<0.001	<0.001	<0.001						
Copper (Filtered)	mg/L	0.001									
Lead	mg/L	0.001	<0.001	<0.001	<0.001						
Lead (Filtered)	mg/L	0.001									
Manganese	mg/L	0.005									
Manganese (Filtered)	mg/L	0.005									
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001						
Mercury (Filtered)	mg/L	0.0001									
Nickel	mg/L	0.001	<0.001	<0.001	<0.001						
Nickel (Filtered)	mg/L	0.001									
Zinc	mg/L	0.005	<0.005	<0.005	<0.005						
Zinc (Filtered)	mg/L	0.005									
TRH - NEPM 1999											
C6-C9 Fraction	µg/L	20				<20	<20	<20			
C10-C14 Fraction	µg/L	50									
C15-C28 Fraction	µg/L	100									
C29-C36 Fraction	µg/L	50									
C10-C36 (Sum of Total)	µg/L	50									
TRH - NEPM 2013											
F1 (C6-C10 minus BTEX)	µg/L	20				<20	<20	<20			
C6-C10 Fraction	µg/L	20				<20	<20	<20			
F2 (>C10-C16 minus Naphthalene)	µg/L	50									
>C10-C16 Fraction	µg/L	50									
F3 (>C16-C34 Fraction)	µg/L	100									
F4 (>C34-C40 Fraction)	µg/L	100									
>C10-C40 (Sum of Total)	µg/L	100									

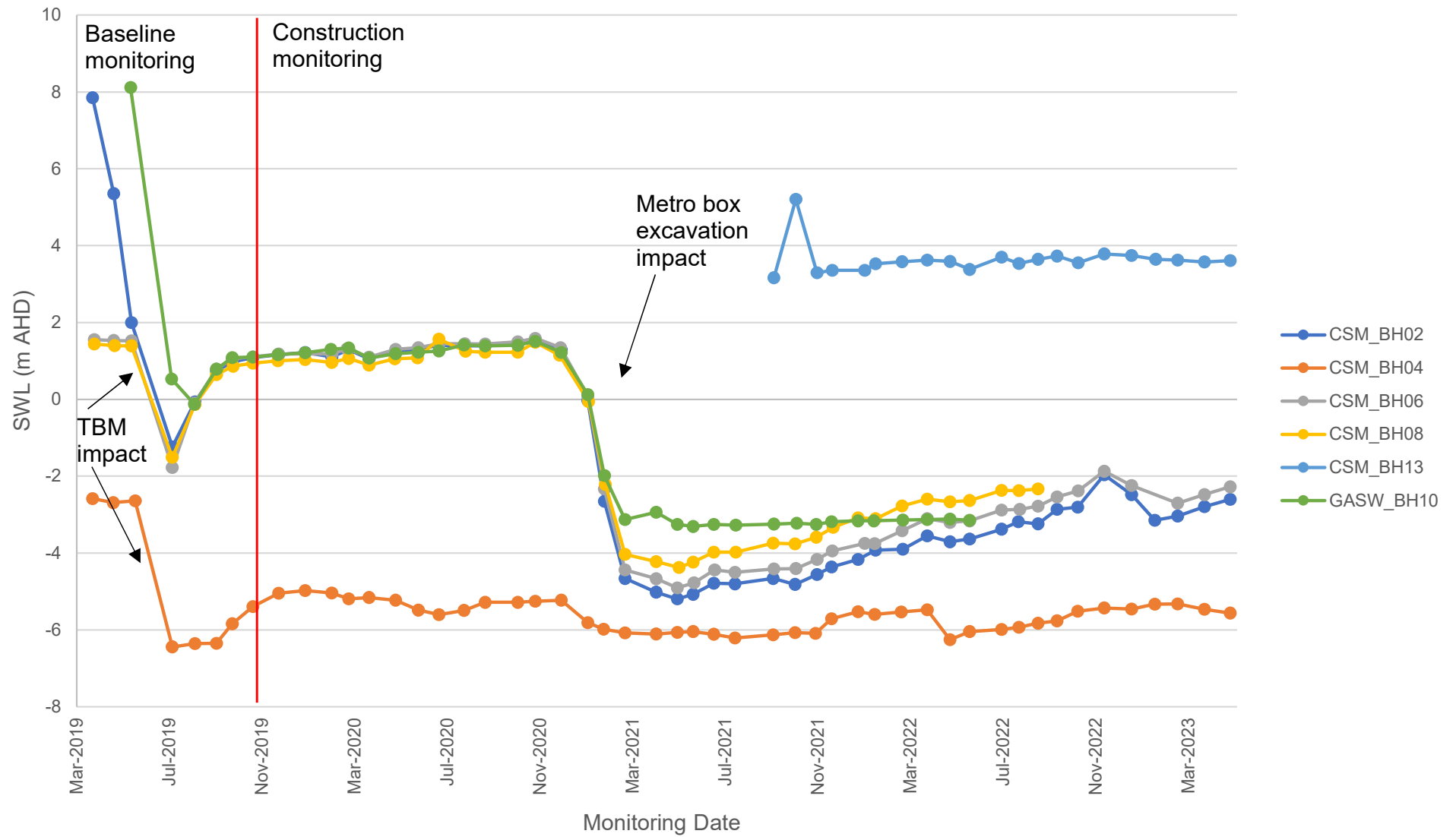


Appendix C

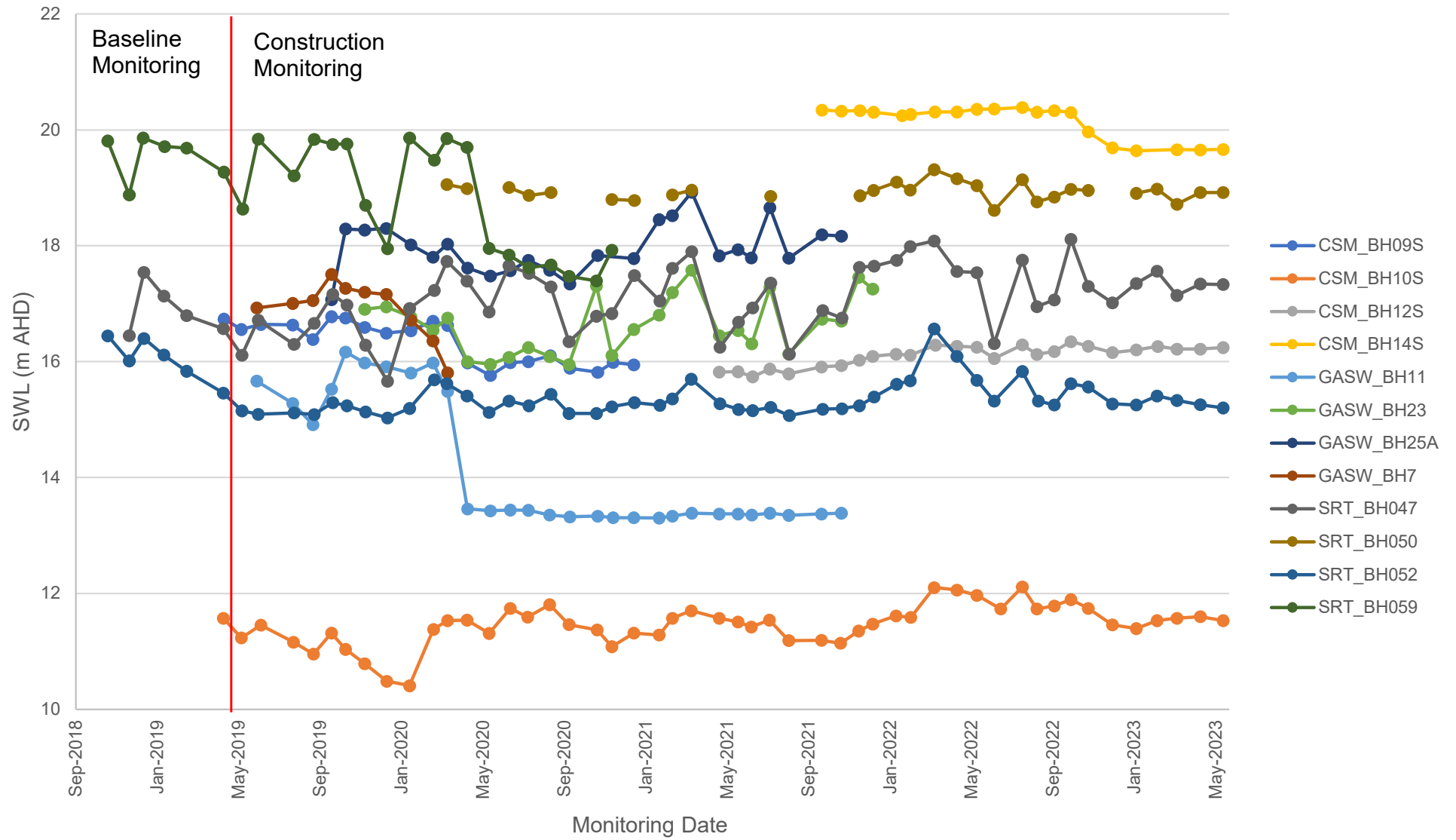
Graphs for groundwater levels and selected analytes / water quality parameters



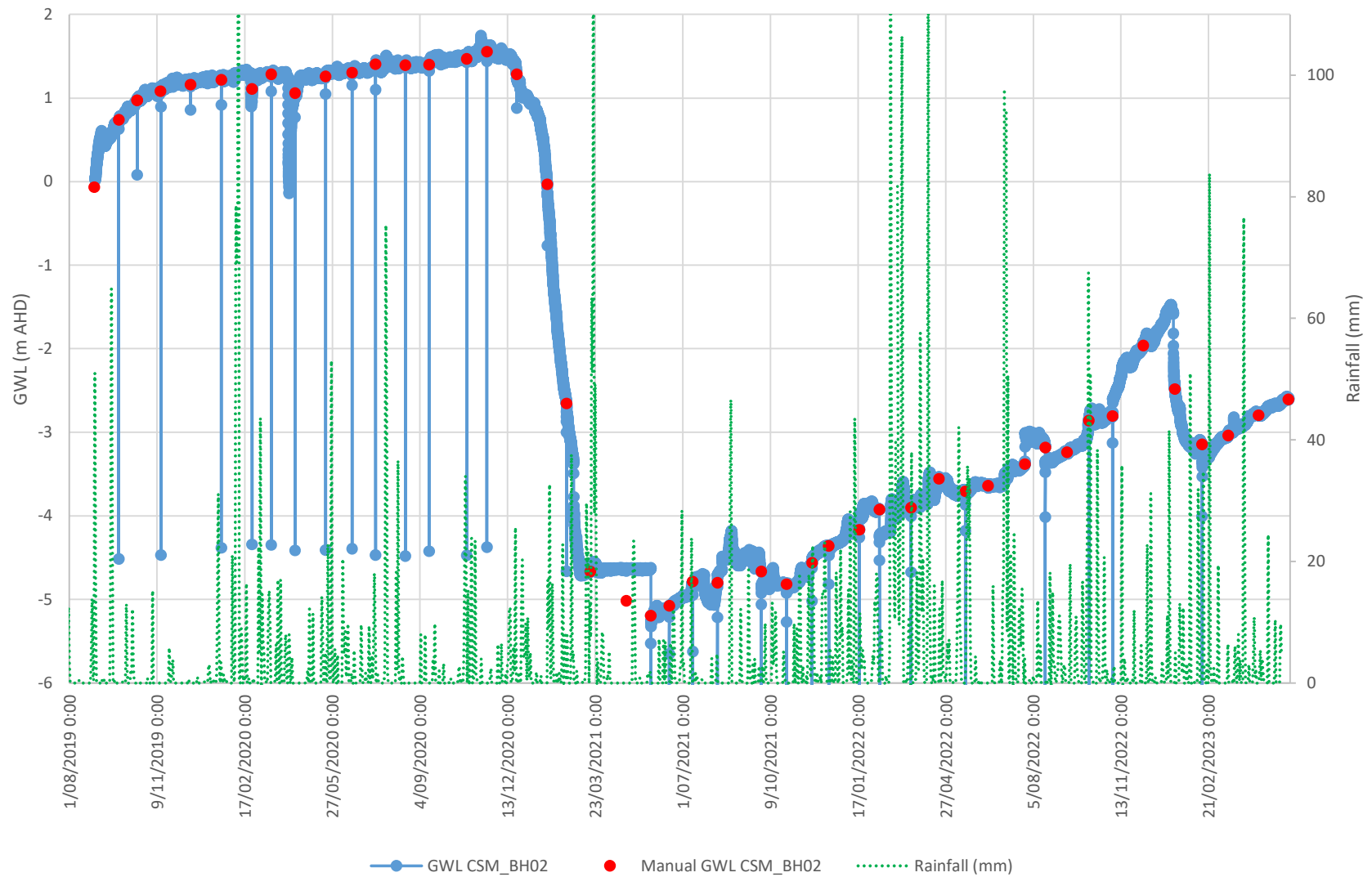
Deep Aquifer Monitoring Wells



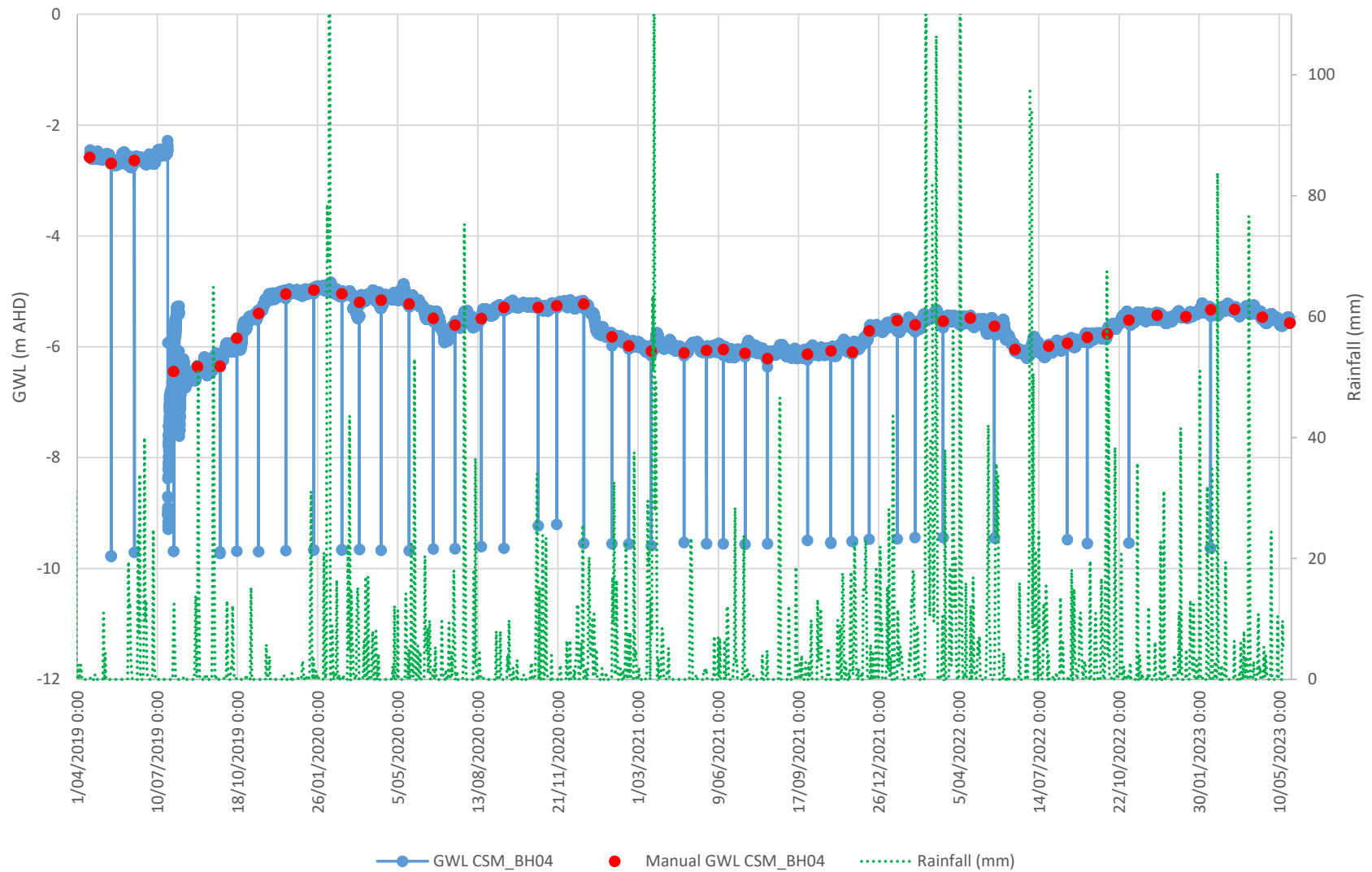
Shallow Aquifer Wells



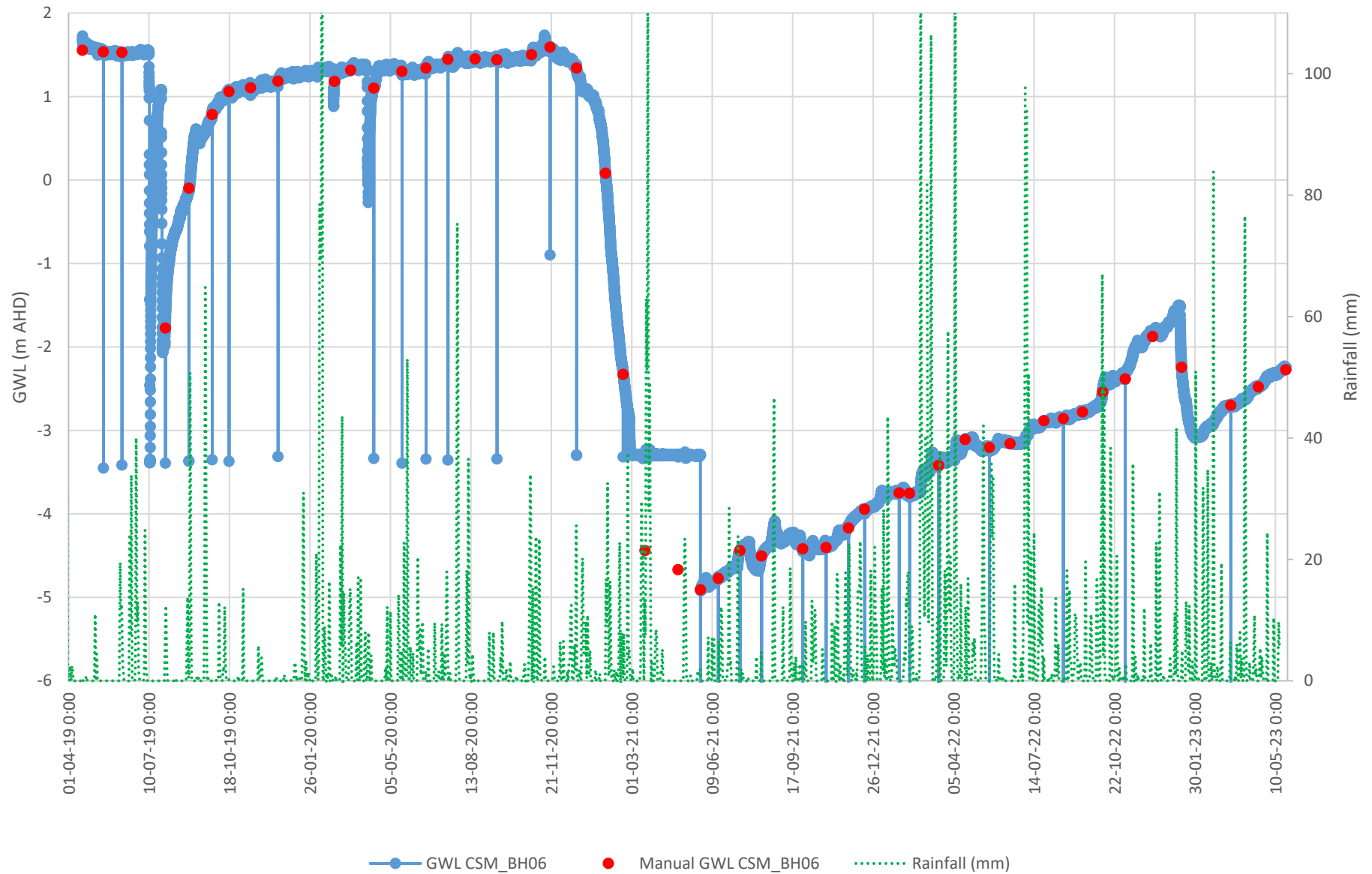
CSM_BH02 - Groundwater Levels - August 2019 to May 2023



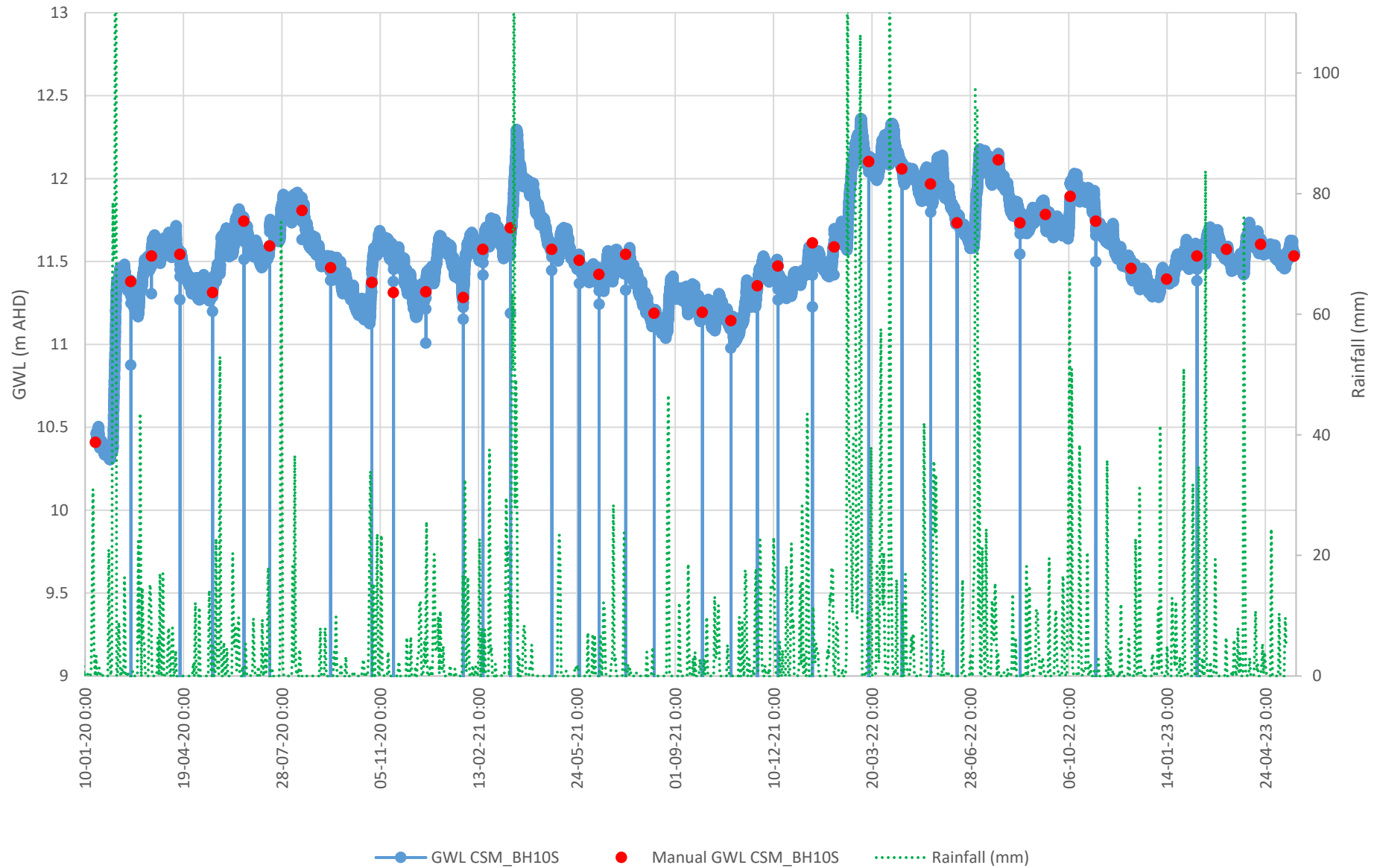
CSM_BH04 - Groundwater Levels - April 2019 to May 2023



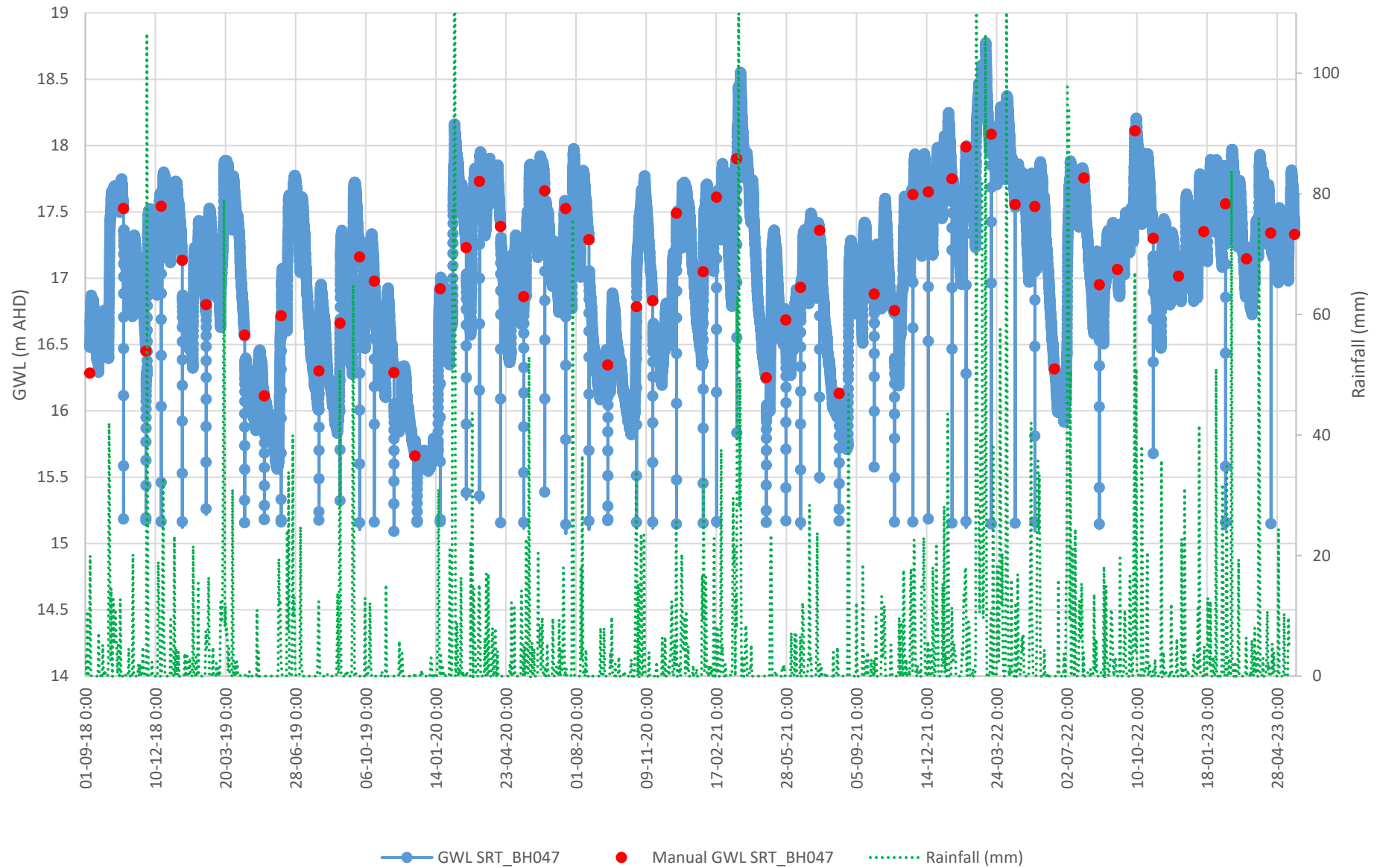
CSM_BH06 - Groundwater Levels - April 2019 to May 2023



CSM_BH10S - Groundwater Levels - January 2020 to May 2023



SRT_BH047 - Groundwater Levels - September 2018 to May 2023





Appendix D

Calibration certificates



airmet

Air-Met Scientific Pty Ltd
1300 137 067

Certificate of Calibration

Calibrated by: _____

Calibration date:

30/09/2022

Next calibration due:

29/11/2022

Oil / Water Interface Meter

Instrument
Serial No.

Geotech Interface Meter (60M)
3963



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: _____ **Dom Ta**

Calibration date: **31/10/2022**

Next calibration due: **31-Dec-22**

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 13D100012



Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad Display	Operation	✓	
	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper	✓	
	Settings	✓	
Software	Version	✓	
Data logger	Operation	✓	
Download	Operation	✓	
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
2. pH 7.00		pH 7.00		386467	pH 7.16
3. pH 4.00		pH 4.00		394432	pH 3.99
4. mV		235.6mV		390802/387761	236.9mV
5. EC		2.76mS		385041	2.761mS
6. D.O		0.0%		379624	0.0%
7. Temp		21.1°C		MultiTherm	20.9°C

Calibrated by: _____ Alex Buist

Calibration date: 01/11/2022

Next calibration due: 02/12/2022

Oil / Water Interface Meter



Air-Met Scientific Pty Ltd
1300 137 067

Instrument **Geotech Interface Meter (60m)**
Serial No. **3954**

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: Lebelle Chee

Calibration date: **24-Nov-22**

Next calibration due: **23-Jan-23**

Oil / Water Interface Meter

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



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

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

Calibrated by: _____ Dom Ta

Calibration date: 20/12/2022

Next calibration due: 18/02/2023

Multi Parameter Water Meter

Instrument **YSI Quatro Pro Plus**
Serial No. **18J104311**



airmet

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad Display	Operation	✓	
	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		393774	pH 6.90
2. pH 4.00		pH 4.00		389384	pH 3.98
3. mV		235.8mV		395557/395763	238.2mV
4. EC		2.76mS		396172	2.740mS
5. D.O		0%		12110	0.20%
6. Temp		22°C		MultiTherm	21.9°C

Calibrated by: Lebelle Chee

Calibration date: **6-Feb-23**

Next calibration due: **5-Aug-23**

Oil / Water Interface Meter

Instrument **Geotech Interface Meter (60M)**
Serial No. **5854**



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: **Izack Muhlbock**

Calibration date: 6-Feb-23

Next calibration due: 7/04/2023

Oil / Water Interface Meter

Instrument **Geotech Interface Meter (60m)**
Serial No. **3954**



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: **Kristyan Corrales**

Calibration date: 02-Mar-23

Next calibration due: 01-May-23

Multi Parameter Water Meter

Instrument **YSI Quatro Pro Plus**
 Serial No. **20M100069**



Air-Met Scientific Pty Ltd
 1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad Display	Operation	✓	
	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		393774	pH 7.02
2. pH 4.00		pH 4.00		394432	pH 4.13
3. EC		2670uS/cm		385789	2759uS/cm
4. D.O		-0.5%		391223	103.9%
5. Temp		22.5 °C		MultiTherm	21.6°C
6. ORP		236.48mV		395557/395763	236.3mV

Calibrated by: **KRISTYAN CORRALES**

Calibration date: **7/03/2023**

Next calibration due: **6/04/2023**

Oil / Water Interface Meter

Instrument: Oil / Water Interface Meter
Serial No: 3963



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: _____ Alex Buist

Calibration date: 29/03/2023

Next calibration due: 29-May-23

Oil / Water Interface Meter

Instrument: **Geotech Interface**
Serial No: **3963**



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: _____ Dom Ta

Calibration date: 28/04/2023

Next calibration due: 28-Jun-23



Appendix E

Groundwater purging sheets





Groundwater Gauging Sheet

Client: Laing O'Rourke / Sydney Metro	WL Meter Type: Int.Fce
Project: Central Station Main Works	Date: 07/10/2022
Job No.: 2127234	Time:
Location: Central Station, Sydney NSW	Sampler: T. Nham / E. Smith

[illegible]



Purging and Sampling Record

Bore ID: CSM_BH02

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro	Purge Method: Micropurge	SWL(mbTOC): 24.23 m	Logic Check: Yes		
Project: Central Station Main Works	Sample Method: Low flow	Screen: From _____ to _____			
Proj. No.: 2127234	WQ Meter Type: YSI	NAPL Check: not present	Stick Up: _____ m		
Sampler: E. Smith / T. Nham	Flow Cell: _____	Pump Depth: 29 m	Ref.datum: TOC	Bore Diam.: 50 mm	
Date: 03/11/2022	WLevel Meter Type: Int.Fce	Bore Depth: 32.56 m	Well Cap Secure? Yes		
Round: November 2022	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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
10:18	2	20.3	7.4	689	1.55	-41.6	24.82	Pale brown, very cloudy, no odour/sheen.
10:21	3	20.3	6.68	686	2.08	79.1	25.06	
10:24	4	20.3	6.11	683	2.31	115.3	25.28	
10:27	5	20.3	6.88	680	2.38	133	25.38	
10:30	6	20.3	6.68	678	2.34	145.2	25.51	
10:33	7	20.3	6.56	677	2.3	155.3	25.62	
10:36	8	20.3	6.34	675	2.24	160.9	25.77	
10:39	9	20.3	6.3	676	2.24	169.3	25.92	
10:42	10	20.3	6.26	682	2.18	108.3	26.31	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 9
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: CSM_BH04

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro	Purge Method: Micropurge	SWL(mbTOC): 21.33 m	Logic Check: Yes		
Project: Central Station Main Works	Sample Method: Low flow	Screen: From _____ to _____			
Proj. No.: 2127234	WQ Meter Type: YSI	NAPL Check: _____	Stick Up: _____ m		
Sampler: E. Smith / T. Nham	Flow Cell: _____	Pump Depth: 29 m	Ref.datum: TOC	Bore Diam.: 50 mm	
Date: 03/11/2022	WLevel Meter Type: Int.Fce	Bore Depth: 32.72 m	Well Cap Secure? Yes		
Round: November 2022	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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
9:01	1	20.1	6.46	515	0.64	63.4	21.51	Pale brown, very cloudy, no odour/sheen.
9:04	2	20.1	5.96	515	0.8	89.2	21.58	
9:07	3	20.2	5.79	502	2.99	103.9	21.64	
9:10	4	20.2	5.75	495	3.7	108.2	21.66	
9:13	5	20.3	5.73	482.2	4.03	111.7	21.69	
9:16	6	20.3	5.73	475.3	4.01	112.5	21.72	Pale brown, very cloudy, no odour/sheen.
9:19	7	20.3	5.74	467.4	3.93	113.2	21.73	
9:22	8	20.3	5.75	463.3	3.95	112.9	21.74	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 9
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: CSM_BH06

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro	Purge Method: Micropurge	SWL(mbTOC): 24.315 m	Logic Check: Yes		
Project: Central Station Main Works	Sample Method: Low flow	Screen: From to			
Proj. No.: 2127234	WQ Meter Type: YSI	NAPL Check: not present	Stick Up:	m	
Sampler: E. Smith / T. Nham	Flow Cell:	Pump Depth: 32 m	Ref.datum: TOC	Bore Diam.:	50 mm
Date: 04/11/2022	WLevel Meter Type: Int.Fce	Bore Depth: 35.18 m	Well Cap Secure?	Yes	
Round: November 2022	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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
10:04	1	20.9	6.68	939	0.42	30.3	24.34	Orange-brown, very cloudy, no odour/sheen
10:07	2	21.1	6.69	943	0.58	29.6	24.38	
10:10	3	21	6.7	943	0.95	30.3	24.38	
10:13	4	21.1	6.69	945	1.07	30.4	24.38	
10:16	5	21.1	6.69	946	1.28	28.3	24.38	Orange-brown, very cloudy, no odour/sheen
10:19	6	21.1	6.78	947	1.31	28.6	24.38	
10:22	7	21.2	6.67	947	1.36	28	24.38	
10:25	8	21.2	6.68	947	1.39	28.2	24.38	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 9
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: CSM_BH10S

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro	Purge Method: Peri pump	SWL(mbTOC): 3.84 m	Logic Check: Yes		
Project: Central Station Main Works	Sample Method: Peri pump	Screen: From _____ to _____			
Proj. No.: 2127234	WQ Meter Type: YSI	NAPL Check: not present	Stick Up: _____ m		
Sampler: E. Smith / T. Nham	Flow Cell: _____	Pump Depth: 3.9m	Ref.datum: TOC	Bore Diam.: 50 mm	
Date: 02/11/2022	WLevel Meter Type: Int.Fce	Bore Depth: 9.7 m	Well Cap Secure? Yes		
Round: November 2022	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 TOC)	Comment:
11:56								Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
11:59	1	20.5	5.5	240	0.1	134.7	4.11	Yellow-brown, some sediment, very cloudy, non-transparent.
12:02	2	20.5	5.5	239	0.59	123.2	4.23	No odour/sheen.
12:05	3	20.5	5.51	239.8	0.82	119	4.25	
12:08	4	20.6	5.51	239.6	1.05	116.1	4.28	
12:11	5	20.6	5.48	239	1.2	113	4.32	
12:14	6	20.5	5.47	237.8	1.33	109.4	4.34	
12:17	7	20.6	5.48	237.4	1.42	108.3	4.36	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 14
COC updated?	Yes	Dissolved metals	Yes	Total metals	No	

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc	Purge Volumes
QC01 (EF Duplicate dissolved metals, TRH, BTEXN)	Casing Int. Dia (mm) 50 100 150
	Vol (L/m of casing) 2.0 7.9 17.7



Purging and Sampling Record

Bore ID: CSM_BH12S

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro	Purge Method: Peri pump	SWL(mbTOC): 4.46 m	Logic Check: Yes		
Project: Central Station Main Works	Sample Method: Peri pump	Screen: From _____ to _____			
Proj. No.: 2127234	WQ Meter Type: YSI	NAPL Check: not present	Stick Up: _____ m		
Sampler: E. Smith / T. Nham	Flow Cell: _____	Pump Depth: 6.2 m	Ref.datum: TOC	Bore Diam.: 50 mm	
Date: 02/11/2022	WLevel Meter Type: Int.Fce	Bore Depth: 6.51 m	Well Cap Secure? Yes		
Round: November 2022	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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
13:44	0.5	20	5.43	635	2.26	89.8	4.52	Brown-orange tinge, clear, no odour/sheen.
13:47	1	19.9	5.56	628	2.14	82.9	4.52	
13:50	2	20	5.73	637	2.08	74.5	4.52	Red-brown tinge, clear, no odour/sheen.
13:53	3	20	5.81	638	2	69.5	4.54	
13:56	4	19.9	5.93	631	2.03	59.9	4.55	
13:59	5	20	6.01	637	1.93	50.2	4.55	
14:00	6	19.9	6.03	630	1.96	43.8	4.55	
14:03	7	20	6.05	628	2.01	41.6	4.55	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 9
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: CSM_BH13

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro	Purge Method: Micropurge	SWL(mbTOC): 21.9 m	Logic Check: Yes		
Project: Central Station Main Works	Sample Method: Low flow	Screen: From to			
Proj. No.: 2127234	WQ Meter Type: YSI	NAPL Check: not present	Stick Up:	m	
Sampler: E. Smith / T. Nham	Flow Cell:	Pump Depth: 30 m	Ref.datum: TOC	Bore Diam.:	50 mm
Date: 04/11/2022	WLevel Meter Type: Int.Fce	Bore Depth: 33.695 m	Well Cap Secure?	Yes	
Round: November 2022	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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
9:02	1	20.5	6.65	951	0.44	18.8	22.375	Brown, very cloudy, no odour/sheen.
9:05	2	20.5	6.62	950	0.46	14.4	22.61	
9:08	3	20.5	6.6	950	0.56	11.7	22.78	
9:11	4	20.7	6.6	950	0.86	8.2	23.04	
9:14	5	20.7	6.57	950	1.09	5.4	23.33	Brown, very cloudy, no odour/sheen.
9:17	6	20.7	6.6	946	1.2	5.2	23.55	
9:20	7	20.7	6.61	946	1.34	3.7	23.85	
9:23	8	20.7	6.61	947	1.41	1.9	24.04	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 9
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: CSM_BH14S

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro		Purge Method: Peri pump		SWL(mbTOC): 2.83 m	Logic Check: Yes
Project: Central Station Main Works		Sample Method: Peri pump		Screen: From to	
Proj. No.: 2127234		WQ Meter Type: YSI		NAPL Check: not present	Stick Up: m
Sampler: E. Smith / T. Nham		Flow Cell:	Pump Depth: 5.3 m	Ref.datum: TOC	Bore Diam.: 50 mm
Date: 02/11/2022		WLevel Meter Type: Int.Fce		Bore Depth: 5.65 m	Well Cap Secure? Yes
Round: November 2022		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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
12:52	1	20.2	6.53	203.1	1.31	57.3	2.85	Pale orange tinge, mostly clear, no sediment, no odour/sheen.
12:55	2	20.2	6.84	198.3	1.73	30.8	2.85	
12:58	3	20.2	7.08	187.8	2.05	14.9	2.85	
13:01	4	20.2	7.17	180.8	1.89	5.6	2.85	
13:04	5	20.3	7.15	178.7	1.82	3.2	2.85	
13:07	6	20.3	7.19	177.6	1.8	-2	2.85	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	Yes	# Bottles collected 14
COC updated?	Yes	Dissolved metals	Yes	Total metals	No	

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc	Purge Volumes
QC02 (ALS Duplicate dissolved metals, TRH, BTEXN)	Casing Int. Dia (mm) 50 100 150
	Vol (L/m of casing) 2.0 7.9 17.7



Purging and Sampling Record

Bore ID: SRT_BH047

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro	Purge Method: Peri pump	SWL(mbTOC): 4.01 m	Logic Check: Yes		
Project: Central Station Main Works	Sample Method: Peri pump	Screen: From to			
Proj. No.: 2127234	WQ Meter Type: YSI	NAPL Check: not present	Stick Up:	m	
Sampler: E. Smith / T. Nham	Flow Cell:	Pump Depth: 6.8 m	Ref.datum: TOC	Bore Diam.:	50 mm
Date: 02/11/2022	WLevel Meter Type: Int.Fce	Bore Depth: 7.05 m	Well Cap Secure? Yes		
Round: November 2022	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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
10:05	0.5	19	5.73	162.3	3.04	169.6	4.63	Slight yellow tinge, mostly clear, no sediment, no odour/sheen.
10:08	1	18.9	5.71	159.4	3.02	168.4	4.82	
10:11	1.5	18.9	5.7	157.7	2.86	166.4	5.04	
10:14	2	18.8	5.72	157.6	2.58	165.3	5.13	
10:17	2.5	18.8	5.75	157.9	2.61	157.9	5.29	Slight yellow tinge, mostly clear, no sediment, no odour/sheen.
10:20	3	18	5.76	158.1	2.66	160.8	5.38	
10:23	3.5	18.8	5.76	158.2	2.62	159.8	5.47	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 9
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: SRT_BH050

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro	Purge Method: Peri pump	SWL(mbTOC): 2.435 m	Logic Check: Yes		
Project: Central Station Main Works	Sample Method: Grab sample	Screen: From to			
Proj. No.: 2127234	WQ Meter Type: YSI	NAPL Check: not present	Stick Up:	m	
Sampler: E. Smith / T. Nham	Flow Cell:	Pump Depth: 2.7 m	Ref.datum: TOC	Bore Diam.:	50 mm
Date: 02/11/2022	WLevel Meter Type: Int.Fce	Bore Depth: 2.76 m	Well Cap Secure? Yes		
Round: November 2022	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 TOC)	Comment:
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
								Grab sample collected due to low water volume available.
								No parameters recorded.

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 9
COC updated?	Yes	Dissolved metals	No	Total metals	No	

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc	Purge Volumes
Just enough water volume to fill all sample bottles, except non-filtered inorganics was 75% full.	Casing Int. Dia (mm) 50 100 150
	Vol (L/m of casing) 2.0 7.9 17.7



Purging and Sampling Record

Bore ID: SRT_BH052

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro	Purge Method: Peri pump	SWL(mbTOC): 5.835 m	Logic Check: Yes		
Project: Central Station Main Works	Sample Method: Peri pump	Screen: From _____ to _____			
Proj. No.: 2127234	WQ Meter Type: YSI	NAPL Check: not present	Stick Up: _____ m		
Sampler: E. Smith / T. Nham	Flow Cell: _____	Pump Depth: 7.6 m	Ref.datum: TOC	Bore Diam.: 50 mm	
Date: 02/11/2022	WLevel Meter Type: Int.Fce	Bore Depth: 7.9 m	Well Cap Secure? Yes		
Round: November 2022	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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
9:11	0.5	19.1	5.68	292.1	4.84	191.7	6.16	Clear, no sediment, no odour/sheen.
9:15	1	19.1	5.69	284	4.82	192.8	6.24	
9:19	1.5	19	5.69	282.6	4.92	191.2	6.38	Pale brown tinge, mostly clear, no sediment, no odour/sheen.
9:23	2	18.9	5.7	280.2	4.54	188.9	6.49	
9:26	2.5	18.9	5.71	280.9	4.73	187.4	6.55	
9:30	3	18.8	5.72	280.3	4.87	185.6	6.6	
9:33	3.5	19	5.73	282	4.79	183.8	6.66	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 9
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

**WL Meter Type:** Int.Fce

Date: 8-12-2022

Time: _____

Sampler: E. Smith / T. Nham

[illegible]

**WL Meter Type:** Int.Fce

Date: 13/01/2023

Time: _____

Sampler: E. Smith / T. Nham

[illegible]



Purging and Sampling Record

Bore ID: CSM_BH02

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro		Purge Method: Micropurge		SWL(mbTOC): 24.57 m	Logic Check: Yes
Project: Central Station Main Works		Sample Method: Low flow		Screen: From to	
Proj. No.: 2127234		WQ Meter Type: YSI		NAPL Check:	Stick Up: m
Sampler: E. Smith / T. Nham		Flow Cell:	Pump Depth:	Ref.datum: TOC	Bore Diam.: 50 mm
Date: 13-02-2023		WLevel Meter Type: Int.Fce		Bore Depth: 32.590 m	Well Cap Secure? Yes
Round: February 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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
14:36	1	23.3	6.3	444	1.65	73.4	24.95	Extremely silty on bottom of well.
14:39	2	22.9	6.28	441	1.45	76.7	25.11	Brown, very turbid, some sediment load, no odour/sheen.
14:42	3	23	6.22	446	1.43	73.5	25.32	
14:46	4	23	6.2	448	1.51	73	25.33	
14:49	5	22.6	6.18	446	1.56	71.9	25.44	
14:52	6	23.1	6.17	451	1.42	70.9	25.57	Pale brown tinge, clear, no odour/sheen.
14:55	7	22.9	6.16	454	1.34	69.9	25.65	
14:58	8	22.8	6.17	453	1.28	68.9	25.77	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 14
COC updated?	Yes	Dissolved metals	Yes	Total metals	No	

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc	Purge Volumes
QC02 (ALS 2x amber, 2x vials, 1x metals) collected	Casing Int. Dia (mm) 50 100 150
	Vol (L/m of casing) 2.0 7.9 17.7



Purging and Sampling Record

Bore ID: CSM_BH04

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro		Purge Method: Micropurge		SWL(mbTOC): 21.145 m	Logic Check: Yes
Project: Central Station Main Works		Sample Method: Low flow		Screen: From to	
Proj. No.: 2127234		WQ Meter Type: YSI		NAPL Check:	Stick Up: m
Sampler: E. Smith / T. Nham		Flow Cell:	Pump Depth: 25 m	Ref.datum: TOC	Bore Diam.: 50 mm
Date: 13-02-2023		WLevel Meter Type: Int.Fce		Bore Depth: 32.630 m	Well Cap Secure? Yes
Round: February 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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
8:44	1	21.5	5.54	489	1.12	90.2	21.28	Brown-orange, cloudy, no odour/sheen.
8:47	2	21.4	5.33	401.2	1.35	91.1	21.31	Good recharge.
8:50	3	21.4	5.22	383.8	1.61	93.2	21.33	
8:54	4	21.4	5.18	387.2	1.39	94.8	21.35	
8:58	5	21.4	5.16	403.1	1.3	94.8	21.36	
9:01	6	21.3	5.26	422	1.02	93.5	21.41	Pale orange tinge, very cloudy, no odour/sheen.
9:04	7	21.3	5.29	420	1.08	92.1	21.42	
9:07	8	21.3	5.3	419	1.16	91.3	21.41	
9:10	9	21.4	5.32	416	1.35	90.2	21.43	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 14
COC updated?	Yes	Dissolved metals	Yes	Total metals	No	

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc QC01 (EF 2x amber, 2x vials, 1x metals (dissolved)) 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: CSM_BH10S

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro		Purge Method: Peri pump		SWL(mbTOC): 4.05 m	Logic Check: Yes
Project: Central Station Main Works		Sample Method: Low flow		Screen: From to	
Proj. No.: 2127234		WQ Meter Type: YSI		NAPL Check:	Stick Up: m
Sampler: E. Smith / T. Nham		Flow Cell:	Pump Depth: 9.4 m	Ref.datum: TOC	Bore Diam.: 50 mm
Date: 13-02-2023		WLevel Meter Type: Int.Fce		Bore Depth: 9.700 m	Well Cap Secure? Yes
Round: February 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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
9:35	0.5	22.1	4.94	246	0.42	75.2	4.22	Clear, slightly cloudy, no sediment, no odour/sheen.
9:38	1	21.8	4.9	249	0.25	76.5	4.28	Great recharge.
9:41	1.5	21.7	4.84	243	0.24	78.2	4.34	
9:44	2	21.6	4.82	242	0.25	79.1	4.39	Pale orange tinge, slightly cloudy, no sediment, no odour/sheen.
9:47	2.5	21.6	4.81	242	0.27	79.5	4.43	
9:50	3	21.5	4.79	241	0.3	80.2	4.47	
9:53	3.5	21.5	4.76	240	0.34	80.8	4.49	Pale orange tinge, slightly cloudy, no sediment, no odour/sheen.
9:56	4	21.5	4.75	240	0.35	80.8	4.51	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 9
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

Bore ID: CSM_BH12S

Job Information		Sampling Information		Bore Information	
Client:	Laing O'Rourke / Sydney Metro	Purge Method:		SWL(mbTOC):	4.465 m
Project:	Central Station Main Works	Sample Method:		Screen: From	to
Proj. No.:	2127234	WQ Meter Type:		NAPL Check:	
Sampler:	E. Smith / T. Nham	Flow Cell:		Stick Up:	m
Date:	14-02-2023	Pump Depth:		Ref.datum:	TOC
Round	February 2023	WLevel Meter Type:		Bore Depth:	6.500 m
		Field Filtered?		Well Cap Secure?	

[illegible]

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



Purging and Sampling Record

Bore ID: CSM_BH13

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro		Purge Method: Micropurge		SWL(mbTOC): 21.807 m	Logic Check: Yes
Project: Central Station Main Works		Sample Method: Low flow		Screen: From to	
Proj. No.: 2127234		WQ Meter Type: YSI		NAPL Check:	Stick Up: m
Sampler: E. Smith / T. Nham		Flow Cell:	Pump Depth:	Ref.datum: TOC	Bore Diam.: mm
Date: 14-02-2023		WLevel Meter Type: Int.Fce		Bore Depth: 33.670 m	Well Cap Secure? Yes
Round: February 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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
9:55	1	2192	5.75	942	0.53	75.3	22.475	Brown-orange, very cloudy, no sediment, no odour/sheen.
9:58	2	21.2	5.6	940	0.44	77	22.85	
10:01	4	21.2	5.6	938	0.05	76.7	23.5	
10:04	6	21.2	5.66	938	0.09	76.1	23.65	
10:07	8	21.2	5.65	939	0.72	75.4	23.85	Pale orange tinge, no odour/sheen.
10:11	10	21.2	5.67	939	0.8	75	24.12	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 9
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: SRT_BH047

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro		Purge Method: Peri pump		SWL(mbTOC): 3.75 m	Logic Check: Yes
Project: Central Station Main Works		Sample Method: Low flow		Screen: From to	
Proj. No.: 2127234		WQ Meter Type: YSI		NAPL Check:	Stick Up: m
Sampler: E. Smith / T. Nham		Flow Cell:	Pump Depth:	Ref.datum: TOC	Bore Diam.: 50 mm
Date: 13-02-2023		WLevel Meter Type: Int.Fce		Bore Depth: 7.010 m	Well Cap Secure? Yes
Round: February 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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
12:47	0.5	20.9	4.82	146	2.72	79.3	4.4	Pale brown tinge, slightly cloudy, no odour/sheen.
12:50	1	20.9	4.52	144	2.76	81.8	4.58	Poor recharge
12:53	1.5	20.9	4.35	143	2.69	85.8	4.71	Clear, no odour/sheen.
12:56	2	20.9	4.92	154	2.85	88.4	4.81	
12:59	2.5	20.8	4.84	151	2.99	89.3	5.02	
13:02	3	21.1	4.66	147	2.94	90.8	5.21	
13:05	3.5	21.1	4.53	146	2.65	90	5.34	Clear, no odour/sheen.
13:08	4	21	4.4	145	2.69	89.4	5.48	
13:11	4.5	20.9	4.47	144	3.04	89.7	5.61	
13:14	5	21	4.41	144	2.94	89.6	5.67	Clear, no odour/sheen.
13:17	5.5	20.9	4.44	144	3.12	89.3	5.88	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 9
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: SRT_BH050

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro		Purge Method:	Peri pump	SWL(mbTOC): 2.41 m	Logic Check: Yes
Project: Central Station Main Works		Sample Method:	Grab sample	Screen: From to	
Proj. No.: 2127234		WQ Meter Type:	YSI	NAPL Check:	Stick Up: m
Sampler: E. Smith / T. Nham		Flow Cell:	Pump Depth: 2.6 m	Ref.datum: TOC	Bore Diam.: 50 mm
Date: 13-02-2023		WLevel Meter Type:	Int.Fce	Bore Depth: 2.770 m	Well Cap Secure? Yes
Round: February 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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
								Grab sample collected due to lower water available
								No parameters recorded.

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 9
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: SRT_BH052

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro		Purge Method: Peri pump		SWL(mbTOC): 5.992 m	Logic Check: Yes
Project: Central Station Main Works		Sample Method: Low flow		Screen: From to	
Proj. No.: 2127234		WQ Meter Type: YSI		NAPL Check:	Stick Up: m
Sampler: E. Smith / T. Nham		Flow Cell:	Pump Depth: 7.6 m	Ref.datum: TOC	Bore Diam.: 50 mm
Date: 13-02-2023		WLevel Meter Type: Int.Fce		Bore Depth: 7.920 m	Well Cap Secure? Yes
Round: February 2023		Field Filtered? Yes (disposable filter)			

Time 10:59	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µs/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
11:06	0.5	20.9	5.22	281	3.37	81.3	6.315	Pale brown tinge, cloudy, no sediment, no odour/sheen
11:10	1	20.9	4.97	270	3.52	88.3	6.48	Poor recharge
11:14	1.5	20.9	5.04	276	3.8	91.1	6.61	Clear, no odour/sheen.
11:18	2	20.8	4.85	260	4.08	93.1	6.815	
11:23	2.5	21	4.84	257	4.11	90.3	7.01	
11:27	3	21	4.9	257	4.02	88	7.24	Clear, no odour/sheen.
								Parameters stable, samples collected due to dropping SWL.

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 9
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



WL Meter Type: Int.Fce
Date: 15-03-2023
Time:
Sampler: E. Smith / T. Nham



Purging and Sampling Record

Bore ID: CSM_BH06

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro	Purge Method: Micropurge	SWL(mbTOC): 24.63 m	Logic Check: Yes		
Project: Central Station Main Works	Sample Method: Low flow	Screen: From _____ to _____			
Proj. No.: 2127234	WQ Meter Type: YSI	NAPL Check: _____	Stick Up: _____ m		
Sampler: E. Smith / T. Nham	Flow Cell: _____	Pump Depth: _____	Ref.datum: TOC		
Date: 15-03-2023	WLevel Meter Type: IP	Bore Depth: 35.180 m	Bore Diam.: 50 mm		
Round: March 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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
14:54	1	26.9	6.16	976	2.68	62.8	24.65	Red-brown, very cloudy, some sediment, no odour/sheen
15:00	2	26.7	6.15	983	2.52	56.8	24.65	
15:05	3	25.9	6.13	962	1.02	56	24.65	
15:10	4	26.2	6.13	965	0.92	55.7	24.65	Pale orange tinge, clear, no odour/sheen.
15:15	5	26	6.12	962	1.03	58.5	24.65	
15:20	6	25.7	6.12	957	1.15	62.1	24.65	
15:25	7	25.8	6.11	956	1.25	67.3	24.65	Clear, no odour/sheen.
15:30	8	25.8	6.11	958	0.39	73.3	24.65	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 9
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: CSM_BH12S

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro		Purge Method:	Peri pump	SWL(mbTOC): 4.507 m	Logic Check: Yes
Project: Central Station Main Works		Sample Method:	Low flow	Screen: From to	
Proj. No.: 2127234		WQ Meter Type:	YSI	NAPL Check:	Stick Up: m
Sampler: E. Smith / T. Nham		Flow Cell:	Pump Depth: 6.2 m	Ref.datum: TOC	Bore Diam.: 50 mm
Date: 15-03-2023		WLevel Meter Type:	IP	Bore Depth: 6.505 m	Well Cap Secure? Yes
Round: March 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 TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
9:11	0.5	21.1	5.47	602	0.14	53.6	4.56	Pale orange tinge, slightly cloudy, no sediment, no odour/sheen
9:16	1	21.2	5.46	589	0.17	51.4	4.56	
9:20	2	21	5.47	579	0.17	50	4.57	" "
9:24	3	20.8	5.49	573	0.21	46.5	4.58	Clear, no odour/sheen.
9:28	4	21	5.51	572	0.25	41.3	4.58	
9:32	5	20.9	5.57	564	0.26	34.3	4.59	" "
9:36	6	21	5.54	560	0.25	30.4	4.59	
9:39	7	21	5.56	556	0.24	22.3	4.59	" "
9:42	8	20.6	5.57	548	0.23	8.9	4.59	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 14
COC updated?	Yes	Dissolved metals	Yes	Total metals	No	

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

QC03 (EF duplicate) collected

Purge Volumes

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



Purging and Sampling Record

Bore ID: CSM_BH14S

Job Information		Sampling Information		Bore Information	
Client: Laing O'Rourke / Sydney Metro	Purge Method: Peri pump	SWL(mbTOC): 3.135 m	Logic Check: Yes		
Project: Central Station Main Works	Sample Method: Low flow	Screen: From _____ to _____			
Proj. No.: 2127234	WQ Meter Type: YSI	NAPL Check: _____	Stick Up: _____ m		
Sampler: E. Smith / T. Nham	Flow Cell: _____	Pump Depth: 5.3 m	Ref.datum: TOC	Bore Diam.: 50 mm	
Date: 15-03-2023	WLevel Meter Type: IP	Bore Depth: 5.645 m	Well Cap Secure? Yes		
Round: March 2023	Field Filtered? Yes (disposable filter)				

Time	Volume	Temp	pH	Elec.Cond	Dis.Oxygen	Ox-Red Pt.	SWL	Comment:
11:30	(L)	(°C)	(pH units)	(µs/cm)	(mg/L)	(± mV)	(m TOC)	Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
11:35	0.5	23.4	6.2	320	0.05	86.5	3.14	Pale brown tinge, no sediment, no odour/sheen.
11:39	1	23.5	6.22	320	0.05	83.1	3.14	
11:42	2	23.4	6.23	320	0.09	81.3	3.14	
11:45	3	23.5	6.28	320	0.09	77.8	3.14	
11:48	4	23.5	6.35	320	0.11	70.1	3.14	" "
11:51	5	23.5	6.42	317	0.1	32.1	3.14	
11:55	6	23.7	6.46	318	0.11	54.5	3.14	
11:58	7	23.7	6.48	319	0.11	46.5	3.14	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 9
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



WL Meter Type: Int.Fce

Date: 19-04-23

Time: 8:30

Sampler: C. Gray / T. Nham

[illegible]



WL Meter Type: Int.Fce
Date: 23-05-23
Time:
Sampler: E. Smith / T. Nham

[illegible]



Appendix F

Laboratory analytical reports

CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Page 1 of 1

Company Name : GHD Pty Ltd, Sydney	Contact Name : Terry Nham	Purchase Order : 2127234	COC Number :
Office Address :	Project Manager : Henry Luo	PROJECT Number : 2127234	Eurofins mgt quote ID : GHD Rates 2022
Level 15, 133 Castlereagh Street, Sydney NSW 2000	Email for results : terry.nham@ghd.com henry.luo@ghd.com emily.smith@ghd.com	PROJECT Name : Central	Data output format: ESDAT

Special Directions & Comments :	Analytes															Some common holding times (with correct preservation). For further information contact the lab			
	TRH, BTEXN, 8 Metals (Dissolved) (Suite B6)	PAH - Trace LOR	Phenols	TRH (with Silica Gel Cleanup)	Cyanide - Trace Level (<0.004 mg/L)	Ammonia	Cation (B11D) and Anion (B11E)	Ferrous Iron	Manganese	pH	TDS	TSS	TRH C6-C10 / BTEX	8 Metals (Total)	Waters		Soils		
															BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days	
															TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days	
															Heavy Metals	6 months	Heavy Metals	6 months	
															Mercury, CrVI	28 days	Mercury, CrVI	28 days	
															Microbiological testing	24 hours	Microbiological testing	72 hours	
															BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days	
															Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours	
															Ferrous iron	7 days	ASLP, TCLP	7 days	

Eurofins | mgt DI water batch number: **50443**

Sample ID	Date	Matrix	TRH, BTEXN, 8 Metals (Dissolved) (Suite B6)	PAH - Trace LOR	Phenols	TRH (with Silica Gel Cleanup)	Cyanide - Trace Level (<0.004 mg/L)	Ammonia	Cation (B11D) and Anion (B11E)	Ferrous Iron	Manganese	pH	TDS	TSS	TRH C6-C10 / BTEX	8 Metals (Total)	Containers:	Sample comments:
1	3/11/22	Water	X	X	X	X	X	X	X	X	X	X	X	X			500P	
2	3/11/22	Water	X	X	X	X	X	X	X	X	X	X	X	X			250P	
3	4/11/22	Water	X	X	X	X	X	X	X	X	X	X	X	X			60P	
4	2/11/22	Water	X	X	X	X	X	X	X	X	X	X	X	X			1LA	
5	2/11/22	Water	X	X	X	X	X	X	X	X	X	X	X	X			40mL vial	
6	2/11/22	Water	X	X	X	X	X	X	X	X	X	X	X	X			200mL A	
7	2/11/22	Water	X	X	X	X	X	X	X	X	X	X	X	X			Jar	
8	2/11/22	Water	X	X	X	X	X	X	X	X	X	X	X	X			Bag	
9	4/11/22	Water	X	X	X	X	X	X	X	X	X	X	X	X				
10	2/11/22	Water	X	X	X	X	X	X	X	X	X	X	X	X				
11	2/11/22	Water	X	X		X	X	X	X	X	X	X	X	X				
12	4/11/22	Water		X						X	X	X	X	X				
13	2/3/22	Water													X			
14	2/11/22	Water													X			
15																		
16																		

Relinquished By: Terry Nham - GHD	Laboratory Staff	Turn around time	Method Of Shipment	Temperature on arrival:
Date & Time : 4/11/2022	Received By: Ren	1 DAY ☐ 2 DAY ☐ 3 DAY ☐	☐ Courier	78°C
Signature: [Signature]	Date & Time : 04/11/22	5 DAY ☒ 10 DAY ☐ Other: ☐	☒ Hand Delivered	Report number:
	Signature: [Signature]		☐ Postal	938474
			Courier Consignment # :	

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Sample Receipt Advice

Company name: GHD Pty Ltd NSW
Contact name: Henry Luo
Project name: CENTRAL
Project ID: 2127234
Turnaround time: 5 Day
Date/Time received: Nov 7, 2022 4:30 PM
Eurofins reference: 938474

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 : 7.8 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.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

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

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 938474-W
Project name CENTRAL
Project ID 2127234
Received Date Nov 07, 2022

Client Sample ID			CSM_BH02	CSM_BH04	CSM_BH06	CSM_BH10S
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22- No0014292	S22- No0014293	S22- No0014294	S22- No0014295
Date Sampled			Nov 03, 2022	Nov 03, 2022	Nov 04, 2022	Nov 02, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	143	137	127	131
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			CSM_BH02	CSM_BH04	CSM_BH06	CSM_BH10S
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22- No0014292	S22- No0014293	S22- No0014294	S22- No0014295
Date Sampled			Nov 03, 2022	Nov 03, 2022	Nov 04, 2022	Nov 02, 2022
Test/Reference	LOR	Unit				
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	27	26	27	26
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total) (after silica-gel clean up)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C14 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total) (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benz(a)anthracene	0.00001	mg/L	< 0.00004	< 0.00001	< 0.00001	< 0.00001
Benzo(a)pyrene - low level	0.00001	mg/L	< 0.00004	< 0.00001	< 0.00001	< 0.00001
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00004	< 0.00001	< 0.00001	< 0.00001
Benzo(g,h,i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00004	< 0.00001	< 0.00001	< 0.00001
Chrysene	0.00001	mg/L	< 0.00004	< 0.00001	< 0.00001	< 0.00001
Dibenz(a,h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluoranthene	0.00001	mg/L	0.00004	< 0.00001	< 0.00001	< 0.00001
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Naphthalene	0.00001	mg/L	< 0.00001	0.00011	< 0.00001	< 0.00001
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Pyrene	0.00001	mg/L	0.00005	< 0.00001	< 0.00001	< 0.00001
Total PAH*	0.00001	mg/L	0.00009	0.00011	< 0.00001	< 0.00001
2-Fluorobiphenyl (surr.)	1	%	96	83	54	110
p-Terphenyl-d14 (surr.)	1	%	123	88	90	134
Ammonia (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Chloride	1	mg/L	93	71	210	21
Cyanide (total) - low level	0.004	mg/L	0.008	< 0.004	0.012	0.007
Ferrous Iron - Fe2+	0.05	mg/L	0.31	3.6	1.3	< 0.05

Client Sample ID			CSM_BH02	CSM_BH04	CSM_BH06	CSM_BH10S
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22-No0014292	S22-No0014293	S22-No0014294	S22-No0014295
Date Sampled			Nov 03, 2022	Nov 03, 2022	Nov 04, 2022	Nov 02, 2022
Test/Reference	LOR	Unit				
pH (at 25 °C)	0.1	pH Units	6.8	5.9	6.6	5.8
Sulphate (as SO ₄)	2	mg/L	29	39	27	61
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	400	310	570	150
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	940	460	28	150
Hardness mg equivalent CaCO ₃ /L	1	mg/L	200	100	250	44
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	250	100	180	26
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10	< 10	< 10	< 10
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	< 20	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	250	100	180	26
Alkali Metals						
Calcium	0.5	mg/L	30	9.6	36	4.9
Magnesium	0.5	mg/L	31	19	38	7.8
Potassium	0.5	mg/L	5.5	3.8	5.3	3.1
Sodium	0.5	mg/L	90	70	120	39
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.002	0.002	0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Manganese (filtered)	0.005	mg/L	0.018	0.30	0.71	0.48
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	0.008	0.002	< 0.001
Zinc (filtered)	0.005	mg/L	0.010	0.037	0.012	< 0.005

Client Sample ID			CSM_BH12S	SRT_BH047	SRT_BH052	SRT_BH050
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22-No0014296	S22-No0014297	S22-No0014298	S22-No0014299
Date Sampled			Nov 02, 2022	Nov 02, 2022	Nov 02, 2022	Nov 02, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1

Client Sample ID			CSM_BH12S	SRT_BH047	SRT_BH052	SRT_BH050
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22- No0014296	S22- No0014297	S22- No0014298	S22- No0014299
Date Sampled			Nov 02, 2022	Nov 02, 2022	Nov 02, 2022	Nov 02, 2022
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	135	136	138	133
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	26	25	25	27
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total) (after silica-gel clean up)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C14 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total) (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benz(a)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(a)pyrene - low level	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Client Sample ID			CSM_BH12S	SRT_BH047	SRT_BH052	SRT_BH050
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22- No0014296	S22- No0014297	S22- No0014298	S22- No0014299
Date Sampled			Nov 02, 2022	Nov 02, 2022	Nov 02, 2022	Nov 02, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (Trace level)						
Benzo(g,h,i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Chrysene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Dibenz(a,h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Indeno(1,2,3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Naphthalene	0.00001	mg/L	< 0.00001	0.00002	0.00002	< 0.00001
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Total PAH*	0.00001	mg/L	< 0.00001	0.00002	0.00002	< 0.00001
2-Fluorobiphenyl (surr.)	1	%	119	96	89	70
p-Terphenyl-d14 (surr.)	1	%	114	65	125	104
Ammonia (as N)	0.01	mg/L	< 0.01	0.03	< 0.01	< 0.01
Chloride	1	mg/L	61	14	41	13
Cyanide (total) - low level	0.004	mg/L	0.006	0.020	0.022	0.020
Ferrous Iron - Fe2+	0.05	mg/L	7.3	0.09	< 0.05	0.11
pH (at 25 °C)	0.1	pH Units	6.1	5.8	5.8	4.9
Sulphate (as SO4)	2	mg/L	180	20	42	59
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	450	110	200	160
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	32	23	170	52
Hardness mg equivalent CaCO3/L	1	mg/L	35	33	36	62
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	46	< 20	< 20	< 20
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10	< 10	< 10	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20	< 20	< 20	< 20
Total Alkalinity (as CaCO3)	20	mg/L	46	< 20	< 20	< 20
Alkali Metals						
Calcium	0.5	mg/L	1.7	4.1	6.6	19
Magnesium	0.5	mg/L	7.4	5.6	4.8	3.8
Potassium	0.5	mg/L	2.4	0.5	1.6	5.7
Sodium	0.5	mg/L	130	18	58	15
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.002	0.012	0.001	0.013
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Manganese (filtered)	0.005	mg/L	0.74	0.011	0.024	0.014
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.022	0.001	< 0.001	< 0.001
Zinc (filtered)	0.005	mg/L	0.075	0.025	0.006	0.013

Client Sample ID Sample Matrix Eurofins Sample No. Date Sampled Test/Reference	LOR	Unit	CSM_BH13 Water S22- No0014300 Nov 04, 2022	CSM_BH14S Water S22- No0014301 Nov 02, 2022	QC01 Water S22- No0014302 Nov 02, 2022	RB01 Water S22- No0014303 Nov 04, 2022
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	0.02	< 0.02	-
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
TRH C6-C10	0.02	mg/L	0.03	0.03	< 0.02	-
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	0.03	0.03	< 0.02	-
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	-
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
4-Bromofluorobenzene (surr.)	1	%	131	134	135	-
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	-	-
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	-	-
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	-	-
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	-	-
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	-	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	-	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	-	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	-	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	-	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	-	-
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	-	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	-	-
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	-	-
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	-	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	-	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	-	-
Total cresols*	0.01	mg/L	< 0.01	< 0.01	-	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	-	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	-	-
Phenol	0.003	mg/L	< 0.003	< 0.003	-	-
Phenol-d6 (surr.)	1	%	27	26	-	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	-	-

Client Sample ID			CSM_BH13	CSM_BH14S	QC01	RB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22- No0014300	S22- No0014301	S22- No0014302	S22- No0014303
Date Sampled			Nov 04, 2022	Nov 02, 2022	Nov 02, 2022	Nov 04, 2022
Test/Reference	LOR	Unit				
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	-	-
TRH >C16-C34 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	-	-
TRH >C34-C40 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	-	-
TRH >C10-C40 (total) (after silica-gel clean up)*	0.1	mg/L	< 0.1	< 0.1	-	-
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C14 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	-	-
TRH C15-C28 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	-	-
TRH C29-C36 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	-	-
TRH C10-C36 (Total) (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	-	-
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benz(a)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(a)pyrene - low level	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(g,h,i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Chrysene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Dibenz(a,h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Fluoranthene	0.00001	mg/L	< 0.00002	< 0.00001	< 0.00001	-
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Indeno(1,2,3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Naphthalene	0.00001	mg/L	0.00004	< 0.00001	< 0.00001	-
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Pyrene	0.00001	mg/L	< 0.00002	< 0.00001	< 0.00001	-
Total PAH*	0.00001	mg/L	0.00004	< 0.00001	< 0.00001	-
2-Fluorobiphenyl (surr.)	1	%	76	63	95	-
p-Terphenyl-d14 (surr.)	1	%	133	104	120	-
Ammonia (as N)	0.01	mg/L	< 0.01	< 0.01	-	-
Chloride	1	mg/L	220	16	-	-
Cyanide (total) - low level	0.004	mg/L	0.012	0.008	-	-
Ferrous Iron - Fe2+	0.05	mg/L	9.2	0.05	-	-
pH (at 25 °C)	0.1	pH Units	6.9	7.3	-	-
Sulphate (as SO4)	2	mg/L	26	2.7	-	-
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	690	100	-	-
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	120	13	-	-
Hardness mg equivalent CaCO3/L	1	mg/L	210	67	-	-
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	120	74	-	-
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10	< 10	-	-
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20	< 20	-	-
Total Alkalinity (as CaCO3)	20	mg/L	120	74	-	-
Alkali Metals						
Calcium	0.5	mg/L	30	21	-	-
Magnesium	0.5	mg/L	34	3.7	-	-
Potassium	0.5	mg/L	4.9	1.6	-	-
Sodium	0.5	mg/L	130	13	-	-

Client Sample ID			CSM_BH13	CSM_BH14S	QC01	RB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S22-No0014300	S22-No0014301	S22-No0014302	S22-No0014303
Date Sampled			Nov 04, 2022	Nov 02, 2022	Nov 02, 2022	Nov 04, 2022
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	0.001	mg/L	-	-	-	< 0.001
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Cadmium	0.0002	mg/L	-	-	-	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	-
Chromium	0.001	mg/L	-	-	-	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Copper	0.001	mg/L	-	-	-	< 0.001
Copper (filtered)	0.001	mg/L	0.001	0.004	< 0.001	-
Lead	0.001	mg/L	-	-	-	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Manganese (filtered)	0.005	mg/L	0.38	< 0.005	-	-
Mercury	0.0001	mg/L	-	-	-	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	-
Nickel	0.001	mg/L	-	-	-	< 0.001
Nickel (filtered)	0.001	mg/L	0.005	< 0.001	< 0.001	-
Zinc	0.005	mg/L	-	-	-	< 0.005
Zinc (filtered)	0.005	mg/L	0.020	< 0.005	< 0.005	-

Client Sample ID			TRIP BLANK	TRIP SPIKE
Sample Matrix			Trip Blank (liquid)	Trip Spike (liquid)
Eurofins Sample No.			S22-No0014304	S22-No0014305
Date Sampled			Nov 02, 2022	Nov 02, 2022
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons				
TRH C6-C9	0.02	mg/L	< 0.02	-
Naphthalene ^{N02}	0.01	mg/L	< 0.01	-
TRH C6-C10	0.02	mg/L	< 0.02	-
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	-
BTEX				
Benzene	0.001	mg/L	< 0.001	-
Toluene	0.001	mg/L	< 0.001	-
Ethylbenzene	0.001	mg/L	< 0.001	-
m&p-Xylenes	0.002	mg/L	< 0.002	-
o-Xylene	0.001	mg/L	< 0.001	-
Xylenes - Total*	0.003	mg/L	< 0.003	-
4-Bromofluorobenzene (surr.)	1	%	87	-
TRH C6-C10	1	%	-	74
Total Recoverable Hydrocarbons				
Naphthalene	1	%	-	110
TRH C6-C9	1	%	-	73
BTEX				
Benzene	1	%	-	100
Ethylbenzene	1	%	-	91
m&p-Xylenes	1	%	-	95
o-Xylene	1	%	-	91

Client Sample ID			TRIP BLANK	TRIP SPIKE
Sample Matrix			Trip Blank (liquid)	Trip Spike (liquid)
Eurofins Sample No.			S22-No0014304	S22-No0014305
Date Sampled			Nov 02, 2022	Nov 02, 2022
Test/Reference	LOR	Unit		
BTEX				
Toluene	1	%	-	95
Xylenes - Total	1	%	-	92
4-Bromofluorobenzene (surr.)	1	%	-	125

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
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Nov 10, 2022	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Nov 10, 2022	7 Days
Total Recoverable Hydrocarbons - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Nov 07, 2022	7 Days
BTEX - Method: LTM-ORG-2010 BTEX and Volatile TRH	Sydney	Nov 10, 2022	14 Days
Eurofins Suite B6 (filtered metals) Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Nov 10, 2022	7 Days
Metals M8 filtered - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Nov 10, 2022	28 Days
Phenols (Halogenated) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Sydney	Nov 10, 2022	7 Days
Phenols (non-Halogenated) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Sydney	Nov 10, 2022	7 Days
TRH - 2013 NEPM Fractions (after silica gel clean-up) - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Nov 10, 2022	7 Days
TRH - 1999 NEPM Fractions (after silica gel clean-up) - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Nov 10, 2022	7 Days
Polycyclic Aromatic Hydrocarbons (Trace level) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water (trace)	Melbourne	Nov 09, 2022	7 Days
Ammonia (as N) - Method: LTM-INO-4200 Ammonia by Discrete Analyser	Sydney	Nov 10, 2022	28 Days
Cyanide (total) - low level - Method: E054 Total Cyanide	Sydney	Nov 10, 2022	14 Days
Ferrous Iron - Fe ²⁺ - Method: LTM-INO-4190 Ferrous Iron in Water by Discrete Analyser	Melbourne	Nov 09, 2022	7 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Nov 10, 2022	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Nov 10, 2022	7 Days
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Nov 07, 2022	28 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Nov 10, 2022	180 Days
Eurofins Suite B11E: Cl/SO ₄ /Alkalinity Chloride - Method: LTM-INO-4270 Anions by Ion Chromatography	Sydney	Nov 10, 2022	28 Days
Sulphate (as SO ₄) - Method: In-house method LTM-INO-4270 Sulphate by Ion Chromatograph	Sydney	Nov 10, 2022	28 Days
Alkalinity (speciated) - Method: LTM-INO-4250 Alkalinity by Electrometric Titration	Melbourne	Nov 09, 2022	14 Days
Total Dissolved Solids Dried at 180 °C ± 2 °C - Method: LTM-INO-4170 Total Dissolved Solids in Water	Sydney	Nov 10, 2022	7 Days
Eurofins Suite B11D: Na/K/Ca/Mg and Hardness Hardness mg equivalent CaCO ₃ /L - Method: E020.1 Hardness in water	Sydney	Nov 14, 2022	28 Days
Alkali Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Nov 14, 2022	180 Days

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

Project Name: CENTRAL
Project ID: 2127234

Order No.: 2127234
Report #: 938474
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Nov 7, 2022 4:30 PM
Due: Nov 14, 2022
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Quinn Raw

Sample Detail						Ammonia (as N)	Cyanide (total) - low level	Ferrous Iron - Fe2+	Manganese (filtered)	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Metals M8	Phenols (Speciated)	TRH (after Silica Gel cleanup)	Eurofins Suite B6 (filtered metals)	BTEXN and Volatile TRH	Eurofins Suite B11E: Cl/SO4/Alkalinity	Eurofins Suite B11D: Na/K/Ca/Mg and Hardness	Polycyclic Aromatic Hydrocarbons (Trace level)	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254								X									X		X	
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X	X	X	X	X		X
External Laboratory																				
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID															
1	CSM BH02	Nov 03, 2022		Water	S22-No0014292	X	X	X	X	X	X		X	X	X		X	X	X	X
2	CSM BH04	Nov 03, 2022		Water	S22-No0014293	X	X	X	X	X	X		X	X	X		X	X	X	X
3	CSM BH06	Nov 04, 2022		Water	S22-No0014294	X	X	X	X	X	X		X	X	X		X	X	X	X
4	CSM BH10S	Nov 02, 2022		Water	S22-No0014295	X	X	X	X	X	X		X	X	X		X	X	X	X
5	CSM BH12S	Nov 02, 2022		Water	S22-No0014296	X	X	X	X	X	X		X	X	X		X	X	X	X
6	SRT BH047	Nov 02, 2022		Water	S22-No0014297	X	X	X	X	X	X		X	X	X		X	X	X	X
7	SRT BH052	Nov 02, 2022		Water	S22-No0014298	X	X	X	X	X	X		X	X	X		X	X	X	X
8	SRT BH050	Nov 02, 2022		Water	S22-No0014299	X	X	X	X	X	X		X	X	X		X	X	X	X
9	CSM BH13	Nov 04, 2022		Water	S22-No0014300	X	X	X	X	X	X		X	X	X		X	X	X	X
10	CSM BH14S	Nov 02, 2022		Water	S22-No0014301	X	X	X	X	X	X		X	X	X		X	X	X	X
11	QC01	Nov 02, 2022		Water	S22-No0014302										X				X	
12	RB01	Nov 04, 2022		Water	S22-No0014303							X								

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

Project Name: CENTRAL
Project ID: 2127234

Order No.: 2127234
Report #: 938474
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Nov 7, 2022 4:30 PM
Due: Nov 14, 2022
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Quinn Raw

Sample Detail						Ammonia (as N)	Cyanide (total) - low level	Ferrous Iron - Fe2+	Manganese (filtered)	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Metals M8	Phenols (Speciated)	TRH (after Silica Gel cleanup)	Eurofins Suite B6 (filtered metals)	BTEXN and Volatile TRH	Eurofins Suite B11E: Cl/SO4/Alkalinity	Eurofins Suite B11D: Na/K/Ca/Mg and Hardness	Polycyclic Aromatic Hydrocarbons (Trace level)	Total Dissolved Solids Dried at 180 °C ± 2 °C	
Melbourne Laboratory - NATA # 1261 Site # 1254								X									X				
Sydney Laboratory - NATA # 1261 Site # 18217						X	X		X	X	X	X	X	X	X	X	X	X		X	
13	TRIP BLANK	Nov 02, 2022		Trip Blank (liquid)	S22-No0014304											X					
14	TRIP SPIKE	Nov 02, 2022		Trip Spike (liquid)	S22-No0014305														X		
Test Counts						10	10	10	10	10	10	1	10	10	11	1	10	10	1	11	10

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

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 (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
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							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2,4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2,4,5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,4,6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4,6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2,4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2,4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Method Blank							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
Method Blank							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH C15-C28 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
TRH C29-C36 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
Method Blank							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Polycyclic Aromatic Hydrocarbons (Trace level)							
Acenaphthene	mg/L	< 0.00001			0.00001	Pass	
Acenaphthylene	mg/L	< 0.00001			0.00001	Pass	
Anthracene	mg/L	< 0.00001			0.00001	Pass	
Benz(a)anthracene	mg/L	< 0.00001			0.00001	Pass	
Benzo(a)pyrene - low level	mg/L	< 0.00001			0.00001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.00001			0.00001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Chrysene	mg/L	< 0.00001			0.00001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.00001			0.00001	Pass	
Fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Fluorene	mg/L	< 0.00001			0.00001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.00001			0.00001	Pass	
Naphthalene	mg/L	< 0.00001			0.00001	Pass	
Phenanthrene	mg/L	< 0.00001			0.00001	Pass	
Pyrene	mg/L	< 0.00001			0.00001	Pass	
Total PAH*	mg/L	-			0.00001	N/A	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Cyanide (total) - low level	mg/L	< 0.004			0.004	Pass	
Sulphate (as SO ₄)	mg/L	< 2			2	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Carbonate Alkalinity (as CaCO ₃)	mg/L	< 10			10	Pass	
Hydroxide Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Total Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
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	
Manganese (filtered)	mg/L	< 0.005			0.005	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	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	93			70-130	Pass	
TRH C10-C14	%	70			70-130	Pass	
Naphthalene	%	99			70-130	Pass	
TRH C6-C10	%	94			70-130	Pass	
TRH >C10-C16	%	126			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	98			70-130	Pass	
Toluene	%	97			70-130	Pass	
Ethylbenzene	%	99			70-130	Pass	
m&p-Xylenes	%	94			70-130	Pass	
o-Xylene	%	96			70-130	Pass	
Xylenes - Total*	%	95			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	87			25-140	Pass	
2,4-Dichlorophenol	%	105			25-140	Pass	
2,4,5-Trichlorophenol	%	115			25-140	Pass	
2,4,6-Trichlorophenol	%	107			25-140	Pass	
2,6-Dichlorophenol	%	103			25-140	Pass	
4-Chloro-3-methylphenol	%	97			25-140	Pass	
Tetrachlorophenols - Total	%	123			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Nitrophenol	%	113			25-140	Pass	
2,4-Dimethylphenol	%	78			25-140	Pass	
2,4-Dinitrophenol	%	121			25-140	Pass	
2-Methylphenol (o-Cresol)	%	74			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	73			25-140	Pass	
4-Nitrophenol	%	45			25-140	Pass	
Phenol	%	40			25-140	Pass	
LCS - % Recovery							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	%	119			70-130	Pass	
LCS - % Recovery							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	%	126			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (Trace level)							
Acenaphthene	%	116			70-130	Pass	
Acenaphthylene	%	115			70-130	Pass	
Anthracene	%	114			70-130	Pass	
Benz(a)anthracene	%	124			70-130	Pass	
Benzo(a)pyrene - low level	%	95			70-130	Pass	
Benzo(b&j)fluoranthene	%	78			70-130	Pass	
Benzo(g,h,i)perylene	%	124			70-130	Pass	
Benzo(k)fluoranthene	%	70			70-130	Pass	
Chrysene	%	102			70-130	Pass	
Dibenz(a,h)anthracene	%	117			70-130	Pass	
Fluoranthene	%	105			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Fluorene			%	119			70-130	Pass	
Indeno(1.2.3-cd)pyrene			%	100			70-130	Pass	
Naphthalene			%	82			70-130	Pass	
Phenanthrene			%	100			70-130	Pass	
Pyrene			%	105			70-130	Pass	
LCS - % Recovery									
Ammonia (as N)			%	103			70-130	Pass	
Chloride			%	98			70-130	Pass	
Cyanide (total) - low level			%	105			70-130	Pass	
Sulphate (as SO4)			%	113			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C			%	101			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C			%	115			70-130	Pass	
LCS - % Recovery									
Alkalinity (speciated)									
Carbonate Alkalinity (as CaCO3)			%	91			70-130	Pass	
Total Alkalinity (as CaCO3)			%	94			70-130	Pass	
LCS - % Recovery									
Alkali Metals									
Calcium			%	98			80-120	Pass	
Magnesium			%	109			80-120	Pass	
Potassium			%	106			80-120	Pass	
Sodium			%	113			80-120	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	91			80-120	Pass	
Arsenic (filtered)			%	101			80-120	Pass	
Cadmium			%	89			80-120	Pass	
Cadmium (filtered)			%	103			80-120	Pass	
Chromium			%	87			80-120	Pass	
Chromium (filtered)			%	89			80-120	Pass	
Copper			%	89			80-120	Pass	
Copper (filtered)			%	89			80-120	Pass	
Lead			%	88			80-120	Pass	
Lead (filtered)			%	96			80-120	Pass	
Manganese (filtered)			%	90			80-120	Pass	
Mercury			%	102			80-120	Pass	
Mercury (filtered)			%	106			80-120	Pass	
Nickel			%	88			80-120	Pass	
Nickel (filtered)			%	88			80-120	Pass	
Zinc			%	88			80-120	Pass	
Zinc (filtered)			%	96			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	S22-No0019101	NCP	%	100			70-130	Pass	
TRH >C10-C16	S22-No0019101	NCP	%	94			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	R22-Oc0060475	NCP	%	76			30-130	Pass	
2.4-Dichlorophenol	R22-Oc0060475	NCP	%	94			30-130	Pass	
2.4.5-Trichlorophenol	R22-Oc0060475	NCP	%	103			30-130	Pass	
2.4.6-Trichlorophenol	R22-Oc0060475	NCP	%	96			30-130	Pass	
2.6-Dichlorophenol	R22-Oc0060475	NCP	%	94			30-130	Pass	
4-Chloro-3-methylphenol	R22-Oc0060475	NCP	%	84			30-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Pentachlorophenol	R22-Oc0060475	NCP	%	115			30-130	Pass	
Tetrachlorophenols - Total	R22-Oc0060475	NCP	%	110			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4,6-dinitrophenol	R22-Oc0060475	NCP	%	121			30-130	Pass	
2-Methyl-4,6-dinitrophenol	R22-Oc0060475	NCP	%	123			30-130	Pass	
2-Nitrophenol	R22-Oc0060475	NCP	%	100			30-130	Pass	
2,4-Dimethylphenol	S22-No0016888	NCP	%	80			30-130	Pass	
2,4-Dinitrophenol	R22-Oc0060475	NCP	%	112			70-130	Pass	
2-Methylphenol (o-Cresol)	S22-No0016888	NCP	%	72			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	S22-No0016888	NCP	%	73			30-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	S22-No0017769	NCP	%	56			70-130	Fail	Q08
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S22-No0001935	NCP	%	95			75-125	Pass	
Magnesium	S22-No0001935	NCP	%	108			75-125	Pass	
Potassium	S22-No0001935	NCP	%	103			75-125	Pass	
Sodium	R22-Oc0046913	NCP	%	116			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S22-No0010383	NCP	%	116			75-125	Pass	
Cadmium (filtered)	S22-No0010383	NCP	%	101			75-125	Pass	
Chromium (filtered)	S22-No0010383	NCP	%	93			75-125	Pass	
Copper (filtered)	S22-No0010383	NCP	%	81			75-125	Pass	
Lead (filtered)	N22-No0012820	NCP	%	99			75-125	Pass	
Manganese (filtered)	N22-No0012820	NCP	%	87			75-125	Pass	
Mercury (filtered)	S22-No0010383	NCP	%	83			75-125	Pass	
Nickel (filtered)	S22-No0010383	NCP	%	83			75-125	Pass	
Spike - % Recovery									
				Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	S22-No0014293	CP	%	107			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chloride	S22-No0014297	CP	%	98			70-130	Pass	
Sulphate (as SO ₄)	S22-No0014297	CP	%	108			70-130	Pass	
Spike - % Recovery									
				Result 1					
Cyanide (total) - low level	S22-No0014298	CP	%	76			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S22-No0001935	NCP	%	116			75-125	Pass	
Cadmium	S22-No0001935	NCP	%	107			75-125	Pass	
Chromium	S22-No0001935	NCP	%	97			75-125	Pass	
Copper	S22-No0001935	NCP	%	88			75-125	Pass	
Lead	S22-No0001935	NCP	%	95			75-125	Pass	
Mercury	S22-No0001935	NCP	%	99			75-125	Pass	
Nickel	S22-No0001935	NCP	%	91			75-125	Pass	
Zinc	S22-No0001935	NCP	%	97			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	S22-No0027055	NCP	mg/L	< 0.02	0.02	9.3	30%	Pass	
TRH C10-C14	S22-Oc0059598	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S22-Oc0059598	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S22-Oc0059598	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Naphthalene	S22-No0027055	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	S22-No0027055	NCP	mg/L	< 0.02	0.02	4.2	30%	Pass	
TRH >C10-C16	S22-Oc0059598	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	S22-Oc0059598	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	S22-Oc0059598	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S22-No0027055	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	S22-No0027055	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	S22-No0027055	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	S22-No0027055	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	S22-No0027055	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	S22-No0027055	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	R22-Oc0060472	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2,4-Dichlorophenol	R22-Oc0060472	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2,4,5-Trichlorophenol	R22-Oc0060472	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2,4,6-Trichlorophenol	R22-Oc0060472	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2,6-Dichlorophenol	R22-Oc0060472	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
4-Chloro-3-methylphenol	R22-Oc0060472	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Pentachlorophenol	R22-Oc0060472	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Tetrachlorophenols - Total	R22-Oc0060472	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4,6-dinitrophenol	R22-Oc0060472	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
2-Methyl-4,6-dinitrophenol	R22-Oc0060472	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Nitrophenol	R22-Oc0060472	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2,4-Dimethylphenol	R22-Oc0060472	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2,4-Dinitrophenol	R22-Oc0060472	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Methylphenol (o-Cresol)	R22-Oc0060472	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	R22-Oc0060472	NCP	mg/L	< 0.006	< 0.006	<1	30%	Pass	
4-Nitrophenol	R22-Oc0060472	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Dinoseb	R22-Oc0060472	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Phenol	R22-Oc0060472	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
TRH - 2013 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD			
TRH >C10-C16 (after silica gel clean-up)	S22-No0001812	NCP	mg/L	0.15	0.15	<1	30%	Pass	
TRH >C16-C34 (after silica gel clean-up)	S22-No0001812	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40 (after silica gel clean-up)	S22-No0001812	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
TRH - 1999 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD			
TRH C10-C14 (after silica gel clean-up)	S22-No0001812	NCP	mg/L	0.13	0.13	4.6	30%	Pass	
TRH C15-C28 (after silica gel clean-up)	S22-No0001812	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36 (after silica gel clean-up)	S22-No0001812	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	

Duplicate								
Polycyclic Aromatic Hydrocarbons (Trace level)				Result 1	Result 2	RPD		
Acenaphthene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Acenaphthylene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Anthracene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benz(a)anthracene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(a)pyrene - low level	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(b&j)fluoranthene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(g,h,i)perylene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(k)fluoranthene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Chrysene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Dibenz(a,h)anthracene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Fluoranthene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Fluorene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Naphthalene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Phenanthrene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Pyrene	L22-No0014900	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Ammonia (as N)	S22-No0010455	NCP	mg/L	2.9	2.7	5.9	30%	Pass
Total Dissolved Solids Dried at 180 °C ± 2 °C	S22-No0014292	CP	mg/L	400	400	1.00	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic (filtered)	S22-No0014292	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium (filtered)	S22-No0014292	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium (filtered)	S22-No0014292	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper (filtered)	S22-No0014292	CP	mg/L	0.002	0.002	16	30%	Pass
Lead (filtered)	S22-No0014292	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Manganese (filtered)	S22-No0014292	CP	mg/L	0.018	0.018	2.6	30%	Pass
Mercury (filtered)	S22-No0014292	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel (filtered)	S22-No0014292	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc (filtered)	S22-No0014292	CP	mg/L	0.010	0.010	1.9	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Total Suspended Solids Dried at 103 °C to 105 °C	S22-No0014293	CP	mg/L	460	380	20	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic (filtered)	S22-No0014293	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium (filtered)	S22-No0014293	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium (filtered)	S22-No0014293	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper (filtered)	S22-No0014293	CP	mg/L	0.002	0.002	<1	30%	Pass
Lead (filtered)	S22-No0014293	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Manganese (filtered)	S22-No0014293	CP	mg/L	0.30	0.30	1.9	30%	Pass
Mercury (filtered)	S22-No0014293	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel (filtered)	S22-No0014293	CP	mg/L	0.008	0.008	5.0	30%	Pass
Zinc (filtered)	S22-No0014293	CP	mg/L	0.037	0.039	5.0	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Chloride	S22-No0014296	CP	mg/L	61	58	5.9	30%	Pass
Sulphate (as SO4)	S22-No0014296	CP	mg/L	180	180	2.1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Cyanide (total) - low level	S22-No0014297	CP	mg/L	0.020	0.020	<1	30%	Pass

Duplicate								
Alkalinity (speciated)				Result 1	Result 2	RPD		
Bicarbonate Alkalinity (as CaCO ₃)	M22-No0016626	NCP	mg/L	38	35	9.0	30%	Pass
Carbonate Alkalinity (as CaCO ₃)	M22-No0016626	NCP	mg/L	< 10	< 10	<1	30%	Pass
Hydroxide Alkalinity (as CaCO ₃)	M22-No0016626	NCP	mg/L	< 20	< 20	<1	30%	Pass
Total Alkalinity (as CaCO ₃)	M22-No0016626	NCP	mg/L	38	35	9.0	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Calcium	S22-No0014301	CP	mg/L	21	21	1.5	30%	Pass
Magnesium	S22-No0014301	CP	mg/L	3.7	3.8	3.5	30%	Pass
Potassium	S22-No0014301	CP	mg/L	1.6	1.7	2.1	30%	Pass
Sodium	S22-No0014301	CP	mg/L	13	14	4.3	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	S22-No0014301	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium	S22-No0014301	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	S22-No0014301	CP	mg/L	< 0.001	0.002	46	30%	Fail
Copper	S22-No0014301	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Lead	S22-No0014301	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Nickel	S22-No0014301	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc	S22-No0014301	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Calcium	S22-No0014303	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass
Magnesium	S22-No0014303	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass
Potassium	S22-No0014303	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	S22-No0014303	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium	S22-No0014303	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	S22-No0014303	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper	S22-No0014303	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Lead	S22-No0014303	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury	S22-No0014303	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	S22-No0014303	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc	S22-No0014303	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass

Comments

Sample Integrity

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

Qualifier Codes/Comments

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

Authorised by:

Quinn Raw	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Charl Du Preez	Senior Analyst-Metal
Dilani Samarakoon	Senior Analyst-Inorganic
Edward Lee	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-Organic
Maria Tian	Senior Analyst-Organic
Raymond Siu	Senior Analyst-Volatile
Roopesh Rangarajan	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Organic
Ryan Phillips	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Page 1 of 1

Company Name : GHD Pty Ltd, Sydney	Contact Name : Terry Nham	Purchase Order : 2127234	COC Number :
Office Address :	Project Manager : Henry Luo	PROJECT Number : 2127234	Eurofins mgt quote ID : GHD Rates 2023
Level 15, 133 Castlereagh Street, Sydney NSW 2000	Email for results : terry.nham@ghd.com henry.luo@ghd.com emily.smith@ghd.com	PROJECT Name : Central	Data output format: ESDAT

				Analytes														Some common holding times (with correct preservation). For further information contact the lab																							
Special Directions & Comments :				TRH, BTEXN, 8 Metals (Dissolved) (Suite B6)	PAH - Trace LOR	Phenols	TRH (with Silica Gel Cleanup)	Cyanide - Trace Level (<0.004 mg/L)	Ammonia	Cation (B11D) and Anion (B11E)	Ferrous Iron	Manganese	pH	TDS	TSS	TRH C6-C10 / BTEX	8 Metals (Total)	Waters					Soils																		
																		BTEX, MAH, VOC					14 days	BTEX, MAH, VOC					14 days												
TRH, PAH, Phenols, Pesticides																		7 days	TRH, PAH, Phenols, Pesticides					14 days																	
Heavy Metals																		6 months	Heavy Metals					6 months																	
Mercury, CrVI																		28 days	Mercury, CrVI					28 days																	
Microbiological testing																		24 hours	Microbiological testing					72 hours																	
BOD, Nitrate, Nitrite, Total N																		2 days	Anions					28 days																	
Solids - TSS, TDS etc																		7 days	SPOCAS, pH Field and FOX, CrS					24 hours																	
Ferrous iron																		7 days	ASLP, TCLP					7 days																	
Eurofins mgt DI water batch number: 50461																																Containers:								Sample comments:	
																		500P	250P	60P	1LA	40mL vial	200mL A	Jar	Bag																
1	CSM_BH02	13/2/23	Water	X	X	X	X	X	X	X	X	X	X	X	X				1		4		2	2																	
2	CSM_BH04	13/2/23	Water	X	X	X	X	X	X	X	X	X	X	X	X				1		4		2	2																	
3	CSM_BH06	13/2/23	Water	X	X	X	X	X	X	X	X	X	X	X	X				1		4		2	2																	
4	CSM_BH10S	13/2/23	Water	X	X	X	X	X	X	X	X	X	X	X	X				1		4		2	2																	
5	CSM_BH12S	13/2/23	Water	X	X	X	X	X	X	X	X	X	X	X	X				1		4		2	2																	
6	SRT_BH047	13/2/23	Water	X	X	X	X	X	X	X	X	X	X	X	X				1		4		2	2																	
7	SRT_BH052	13/2/23	Water	X	X	X	X	X	X	X	X	X	X	X	X				1		4		2	2																	
8	SRT_BH050	13/2/23	Water	X	X	X	X	X	X	X	X	X	X	X	X				1		4		2	2																	
9	CSM_BH13	14/2/23	Water	X	X	X	X	X	X	X	X	X	X	X	X				1		4		2	2																	
10	CSM_BH14S	14/2/23	Water	X	X	X	X	X	X	X	X	X	X	X	X				1		4		2	2																	
11	QC01	13/2/23	Water	X	X																1		2	2																	
12	RB01	14/2/23	Water														X				1																				
13	Trip Blank	13/2/23	Water													X							2																		
14	Trip Spike	13/2/23	Water													X							2																		
15	QC02	13/2/23	Water	Please forward to ALS with attached COC																			1			2	2														
16																																									

Relinquished By: Terry Nham - GHD	Received By: S. Nham	Turn around time	Method Of Shipment	Temperature on arrival: 0.1°C
Date & Time: 14/02/2023	Date & Time: 14/02 7:14pm	1 DAY ☐ 2 DAY ☐ 3 DAY ☐	☐ Courier ☒ Hand Delivered ☐ Postal	Report number: 964880
Signature: [Signature]	Signature: [Signature]	5 DAY ☒ 10 DAY ☐ Other:	Courier Consignment # :	

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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

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

Sample Receipt Advice

Company name:	GHD Pty Ltd NSW
Contact name:	Terry Nham
Project name:	CENTRAL
Project ID:	2127234
Turnaround time:	5 Day
Date/Time received	Feb 14, 2023 7:14 PM
Eurofins reference	964880

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : .1 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✓ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

QC02 sent to ALS.
Samples received by the laboratory after 5.30pm are deemed to have been received the following working day.

Contact

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

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

Results will be delivered electronically via email to Terry Nham - Terry.Nham@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: Terry Nham

Report 964880-W-V2

Project name **CENTRAL**

Project ID **2127234**

Received Date Feb 14, 2023

Client Sample ID			CSM_BH02	CSM_BH04	CSM_BH10S	SRT_BH047
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S23-Fe0042725	S23-Fe0042726	S23-Fe0042727	S23-Fe0042728
Date Sampled			Feb 13, 2023	Feb 13, 2023	Feb 13, 2023	Feb 13, 2023
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	114	115	117	117
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			CSM_BH02	CSM_BH04	CSM_BH10S	SRT_BH047
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S23-Fe0042725	S23-Fe0042726	S23-Fe0042727	S23-Fe0042728
Date Sampled			Feb 13, 2023	Feb 13, 2023	Feb 13, 2023	Feb 13, 2023
Test/Reference	LOR	Unit				
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	40	43	44	44
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total) (after silica-gel clean up)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C14 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total) (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benz(a)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(a)pyrene - low level	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(g,h,i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Chrysene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Dibenz(a,h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Naphthalene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Total PAH*	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
2-Fluorobiphenyl (surr.)	1	%	57	73	76	64
p-Terphenyl-d14 (surr.)	1	%	58	85	115	89
Ammonia (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Chloride	1	mg/L	46	53	20	12
Cyanide (weak acid dissoc.)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Ferrous Iron - Fe2+	0.05	mg/L	0.11	2.5	< 0.05	< 0.05
pH (at 25 °C)	0.1	pH Units	6.7	6.3	5.7	5.8

Client Sample ID			CSM_BH02	CSM_BH04	CSM_BH10S	SRT_BH047
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S23-Fe0042725	S23-Fe0042726	S23-Fe0042727	S23-Fe0042728
Date Sampled			Feb 13, 2023	Feb 13, 2023	Feb 13, 2023	Feb 13, 2023
Test/Reference	LOR	Unit				
Sulphate (as SO ₄)	2	mg/L	26	35	50	15
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	250	310	180	100
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	1800	210	130	23
Hardness mg equivalent CaCO ₃ /L	1	mg/L	100	75	40	30
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	130	84	20	< 20
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10	< 10	< 10	< 10
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	< 20	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	130	84	20	< 20
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	0.002	< 0.001	0.002
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.005	mg/L	1.3	0.54	0.63	0.047
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.002	0.008	0.002	0.002
Zinc (filtered)	0.005	mg/L	< 0.005	0.011	< 0.005	0.016
Alkali Metals						
Calcium	0.5	mg/L	14	7.4	4.6	3.7
Magnesium	0.5	mg/L	16	14	6.9	5.0
Potassium	0.5	mg/L	3.7	3.0	3.0	0.6
Sodium	0.5	mg/L	55	59	34	16

Client Sample ID			SRT_BH052	SRT_BH050	CSM_BH13	QC01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S23-Fe0042729	S23-Fe0042730	S23-Fe0042731	S23-Fe0042732
Date Sampled			Feb 13, 2023	Feb 13, 2023	Feb 14, 2023	Feb 13, 2023
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002

Client Sample ID			SRT_BH052	SRT_BH050	CSM_BH13	QC01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S23-Fe0042729	S23-Fe0042730	S23-Fe0042731	S23-Fe0042732
Date Sampled			Feb 13, 2023	Feb 13, 2023	Feb 14, 2023	Feb 13, 2023
Test/Reference	LOR	Unit				
BTEX						
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	125	114	121	121
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	-
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
Phenol-d6 (surr.)	1	%	34	36	40	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C16-C34 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C34-C40 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C10-C40 (total) (after silica-gel clean up)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C14 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C15-C28 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C29-C36 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C10-C36 (Total) (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benz(a)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(a)pyrene - low level	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(g,h,i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Chrysene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Client Sample ID			SRT_BH052	SRT_BH050	CSM_BH13	QC01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S23-Fe0042729	S23-Fe0042730	S23-Fe0042731	S23-Fe0042732
Date Sampled			Feb 13, 2023	Feb 13, 2023	Feb 14, 2023	Feb 13, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (Trace level)						
Dibenz(a,h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Naphthalene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00002	< 0.00001
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Total PAH*	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00002	< 0.00001
2-Fluorobiphenyl (surr.)	1	%	67	67	85	62
p-Terphenyl-d14 (surr.)	1	%	54	65	76	91
Ammonia (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Chloride	1	mg/L	30	8.9	210	-
Cyanide (weak acid dissoc.)	0.005	mg/L	< 0.005	< 0.005	< 0.005	-
Ferrous Iron - Fe ²⁺	0.05	mg/L	0.06	< 0.05	8.1	-
pH (at 25 °C)	0.1	pH Units	6.0	4.9	6.3	-
Sulphate (as SO ₄)	2	mg/L	17	35	20	-
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	160	140	540	-
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	110	1200	72	-
Hardness mg equivalent CaCO ₃ /L	1	mg/L	29	49	170	-
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	100	-
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10	< 10	< 10	-
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	< 20	-
Total Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	100	-
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	0.002	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.005	mg/L	0.049	0.016	0.46	-
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.001	0.001	0.006	0.008
Zinc (filtered)	0.005	mg/L	0.006	0.015	0.009	0.011
Alkali Metals						
Calcium	0.5	mg/L	5.6	14	24	-
Magnesium	0.5	mg/L	3.6	3.0	28	-
Potassium	0.5	mg/L	1.2	5.1	4.3	-
Sodium	0.5	mg/L	42	14	120	-

Client Sample ID			RB01	TB	TS
Sample Matrix			Water	Trip Blank (liquid)	Trip Spike (liquid)
Eurofins Sample No.			S23-Fe0042733	S23-Fe0042734	S23-Fe0042735
Date Sampled			Feb 14, 2023	Feb 13, 2023	Feb 13, 2023
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons					
TRH C6-C9	0.02	mg/L	-	< 0.02	-
TRH C6-C10	0.02	mg/L	-	< 0.02	-
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	-	< 0.02	-
BTEX					
Benzene	0.001	mg/L	-	< 0.001	-
Toluene	0.001	mg/L	-	< 0.001	-
Ethylbenzene	0.001	mg/L	-	< 0.001	-
m&p-Xylenes	0.002	mg/L	-	< 0.002	-
o-Xylene	0.001	mg/L	-	< 0.001	-
Xylenes - Total*	0.003	mg/L	-	< 0.003	-
4-Bromofluorobenzene (surr.)	1	%	-	123	-
Naphthalene ^{N02}	0.01	mg/L	-	< 0.01	-
TRH C6-C10	1	%	-	-	75
Heavy Metals					
Arsenic	0.001	mg/L	< 0.001	-	-
Cadmium	0.0002	mg/L	< 0.0002	-	-
Chromium	0.001	mg/L	< 0.001	-	-
Copper	0.001	mg/L	< 0.001	-	-
Lead	0.001	mg/L	< 0.001	-	-
Mercury	0.0001	mg/L	< 0.0001	-	-
Nickel	0.001	mg/L	< 0.001	-	-
Zinc	0.005	mg/L	< 0.005	-	-
Total Recoverable Hydrocarbons					
Naphthalene	1	%	-	-	110
TRH C6-C9	1	%	-	-	74
BTEX					
Benzene	1	%	-	-	120
Ethylbenzene	1	%	-	-	90
m&p-Xylenes	1	%	-	-	100
o-Xylene	1	%	-	-	78
Toluene	1	%	-	-	98
Xylenes - Total	1	%	-	-	87
4-Bromofluorobenzene (surr.)	1	%	-	-	123

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
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Mar 01, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Feb 27, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Sydney	Feb 19, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Feb 27, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Eurofins Suite B6 (filtered metals)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Feb 27, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8 filtered	Sydney	Feb 19, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Phenols (Halogenated)	Sydney	Feb 19, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Sydney	Feb 27, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
TRH - 2013 NEPM Fractions (after silica gel clean-up)	Sydney	Feb 27, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 1999 NEPM Fractions (after silica gel clean-up)	Sydney	Feb 27, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons (Trace level)	Melbourne	Feb 26, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water (trace)			
Ammonia (as N)	Sydney	Feb 27, 2023	28 Days
- Method: LTM-INO-4200 Ammonia by Discrete Analyser			
Cyanide (weak acid dissoc.)	Melbourne	Feb 23, 2023	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Ferrous Iron - Fe ²⁺	Melbourne	Feb 23, 2023	7 Days
- Method: LTM-INO-4190 Ferrous Iron in Water by Discrete Analyser			
pH (at 25 °C)	Sydney	Feb 27, 2023	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Feb 27, 2023	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Metals M8	Sydney	Feb 19, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Sydney	Feb 19, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11E: Cl/SO ₄ /Alkalinity			
Chloride	Sydney	Feb 27, 2023	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Sulphate (as SO ₄)	Sydney	Feb 27, 2023	28 Days
- Method: In-house method LTM-INO-4270 Sulphate by Ion Chromatograph			
Alkalinity (speciated)	Melbourne	Feb 23, 2023	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Feb 27, 2023	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Eurofins Suite B11D: Na/K/Ca/Mg and Hardness			
Hardness mg equivalent CaCO ₃ /L	Sydney	Feb 19, 2023	28 Days
- Method: E020.1 Hardness in water			
Alkali Metals	Sydney	Feb 19, 2023	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

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

Project Name: CENTRAL
Project ID: 2127234

Order No.:
Report #: 964880
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Feb 14, 2023 7:14 PM
Due: Feb 22, 2023
Priority: 5 Day
Contact Name: Terry Nham

Eurofins Analytical Services Manager : Quinn Raw

Sample Detail						Ammonia (as N)	Cyanide (weak acid dissoc.)	Ferrous Iron - Fe2+	Manganese	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Metals M8	Phenols (Speciated)	TRH (after Silica Gel cleanup)	Eurofins Suite B6 (filtered metals)	BTEXN and Volatile TRH	Eurofins Suite B11E: Cl/SO4/Alkalinity	Eurofins Suite B11D: Na/K/Ca/Mg and Hardness	Polycyclic Aromatic Hydrocarbons (Trace level)	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254							X	X									X		X	
Sydney Laboratory - NATA # 1261 Site # 18217						X			X	X	X	X	X	X	X	X	X	X		X
External Laboratory																				
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID															
1	CSM BH02	Feb 13, 2023		Water	S23-Fe0042725	X	X	X	X	X	X		X	X	X		X	X	X	X
2	CSM BH04	Feb 13, 2023		Water	S23-Fe0042726	X	X	X	X	X	X		X	X	X		X	X	X	X
3	CSM BH10S	Feb 13, 2023		Water	S23-Fe0042727	X	X	X	X	X	X		X	X	X		X	X	X	X
4	SRT BH047	Feb 13, 2023		Water	S23-Fe0042728	X	X	X	X	X	X		X	X	X		X	X	X	X
5	SRT BH052	Feb 13, 2023		Water	S23-Fe0042729	X	X	X	X	X	X		X	X	X		X	X	X	X
6	SRT BH050	Feb 13, 2023		Water	S23-Fe0042730	X	X	X	X	X	X		X	X	X		X	X	X	X
7	CSM BH13	Feb 14, 2023		Water	S23-Fe0042731	X	X	X	X	X	X		X	X	X		X	X	X	X
8	QC01	Feb 13, 2023		Water	S23-Fe0042732										X				X	
9	RB01	Feb 14, 2023		Water	S23-Fe0042733							X								
10	TB	Feb 13, 2023		Trip Blank (liquid)	S23-Fe0042734											X				
11	TS	Feb 13, 2023		Trip Spike (liquid)	S23-Fe0042735														X	

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

Project Name: CENTRAL
Project ID: 2127234

Order No.:
Report #: 964880
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Feb 14, 2023 7:14 PM
Due: Feb 22, 2023
Priority: 5 Day
Contact Name: Terry Nham

Eurofins Analytical Services Manager : Quinn Raw

Sample Detail	Ammonia (as N)	Cyanide (weak acid dissoc.)	Ferrous Iron - Fe2+	Manganese	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Metals M8	Phenols (Speciated)	TRH (after Silica Gel cleanup)	Eurofins Suite B6 (filtered metals)	BTEXN and Volatile TRH	Eurofins Suite B11D: Na/K/Ca/Mg and Hardness	Eurofins Suite B11E: Cl/SO4/Alkalinity	BTEXN and Volatile TRH	Polycyclic Aromatic Hydrocarbons (Trace level)	Total Dissolved Solids Dried at 180 °C ± 2 °C
		X	X										X		X	
	X			X	X	X	X	X	X	X	X	X	X	X		X
	7	7	7	7	7	7	1	7	7	8	1	7	7	1	8	7
Melbourne Laboratory - NATA # 1261 Site # 1254		X	X										X		X	
Sydney Laboratory - NATA # 1261 Site # 18217	X			X	X	X	X	X	X	X	X	X	X	X		X
Test Counts	7	7	7	7	7	7	1	7	7	8	1	7	7	1	8	7

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

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 (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
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

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2,4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2,4,5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,4,6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4,6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2,4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2,4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Method Blank							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
Method Blank							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH C15-C28 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C29-C36 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons (Trace level)							
Acenaphthene	mg/L	< 0.00001			0.00001	Pass	
Acenaphthylene	mg/L	< 0.00001			0.00001	Pass	
Anthracene	mg/L	< 0.00001			0.00001	Pass	
Benz(a)anthracene	mg/L	< 0.00001			0.00001	Pass	
Benzo(a)pyrene - low level	mg/L	< 0.00001			0.00001	Pass	
Benzo(b&i)fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.00001			0.00001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Chrysene	mg/L	< 0.00001			0.00001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.00001			0.00001	Pass	
Fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Fluorene	mg/L	< 0.00001			0.00001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.00001			0.00001	Pass	
Naphthalene	mg/L	< 0.00001			0.00001	Pass	
Phenanthrene	mg/L	< 0.00001			0.00001	Pass	
Pyrene	mg/L	< 0.00001			0.00001	Pass	
Method Blank							
Chloride	mg/L	< 1			1	Pass	
Ferrous Iron - Fe2+	mg/L	< 0.05			0.05	Pass	
Sulphate (as SO4)	mg/L	< 2			2	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Carbonate Alkalinity (as CaCO3)	mg/L	< 10			10	Pass	
Hydroxide Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Total Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
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	
Manganese	mg/L	< 0.005			0.005	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	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	78			70-130	Pass	
TRH C10-C14	%	79			70-130	Pass	
TRH C6-C10	%	78			70-130	Pass	
TRH >C10-C16	%	80			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	98			70-130	Pass	
Toluene	%	94			70-130	Pass	
Ethylbenzene	%	91			70-130	Pass	
m&p-Xylenes	%	85			70-130	Pass	
o-Xylene	%	92			70-130	Pass	
Xylenes - Total*	%	87			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	95			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	108			25-140	Pass	
2,4-Dichlorophenol	%	120			25-140	Pass	
2,4,5-Trichlorophenol	%	110			25-140	Pass	
2,4,6-Trichlorophenol	%	109			25-140	Pass	
2,6-Dichlorophenol	%	124			25-140	Pass	
4-Chloro-3-methylphenol	%	114			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2,4-Dimethylphenol	%	98			25-140	Pass	
2-Methylphenol (o-Cresol)	%	90			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	86			25-140	Pass	
4-Nitrophenol	%	53			25-140	Pass	
Phenol	%	46			25-140	Pass	
LCS - % Recovery							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	%	88			70-130	Pass	
LCS - % Recovery							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	%	93			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (Trace level)							
Acenaphthene	%	78			70-130	Pass	
Acenaphthylene	%	76			70-130	Pass	
Anthracene	%	81			70-130	Pass	
Benz(a)anthracene	%	120			70-130	Pass	
Benzo(a)pyrene - low level	%	110			70-130	Pass	
Benzo(b&j)fluoranthene	%	101			70-130	Pass	
Benzo(g,h,i)perylene	%	111			70-130	Pass	
Benzo(k)fluoranthene	%	121			70-130	Pass	
Chrysene	%	96			70-130	Pass	
Dibenz(a,h)anthracene	%	116			70-130	Pass	
Fluoranthene	%	83			70-130	Pass	
Fluorene	%	95			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1.2.3-cd)pyrene			%	90			70-130	Pass	
Naphthalene			%	86			70-130	Pass	
Phenanthrene			%	75			70-130	Pass	
Pyrene			%	82			70-130	Pass	
LCS - % Recovery									
Chloride			%	100			70-130	Pass	
Ferrous Iron - Fe2+			%	94			70-130	Pass	
Sulphate (as SO4)			%	102			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C			%	98			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C			%	112			70-130	Pass	
LCS - % Recovery									
Alkalinity (speciated)									
Carbonate Alkalinity (as CaCO3)			%	74			70-130	Pass	
Total Alkalinity (as CaCO3)			%	75			70-130	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	116			80-120	Pass	
Arsenic (filtered)			%	95			80-120	Pass	
Cadmium			%	108			80-120	Pass	
Cadmium (filtered)			%	88			80-120	Pass	
Chromium			%	115			80-120	Pass	
Chromium (filtered)			%	89			80-120	Pass	
Copper			%	113			80-120	Pass	
Copper (filtered)			%	88			80-120	Pass	
Lead			%	110			80-120	Pass	
Lead (filtered)			%	89			80-120	Pass	
Manganese			%	91			80-120	Pass	
Mercury			%	120			80-120	Pass	
Mercury (filtered)			%	100			80-120	Pass	
Nickel			%	114			80-120	Pass	
Nickel (filtered)			%	89			80-120	Pass	
Zinc			%	114			80-120	Pass	
Zinc (filtered)			%	90			80-120	Pass	
LCS - % Recovery									
Alkali Metals									
Calcium			%	84			80-120	Pass	
Magnesium			%	92			80-120	Pass	
Potassium			%	93			80-120	Pass	
Sodium			%	95			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (Trace level)				Result 1					
Acenaphthene	M23-Fe0050613	NCP	%	92			70-130	Pass	
Acenaphthylene	M23-Fe0050613	NCP	%	86			70-130	Pass	
Anthracene	M23-Fe0050613	NCP	%	87			70-130	Pass	
Benz(a)anthracene	M23-Fe0050613	NCP	%	79			70-130	Pass	
Benzo(a)pyrene - low level	M23-Fe0050613	NCP	%	85			70-130	Pass	
Benzo(b&i)fluoranthene	M23-Fe0050613	NCP	%	85			70-130	Pass	
Benzo(g,h,i)perylene	M23-Fe0050613	NCP	%	78			70-130	Pass	
Benzo(k)fluoranthene	M23-Fe0050613	NCP	%	87			70-130	Pass	
Chrysene	M23-Fe0050613	NCP	%	83			70-130	Pass	
Dibenz(a,h)anthracene	M23-Fe0050613	NCP	%	92			70-130	Pass	
Fluoranthene	M23-Fe0050613	NCP	%	95			70-130	Pass	
Fluorene	M23-Fe0050613	NCP	%	91			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1.2.3-cd)pyrene	M23-Fe0050613	NCP	%	75			70-130	Pass	
Naphthalene	M23-Fe0050613	NCP	%	87			70-130	Pass	
Phenanthrene	M23-Fe0050613	NCP	%	94			70-130	Pass	
Pyrene	M23-Fe0050613	NCP	%	95			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	S23-Fe0054971	NCP	%	105			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Fe0053281	NCP	%	118			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	N23-Fe0035536	NCP	%	96			75-125	Pass	
Cadmium (filtered)	N23-Fe0035536	NCP	%	85			75-125	Pass	
Chromium (filtered)	N23-Fe0035536	NCP	%	86			75-125	Pass	
Copper (filtered)	N23-Fe0035536	NCP	%	87			75-125	Pass	
Lead (filtered)	N23-Fe0035536	NCP	%	90			75-125	Pass	
Manganese	R23-Fe0029931	NCP	%	95			75-125	Pass	
Mercury (filtered)	N23-Fe0035536	NCP	%	101			75-125	Pass	
Nickel (filtered)	N23-Fe0035536	NCP	%	87			75-125	Pass	
Zinc (filtered)	S23-Fe0032362	NCP	%	89			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	R23-Fe0029931	NCP	%	87			75-125	Pass	
Magnesium	R23-Fe0029931	NCP	%	92			75-125	Pass	
Potassium	R23-Fe0029931	NCP	%	91			75-125	Pass	
Sodium	R23-Fe0029931	NCP	%	83			75-125	Pass	
Spike - % Recovery									
				Result 1					
Chloride	S23-Fe0042727	CP	%	76			70-130	Pass	
Sulphate (as SO ₄)	S23-Fe0042727	CP	%	102			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	S23-Fe0057065	NCP	%	72			70-130	Pass	
TRH >C10-C16	S23-Fe0057065	NCP	%	77			70-130	Pass	
Spike - % Recovery									
TRH - 2013 NEPM Fractions (after silica gel clean-up)				Result 1					
TRH >C10-C16 (after silica gel clean-up)	S23-Fe0042729	CP	%	74			70-130	Pass	
Spike - % Recovery									
TRH - 1999 NEPM Fractions (after silica gel clean-up)				Result 1					
TRH C10-C14 (after silica gel clean-up)	S23-Fe0042729	CP	%	77			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	R23-Fe0029931	NCP	%	104			75-125	Pass	
Cadmium	R23-Fe0029931	NCP	%	91			75-125	Pass	
Chromium	R23-Fe0029931	NCP	%	93			75-125	Pass	
Copper	R23-Fe0029931	NCP	%	92			75-125	Pass	
Lead	R23-Fe0029931	NCP	%	93			75-125	Pass	
Mercury	R23-Fe0029931	NCP	%	97			75-125	Pass	
Nickel	R23-Fe0029931	NCP	%	92			75-125	Pass	
Zinc	R23-Fe0029931	NCP	%	92			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	S23-Fe0054357	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2,4-Dichlorophenol	S23-Fe0054357	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2,4,5-Trichlorophenol	S23-Fe0054357	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2,4,6-Trichlorophenol	S23-Fe0054357	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2,6-Dichlorophenol	S23-Fe0054357	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
4-Chloro-3-methylphenol	S23-Fe0054357	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Pentachlorophenol	S23-Fe0054357	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Tetrachlorophenols - Total	S23-Fe0054357	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4,6-dinitrophenol	S23-Fe0054357	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
2-Methyl-4,6-dinitrophenol	S23-Fe0054357	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Nitrophenol	S23-Fe0054357	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2,4-Dimethylphenol	S23-Fe0054357	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2,4-Dinitrophenol	S23-Fe0054357	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Methylphenol (o-Cresol)	S23-Fe0054357	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	S23-Fe0054357	NCP	mg/L	< 0.006	< 0.006	<1	30%	Pass	
4-Nitrophenol	S23-Fe0054357	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Dinoseb	S23-Fe0054357	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Phenol	S23-Fe0054357	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	W23-Fe0047808	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Ferrous Iron - Fe2+	M23-Fe0052042	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	S23-Fe0056038	NCP	mg/L	60	60	<1	30%	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Fe0056038	NCP	mg/L	30	29	2.7	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S23-Fe0042871	NCP	mg/L	0.18	0.18	1.2	30%	Pass	
Cadmium (filtered)	S23-Fe0042880	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S23-Fe0042880	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	N23-Fe0035537	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead (filtered)	N23-Fe0035537	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Manganese	R23-Fe0029929	NCP	mg/L	0.036	0.036	1.7	30%	Pass	
Mercury (filtered)	S23-Fe0042880	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S23-Fe0042880	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc (filtered)	N23-Fe0035537	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Potassium	R23-Fe0029929	NCP	mg/L	47	46	<1	30%	Pass	
Duplicate									
Alkalinity (speciated)				Result 1	Result 2	RPD			
Bicarbonate Alkalinity (as CaCO3)	M23-Fe0055152	NCP	mg/L	170	150	10	30%	Pass	
Carbonate Alkalinity (as CaCO3)	M23-Fe0055152	NCP	mg/L	< 20	< 20	<1	30%	Pass	
Hydroxide Alkalinity (as CaCO3)	M23-Fe0055152	NCP	mg/L	< 20	< 20	<1	30%	Pass	
Total Alkalinity (as CaCO3)	M23-Fe0055152	NCP	mg/L	170	150	10	30%	Pass	

Duplicate								
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD		
TRH C10-C14	S23-Fe0052555	NCP	mg/L	0.05	0.06	15	30%	Pass
TRH C15-C28	S23-Fe0052555	NCP	mg/L	0.3	0.2	17	30%	Pass
TRH C29-C36	S23-Fe0052555	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C10-C16	S23-Fe0052555	NCP	mg/L	0.12	0.12	4.9	30%	Pass
TRH >C16-C34	S23-Fe0052555	NCP	mg/L	0.2	0.1	14	30%	Pass
TRH >C34-C40	S23-Fe0052555	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
TRH - 2013 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD		
TRH >C10-C16 (after silica gel clean-up)	S23-Fe0042728	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH >C16-C34 (after silica gel clean-up)	S23-Fe0042728	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C34-C40 (after silica gel clean-up)	S23-Fe0042728	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
TRH - 1999 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD		
TRH C10-C14 (after silica gel clean-up)	S23-Fe0042728	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH C15-C28 (after silica gel clean-up)	S23-Fe0042728	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH C29-C36 (after silica gel clean-up)	S23-Fe0042728	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons (Trace level)				Result 1	Result 2	RPD		
Acenaphthene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Acenaphthylene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Anthracene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benz(a)anthracene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(a)pyrene - low level	M23-Fe0000558	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(b&j)fluoranthene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(g,h,i)perylene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(k)fluoranthene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Chrysene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Dibenz(a,h)anthracene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Fluoranthene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Fluorene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Naphthalene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Phenanthrene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Pyrene	N23-Fe0064253	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD		
TRH C6-C9	S23-Fe0042731	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass
TRH C6-C10	S23-Fe0042731	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass
Duplicate								
BTEX				Result 1	Result 2	RPD		
Benzene	S23-Fe0042731	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Toluene	S23-Fe0042731	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Ethylbenzene	S23-Fe0042731	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
m&p-Xylenes	S23-Fe0042731	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass
o-Xylene	S23-Fe0042731	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Xylenes - Total*	S23-Fe0042731	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	S23-Fe0042731	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass

Duplicate								
				Result 1	Result 2	RPD		
Chloride	S23-Fe0042731	CP	mg/L	210	220	2.2	30%	Pass
Sulphate (as SO ₄)	S23-Fe0042731	CP	mg/L	20	20	2.8	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	S23-Fe0042733	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium	S23-Fe0042819	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	R23-Fe0029929	NCP	mg/L	0.31	0.31	1.1	30%	Pass
Copper	R23-Fe0029929	NCP	mg/L	0.001	0.001	6.2	30%	Pass
Lead	S23-Fe0042733	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury	S23-Fe0042819	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	S23-Fe0042733	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc	R23-Fe0029929	NCP	mg/L	0.007	0.006	15	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Calcium	S23-Fe0042733	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass
Magnesium	S23-Fe0042733	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass
Sodium	S23-Fe0042733	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass

Comments

V2- Hardness results for Fe0042731 have been corrected following a technical glitch

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.

Authorised by:

Bonnie Pu	Analytical Services Manager
Edward Lee	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-Organic
Mary Makarios	Senior Analyst-Inorganic
Mickael Ros	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Ryan Phillips	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS															Page <u>1</u> of <u>1</u>													
Company Name : GHD Pty Ltd, Sydney				Contact Name : Terry Nham						Purchase Order : 2127234					COC Number :													
Office Address :				Project Manager : Henry Luo						PROJECT Number : 2127234					Eurofins mgt quote ID : GHD Rates 2023													
Level 15, 133 Castlereagh Street, Sydney NSW 2000				Email for results : terry.nham@ghd.com henry.luo@ghd.com emily.smith@ghd.com						PROJECT Name : Central					Data output format: ESDAT													
Special Directions & Comments :				Analytes										Some common holding times (with correct preservation). For further information contact the lab														
														Waters					Soils									
														BTEX, MAH, VOC					14 days									
														TRH, PAH, Phenols, Pesticides					7 days									
														Heavy Metals					6 months									
										Mercury, CrVI					28 days													
										Microbiological testing					24 hours													
										BOD, Nitrate, Nitrite, Total N					2 days													
										Solids - TSS, TDS etc					7 days													
										Ferrous Iron					7 days													
										ASLP, TCLP					7 days													
Eurofins mgt DI water batch number:				TRH, BTEXN, 8 Metals (Dissolved) (Suite B6) PAH - Trace LOR Phenols TRH (with Silica Gel Cleanup) Cyanide - Trace Level (<0.004 mg/L) Ammonia Cation (B11D) and Anion (B11E) Ferrous Iron Manganese pH TDS TSS TRH C6-C10 / BTEX 8 Metals (Total)										Containers:										Sample comments:				
														500P 250P 60P 1LA 40mL vial 200mL A Jar Bag														
1	CSM_BH06	15-03-23	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1	250P	4	1LA	2	2					
2	CSM_BH12S	15-03-23	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1	4		2	2						
3	CSM_BH14S	15-03-23	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1	4		2	2						
4	QC03	15-03-23	Water	X	X														1		2	2						
5	RB01	15-03-23	Water													X			1									
6	Trip Blank	15-03-23	Water												X						2							
7	Trip Spike	15-03-23	Water												X						2							
8																												
9																												
10																												
11																												
12																												
13																												
14																												
15																												
16																												
Relinquished By: Terry Nham - GHD				Laboratory Staff						Turn around time						Method Of Shipment						Temperature on arrival:						
				Received By:						1 DAY ☐ 2 DAY ☐ 3 DAY ☐						☐ Courier ☒ Hand Delivered ☐ Postal Courier Consignment # :												
				Date & Time : 16/03/2023 3:30 pm						5 DAY ☒ 10 DAY ☐ Other:																		
Signature: tnham				Signature:																		Report number:						

Eurofins Environment Testing Australia Pty Ltd

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

Sample Receipt Advice

Company name:	GHD Pty Ltd NSW
Contact name:	Henry Luo
Project name:	CENTRAL
Project ID:	2127234
Turnaround time:	5 Day
Date/Time received	Mar 16, 2023 3:30 PM
Eurofins reference	972852

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 10 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

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

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



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Accreditation Number 1261
Site Number 18217

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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 **972852-W**
Project name **CENTRAL**
Project ID **2127234**
Received Date **Mar 16, 2023**

Client Sample ID			CSM_BH06	CSM_BH12S	CSM_BH14S	QC03
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S23- Ma0041438	S23- Ma0041439	S23- Ma0041440	S23- Ma0041441
Date Sampled			Mar 15, 2023	Mar 15, 2023	Mar 15, 2023	Mar 15, 2023
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	93	84	93	94
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-

Client Sample ID			CSM_BH06	CSM_BH12S	CSM_BH14S	QC03
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S23-Ma0041438	S23-Ma0041439	S23-Ma0041440	S23-Ma0041441
Date Sampled			Mar 15, 2023	Mar 15, 2023	Mar 15, 2023	Mar 15, 2023
Test/Reference	LOR	Unit				
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	-
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
Phenol-d6 (surr.)	1	%	32	36	33	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C16-C34 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C34-C40 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C10-C40 (total) (after silica-gel clean up)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C14 (after silica gel clean-up)	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C15-C28 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C29-C36 (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C10-C36 (Total) (after silica gel clean-up)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benz(a)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(a)pyrene - low level	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(g,h,i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Chrysene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Dibenz(a,h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Naphthalene	0.00001	mg/L	< 0.00002	< 0.00001	< 0.00002	< 0.00001
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Total PAH*	0.00001	mg/L	< 0.00002	< 0.00001	< 0.00002	< 0.00001
2-Fluorobiphenyl (surr.)	1	%	78	59	71	62
p-Terphenyl-d14 (surr.)	1	%	79	96	74	54
Ammonia (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Chloride	1	mg/L	220	65	18	-
Cyanide (total) - low level	0.004	mg/L	< 0.004	< 0.004	0.004	-
Ferrous Iron - Fe2+	0.5	mg/L	< 0.5	8.8	< 0.5	-

Client Sample ID			CSM_BH06	CSM_BH12S	CSM_BH14S	QC03
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S23-Ma0041438	S23-Ma0041439	S23-Ma0041440	S23-Ma0041441
Date Sampled			Mar 15, 2023	Mar 15, 2023	Mar 15, 2023	Mar 15, 2023
Test/Reference	LOR	Unit				
pH (at 25 °C)	0.1	pH Units	7.4	7.1	7.1	-
Sulphate (as SO ₄)	2	mg/L	24	110	23	-
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	720	430	210	-
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	39	13	< 5	-
Hardness mg equivalent CaCO ₃ /L	1	mg/L	32	31	140	-
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	120	51	100	-
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10	< 10	< 10	-
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	< 20	-
Total Alkalinity (as CaCO ₃)	20	mg/L	120	51	100	-
Alkali Metals						
Calcium	0.5	mg/L	1.7	1.5	52	-
Magnesium	0.5	mg/L	6.7	6.5	3.4	-
Potassium	0.5	mg/L	1.9	2.2	2.5	-
Sodium	0.5	mg/L	120	120	16	-
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.006	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Manganese (filtered)	0.005	mg/L	0.20	0.58	0.065	-
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.012	0.012	< 0.001	0.013
Zinc (filtered)	0.005	mg/L	0.060	0.047	< 0.005	0.044

Client Sample ID			RB01	TRIP BLANK	TRIP SPIKE
Sample Matrix			Water	Water	Water
Eurofins Sample No.			S23-Ma0041442	S23-Ma0041443	S23-Ma0041444
Date Sampled			Mar 15, 2023	Mar 15, 2023	Mar 15, 2023
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons					
TRH C6-C9	0.02	mg/L	-	< 0.02	-
TRH C6-C10	0.02	mg/L	-	< 0.02	-
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	-	< 0.02	-
BTEX					
Benzene	0.001	mg/L	-	< 0.001	-
Toluene	0.001	mg/L	-	< 0.001	-
Ethylbenzene	0.001	mg/L	-	< 0.001	-
m&p-Xylenes	0.002	mg/L	-	< 0.002	-
o-Xylene	0.001	mg/L	-	< 0.001	-
Xylenes - Total*	0.003	mg/L	-	< 0.003	-
4-Bromofluorobenzene (surr.)	1	%	-	78	-
Naphthalene ^{N02}	0.01	mg/L	-	< 0.01	-
TRH C6-C10	1	%	-	-	74

Client Sample ID			RB01	TRIP BLANK	TRIP SPIKE
Sample Matrix			Water	Water	Water
Eurofins Sample No.			S23-Ma0041442	S23-Ma0041443	S23-Ma0041444
Date Sampled			Mar 15, 2023	Mar 15, 2023	Mar 15, 2023
Test/Reference	LOR	Unit			
Heavy Metals					
Arsenic	0.001	mg/L	< 0.001	-	-
Cadmium	0.0002	mg/L	< 0.0002	-	-
Chromium	0.001	mg/L	< 0.001	-	-
Copper	0.001	mg/L	< 0.001	-	-
Lead	0.001	mg/L	< 0.001	-	-
Mercury	0.0001	mg/L	< 0.0001	-	-
Nickel	0.001	mg/L	< 0.001	-	-
Zinc	0.005	mg/L	< 0.005	-	-
Total Recoverable Hydrocarbons					
Naphthalene	1	%	-	-	110
TRH C6-C9	1	%	-	-	74
BTEX					
Benzene	1	%	-	-	97
Ethylbenzene	1	%	-	-	98
m&p-Xylenes	1	%	-	-	100
o-Xylene	1	%	-	-	96
Toluene	1	%	-	-	93
Xylenes - Total	1	%	-	-	97
4-Bromofluorobenzene (surr.)	1	%	-	-	96

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
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Mar 21, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 17, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Sydney	Mar 17, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Mar 17, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Eurofins Suite B6 (filtered metals)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 21, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8 filtered	Sydney	Mar 21, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Phenols (Halogenated)	Sydney	Mar 21, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Sydney	Mar 21, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
TRH - 2013 NEPM Fractions (after silica gel clean-up)	Sydney	Mar 21, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 1999 NEPM Fractions (after silica gel clean-up)	Sydney	Mar 21, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons (Trace level)	Melbourne	Mar 23, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water (trace)			
Ammonia (as N)	Sydney	Mar 21, 2023	28 Days
- Method: LTM-INO-4200 Ammonia by Discrete Analyser			
Cyanide (total) - low level	Sydney	Mar 21, 2023	14 Days
- Method: E054 Total Cyanide II			
Ferrous Iron - Fe ²⁺	Sydney	Mar 21, 2023	7 Days
- Method: in-house method E058.1 Ferrous iron in water by DA			
pH (at 25 °C)	Sydney	Mar 21, 2023	0 Hour
- Method: LTM-GEN-7090 pH in water by ISE			
Total Suspended Solids Dried at 103 °C to 105 °C	Sydney	Mar 21, 2023	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Metals M8	Sydney	Mar 22, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Sydney	Mar 21, 2023	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11E: Cl/SO ₄ /Alkalinity			
Chloride	Sydney	Mar 21, 2023	28 Days
- Method: LTM-INO-4270 Anions by Ion Chromatography			
Sulphate (as SO ₄)	Sydney	Mar 21, 2023	28 Days
- Method: In-house method LTM-INO-4270 Sulphate by Ion Chromatograph			
Alkalinity (speciated)	Melbourne	Mar 20, 2023	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Sydney	Mar 21, 2023	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Eurofins Suite B11D: Na/K/Ca/Mg and Hardness			
Hardness mg equivalent CaCO ₃ /L	Sydney	Mar 22, 2023	28 Days
- Method: E020.1 Hardness in water			
Alkali Metals	Sydney	Mar 22, 2023	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

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

Project Name: CENTRAL
Project ID: 2127234

Order No.:
Report #: 972852
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Mar 16, 2023 3:30 PM
Due: Mar 23, 2023
Priority: 5 Day
Contact Name: Henry Luo

Eurofins Analytical Services Manager : Quinn Raw

Sample Detail						Ammonia (as N)	Cyanide (total low-level)	Ferrous Iron - Fe2+	Manganese	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Polycyclic Aromatic Hydrocarbons	Metals M8	Phenols (Speciated)	TRH (after Silica Gel cleanup)	Eurofins Suite B6: BTEX/TRH/M8	BTEXN and Volatile TRH	Eurofins Suite B11D: Na/K/Ca/Mg and Hardness	Eurofins Suite B11E: Cl/SO4/Alkalinity	BTEXN and Volatile TRH	Polycyclic Aromatic Hydrocarbons (Trace level)	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254							X					X							X		X	
Sydney Laboratory - NATA # 1261 Site # 18217						X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID																	
1	CSM BH06	Mar 15, 2023		Water	S23-Ma0041438	X	X	X	X	X	X	X		X	X	X		X	X		X	X
2	CSM BH12S	Mar 15, 2023		Water	S23-Ma0041439	X	X	X	X	X	X	X		X	X	X		X	X		X	X
3	CSM BH14S	Mar 15, 2023		Water	S23-Ma0041440	X	X	X	X	X	X	X		X	X	X		X	X		X	X
4	QC03	Mar 15, 2023		Water	S23-Ma0041441											X					X	
5	RB01	Mar 15, 2023		Water	S23-Ma0041442								X									
6	TRIP BLANK	Mar 15, 2023		Water	S23-Ma0041443												X					
7	TRIP SPIKE	Mar 15, 2023		Water	S23-Ma0041444															X		
Test Counts						3	3	3	3	3	3	3	1	3	3	4	1	3	3	1	4	3



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 (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
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							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2,4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2,4,5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,4,6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4,6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2,4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2,4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Total Non-Halogenated Phenol*	mg/L	< 0			0.1	Pass	
Method Blank							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
Method Blank							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C15-C28 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
TRH C29-C36 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons (Trace level)							
Acenaphthene	mg/L	< 0.00001			0.00001	Pass	
Acenaphthylene	mg/L	< 0.00001			0.00001	Pass	
Anthracene	mg/L	< 0.00001			0.00001	Pass	
Benz(a)anthracene	mg/L	< 0.00001			0.00001	Pass	
Benzo(a)pyrene - low level	mg/L	< 0.00001			0.00001	Pass	
Benzo(b&i)fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.00001			0.00001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Chrysene	mg/L	< 0.00001			0.00001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.00001			0.00001	Pass	
Fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Fluorene	mg/L	< 0.00001			0.00001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.00001			0.00001	Pass	
Naphthalene	mg/L	< 0.00001			0.00001	Pass	
Phenanthrene	mg/L	< 0.00001			0.00001	Pass	
Pyrene	mg/L	< 0.00001			0.00001	Pass	
Method Blank							
Ammonia (as N)	mg/L	0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Cyanide (total) - low level	mg/L	< 0.004			0.004	Pass	
Ferrous Iron - Fe ²⁺	mg/L	< 0.5			0.5	Pass	
Sulphate (as SO ₄)	mg/L	< 2			2	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
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	
Manganese (filtered)	mg/L	< 0.005			0.005	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							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Recoverable Hydrocarbons							
TRH C6-C9	%	99			70-130	Pass	
TRH C10-C14	%	77			70-130	Pass	
TRH C6-C10	%	99			70-130	Pass	
TRH >C10-C16	%	73			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	103			70-130	Pass	
Toluene	%	104			70-130	Pass	
Ethylbenzene	%	109			70-130	Pass	
m&p-Xylenes	%	106			70-130	Pass	
o-Xylene	%	105			70-130	Pass	
Xylenes - Total*	%	106			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	115			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	103			25-140	Pass	
2,4-Dichlorophenol	%	118			25-140	Pass	
2,4,5-Trichlorophenol	%	108			25-140	Pass	
2,4,6-Trichlorophenol	%	119			25-140	Pass	
2,6-Dichlorophenol	%	124			25-140	Pass	
4-Chloro-3-methylphenol	%	92			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Methyl-4,6-dinitrophenol	%	112			25-140	Pass	
2-Nitrophenol	%	113			25-140	Pass	
2,4-Dimethylphenol	%	115			25-140	Pass	
2,4-Dinitrophenol	%	92			25-140	Pass	
2-Methylphenol (o-Cresol)	%	88			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	78			25-140	Pass	
4-Nitrophenol	%	36			25-140	Pass	
Dinoseb	%	129			25-140	Pass	
Phenol	%	38			25-140	Pass	
LCS - % Recovery							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	%	124			70-130	Pass	
LCS - % Recovery							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	%	125			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (Trace level)							
Acenaphthene	%	116			70-130	Pass	
Acenaphthylene	%	108			70-130	Pass	
Anthracene	%	70			70-130	Pass	
Benz(a)anthracene	%	113			70-130	Pass	
Benzo(a)pyrene - low level	%	105			70-130	Pass	
Benzo(b&j)fluoranthene	%	106			70-130	Pass	
Benzo(g,h,i)perylene	%	92			70-130	Pass	
Benzo(k)fluoranthene	%	102			70-130	Pass	
Chrysene	%	88			70-130	Pass	
Dibenz(a,h)anthracene	%	100			70-130	Pass	
Fluoranthene	%	75			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Fluorene			%	80			70-130	Pass	
Indeno(1.2.3-cd)pyrene			%	97			70-130	Pass	
Naphthalene			%	86			70-130	Pass	
Phenanthrene			%	71			70-130	Pass	
Pyrene			%	76			70-130	Pass	
LCS - % Recovery									
Ammonia (as N)			%	102			70-130	Pass	
Chloride			%	104			70-130	Pass	
Cyanide (total) - low level			%	98			70-130	Pass	
Ferrous Iron - Fe2+			%	101			70-130	Pass	
Sulphate (as SO4)			%	103			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C			%	116			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C			%	112			70-130	Pass	
LCS - % Recovery									
Alkali Metals									
Calcium			%	102			80-120	Pass	
Magnesium			%	117			80-120	Pass	
Potassium			%	110			80-120	Pass	
Sodium			%	100			80-120	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	90			80-120	Pass	
Arsenic (filtered)			%	89			80-120	Pass	
Cadmium			%	87			80-120	Pass	
Cadmium (filtered)			%	85			80-120	Pass	
Chromium			%	93			80-120	Pass	
Chromium (filtered)			%	91			80-120	Pass	
Copper			%	90			80-120	Pass	
Copper (filtered)			%	91			80-120	Pass	
Lead			%	93			80-120	Pass	
Lead (filtered)			%	93			80-120	Pass	
Manganese (filtered)			%	91			80-120	Pass	
Mercury			%	103			80-120	Pass	
Mercury (filtered)			%	101			80-120	Pass	
Nickel			%	93			80-120	Pass	
Nickel (filtered)			%	92			80-120	Pass	
Zinc			%	94			80-120	Pass	
Zinc (filtered)			%	94			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	S23-Ma0027933	NCP	%	93			70-130	Pass	
TRH >C10-C16	S23-Ma0027933	NCP	%	90			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (Trace level)				Result 1					
Acenaphthene	M23-Ma0045328	NCP	%	93			70-130	Pass	
Benzo(a)pyrene - low level	M23-Ma0043276	NCP	%	75			70-130	Pass	
Fluoranthene	M23-Ma0045328	NCP	%	109			70-130	Pass	
Pyrene	M23-Ma0045328	NCP	%	95			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	S23-Ma0040011	NCP	%	92			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ma0049256	NCP	%	89			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S23-Ma0046369	NCP	%	96			75-125	Pass	
Magnesium	S23-Ma0046369	NCP	%	116			75-125	Pass	
Potassium	S23-Ma0046369	NCP	%	109			75-125	Pass	
Sodium	S23-Ma0046369	NCP	%	97			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S23-Ma0038945	NCP	%	88			75-125	Pass	
Cadmium (filtered)	S23-Ma0038945	NCP	%	86			75-125	Pass	
Chromium (filtered)	S23-Ma0038945	NCP	%	86			75-125	Pass	
Copper (filtered)	S23-Ma0038945	NCP	%	87			75-125	Pass	
Lead (filtered)	S23-Ma0038945	NCP	%	88			75-125	Pass	
Manganese (filtered)	S23-Ma0038945	NCP	%	85			75-125	Pass	
Mercury (filtered)	S23-Ma0038945	NCP	%	97			75-125	Pass	
Nickel (filtered)	S23-Ma0038945	NCP	%	84			75-125	Pass	
Zinc (filtered)	S23-Ma0038945	NCP	%	86			75-125	Pass	
Spike - % Recovery									
TRH - 2013 NEPM Fractions (after silica gel clean-up)				Result 1					
TRH >C10-C16 (after silica gel clean-up)	S23-Ma0041439	CP	%	85			70-130	Pass	
Spike - % Recovery									
TRH - 1999 NEPM Fractions (after silica gel clean-up)				Result 1					
TRH C10-C14 (after silica gel clean-up)	S23-Ma0041439	CP	%	85			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chloride	S23-Ma0041439	CP	%	108			70-130	Pass	
Cyanide (total) - low level	S23-Ma0041439	CP	%	100			70-130	Pass	
Sulphate (as SO ₄)	S23-Ma0041439	CP	%	103			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	N23-Ma0045674	NCP	%	100			75-125	Pass	
Cadmium	N23-Ma0045674	NCP	%	86			75-125	Pass	
Chromium	N23-Ma0045674	NCP	%	90			75-125	Pass	
Copper	N23-Ma0045674	NCP	%	86			75-125	Pass	
Lead	N23-Ma0045674	NCP	%	91			75-125	Pass	
Mercury	N23-Ma0045674	NCP	%	108			75-125	Pass	
Nickel	N23-Ma0045674	NCP	%	87			75-125	Pass	
Zinc	N23-Ma0045674	NCP	%	90			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	S23-Ma0031978	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S23-Ma0031978	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S23-Ma0031978	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C10-C16	S23-Ma0031978	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	S23-Ma0031978	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	S23-Ma0031978	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	

Duplicate								
TRH - 2013 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD		
TRH >C10-C16 (after silica gel clean-up)	W23-Fe0046486	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH >C16-C34 (after silica gel clean-up)	W23-Fe0046486	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C34-C40 (after silica gel clean-up)	W23-Fe0046486	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
TRH - 1999 NEPM Fractions (after silica gel clean-up)				Result 1	Result 2	RPD		
TRH C10-C14 (after silica gel clean-up)	W23-Fe0046486	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH C15-C28 (after silica gel clean-up)	W23-Fe0046486	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH C29-C36 (after silica gel clean-up)	W23-Fe0046486	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons (Trace level)				Result 1	Result 2	RPD		
Acenaphthene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Acenaphthylene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Anthracene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benz(a)anthracene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(a)pyrene - low level	M23-Ma0043277	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(b&j)fluoranthene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(g,h,i)perylene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Benzo(k)fluoranthene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Chrysene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Dibenz(a,h)anthracene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Fluoranthene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Fluorene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Naphthalene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Phenanthrene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Pyrene	M23-Ma0045332	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Ammonia (as N)	S23-Ma0040010	NCP	mg/L	0.02	0.02	5.0	30%	Pass
Chloride	S23-Ma0040009	NCP	mg/L	470	410	12	30%	Pass
Cyanide (total) - low level	S23-Ma0041438	CP	mg/L	< 0.004	< 0.004	<1	30%	Pass
Ferrous Iron - Fe2+	S23-Ma0041438	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass
Sulphate (as SO4)	S23-Ma0040009	NCP	mg/L	27	25	7.7	30%	Pass
Total Dissolved Solids Dried at 180 °C ± 2 °C	S23-Ma0041438	CP	mg/L	720	700	2.8	30%	Pass
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ma0049256	NCP	mg/L	1200	1300	7.7	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Sodium	S23-Ma0041438	CP	mg/L	120	120	3.7	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic (filtered)	S23-Ma0044298	NCP	mg/L	0.001	0.001	9.4	30%	Pass
Cadmium (filtered)	S23-Ma0044298	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium (filtered)	S23-Ma0044298	NCP	mg/L	0.004	0.004	6.8	30%	Pass
Copper (filtered)	S23-Ma0044298	NCP	mg/L	0.002	0.002	8.2	30%	Pass
Lead (filtered)	S23-Ma0044298	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Manganese (filtered)	S23-Ma0044298	NCP	mg/L	0.049	0.049	<1	30%	Pass
Mercury (filtered)	S23-Ma0044298	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel (filtered)	S23-Ma0044298	NCP	mg/L	0.018	0.018	<1	30%	Pass
Zinc (filtered)	S23-Ma0044298	NCP	mg/L	0.009	0.008	18	30%	Pass

Duplicate								
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD		
TRH C6-C9	S23-Ma0041440	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass
TRH C6-C10	S23-Ma0041440	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass
Duplicate								
BTEX				Result 1	Result 2	RPD		
Benzene	S23-Ma0041440	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Toluene	S23-Ma0041440	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Ethylbenzene	S23-Ma0041440	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
m&p-Xylenes	S23-Ma0041440	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass
o-Xylene	S23-Ma0041440	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Xylenes - Total*	S23-Ma0041440	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	S23-Ma0041440	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Calcium	S23-Ma0041442	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass
Magnesium	S23-Ma0041442	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass
Potassium	S23-Ma0041442	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass
Sodium	S23-Ma0041442	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	S23-Ma0041442	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium	S23-Ma0041442	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	S23-Ma0041442	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper	S23-Ma0041442	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Lead	S23-Ma0041442	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury	S23-Ma0041442	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	S23-Ma0041442	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc	S23-Ma0031607	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
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.

Authorised by:

Bonnie Pu	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Joseph Edouard	Senior Analyst-Organic
Mary Makarios	Senior Analyst-Inorganic
Mickael Ros	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Ryan Phillips	Senior Analyst-Inorganic



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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CERTIFICATE OF ANALYSIS

Work Order : **ES2239623**
Client : **GHD PTY LTD**
Contact : **MR HENRY LUO**
Address : **LEVEL 15, 133 CASTLEREAGH STREET**
SYDNEY NSW, AUSTRALIA 2000
Telephone : **+61 02 9239 7100**
Project : **2127234 Central**
Order number : **2127234**
C-O-C number : **----**
Sampler : **TERRY NHAM**
Site :
Quote number : **EN/005**
No. of samples received : **1**
No. of samples analysed : **1**

Page : 1 of 5
Laboratory : Environmental Division Sydney
Contact : Sarah Mathew
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 03-Nov-2022 13:45
Date Analysis Commenced : 04-Nov-2022
Issue Date : 10-Nov-2022 16:24



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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
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.
- EP132: Where reported, Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Sample ID

				QC02	----	----	----	----
Sampling date / time				02-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2239623-001	-----	-----	-----	-----
Result				----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
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	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
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	----	----	----	----



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Sample ID

				QC02	----	----	----	----
Sampling date / time				02-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2239623-001	-----	-----	-----	-----
Result				----	----	----	----	----

EP132B: Polynuclear Aromatic Hydrocarbons

3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	----	----	----	----
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	----	----	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	----	----	----	----
Acenaphthene	83-32-9	0.1	µg/L	<0.1	----	----	----	----
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	----	----	----	----
Anthracene	120-12-7	0.1	µg/L	<0.1	----	----	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	----	----	----	----
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	----	----	----	----
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	0.1	µg/L	<0.1	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	----	----	----	----
Chrysene	218-01-9	0.1	µg/L	<0.1	----	----	----	----
Coronene	191-07-1	0.1	µg/L	<0.1	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	0.1	µg/L	<0.1	----	----	----	----
Fluoranthene	206-44-0	0.1	µg/L	<0.1	----	----	----	----
Fluorene	86-73-7	0.1	µg/L	<0.1	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	----	----	----	----
Naphthalene	91-20-3	0.1	µg/L	<0.1	----	----	----	----
Perylene	198-55-0	0.1	µg/L	<0.1	----	----	----	----
Phenanthrene	85-01-8	0.1	µg/L	<0.1	----	----	----	----
Pyrene	129-00-0	0.1	µg/L	<0.1	----	----	----	----
^ Sum of PAHs	----	0.05	µg/L	<0.05	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	----	----	----	----

EP080S: TPH(V)/BTEX Surrogates

1,2-Dichloroethane-D4	17060-07-0	2	%	115	----	----	----	----
Toluene-D8	2037-26-5	2	%	107	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	104	----	----	----	----

EP132T: Base/Neutral Extractable Surrogates

2-Fluorobiphenyl	321-60-8	0.1	%	71.2	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	78.9	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	81.9	----	----	----	----



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	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	43	135
Anthracene-d10	1719-06-8	48	138
4-Terphenyl-d14	1718-51-0	48	144

QUALITY CONTROL REPORT

Work Order : **ES2239623**

Page : 1 of 6

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 : 2127234 Central

Date Samples Received : 03-Nov-2022

Order number : 2127234

Date Analysis Commenced : 04-Nov-2022

C-O-C number : ----

Issue Date : 10-Nov-2022

Sampler : TERRY NHAM

Site :

Quote number : EN/005

No. of samples received : 1

No. of samples analysed : 1



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

This Quality Control Report contains the following information:

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

Signatories

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

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



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

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: 4684255)									
ES2239612-004	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: Nickel	7440-02-0	0.001	mg/L	0.022	0.022	0.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.009	0.009	0.0	No Limit
ES2239845-007	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.040	0.037	6.0	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.014	0.013	7.6	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4684252)									
ES2239089-012	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2239552-005	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4684151)									
ES2239136-009	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2239599-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4684151)									
ES2239136-009	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2239599-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit

Page : 3 of 6
 Work Order : ES2239623
 Client : GHD PTY LTD
 Project : 2127234 Central



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: 4684151)									
ES2239136-009	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
ES2239599-002	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
		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	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		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**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4684255)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	101	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.4	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.6	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.9	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.5	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.2	81.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 4684252)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	99.2	83.0	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4679613)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	72.1	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	90.0	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	84.3	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4684151)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	93.9	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4679613)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	75.5	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	90.6	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	56.7	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4684151)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	98.9	75.0	127
EP080: BTEXN (QCLot: 4684151)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	94.8	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	99.8	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	101	70.0	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	99.5	69.0	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	99.5	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	107	70.0	120
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 4680905)								
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	93.5	60.0	120
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	67.2	59.0	123
EP132: 7,12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	72.0	36.0	144



Sub-Matrix: **WATER**

Method: Compound				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
CAS Number	LOR	Unit	Result					
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 4680905) - continued								
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	76.0	64.0	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	77.5	64.0	126
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	88.4	65.0	127
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	96.5	64.0	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	101	64.0	126
EP132: Benzo(b+j)fluoranthene	205-99-2	0.1	µg/L	<0.1	2 µg/L	101	62.0	126
	205-82-3							
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	94.0	62.0	126
EP132: Benzo(g,h,i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	101	56.0	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	94.2	68.0	130
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	94.8	66.0	130
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	109	35.0	133
EP132: Dibenz(a,h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	103	58.0	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	94.1	65.0	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	81.4	64.0	124
EP132: Indeno(1,2,3-cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	102	57.0	127
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	68.0	54.0	128
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	96.9	66.0	130
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	89.5	65.0	129
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	94.4	66.0	128

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**

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: 4684255)							
ES2239612-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	99.2	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	102	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	106	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	97.0	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	108	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	97.6	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	96.0	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4684252)							
ES2239089-011	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	96.0	70.0	130

Page : 6 of 6
 Work Order : ES2239623
 Client : GHD PTY LTD
 Project : 2127234 Central



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4684151)							
ES2239136-009	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	95.8	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4684151)							
ES2239136-009	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	95.8	70.0	130
EP080: BTEXN (QCLot: 4684151)							
ES2239136-009	Anonymous	EP080: Benzene	71-43-2	25 µg/L	95.6	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	94.0	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	95.7	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	95.2	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	95.5	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	100	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2239623	Page	: 1 of 4
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Telephone	: +61-2-8784 8555
Project	: 2127234 Central	Date Samples Received	: 03-Nov-2022
Site	:	Issue Date	: 10-Nov-2022
Sampler	: TERRY NHAM	No. of samples received	: 1
Order number	: 2127234	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	6	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	6	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) QC02	02-Nov-2022	----	----	----	07-Nov-2022	01-May-2023	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) QC02	02-Nov-2022	----	----	----	07-Nov-2022	30-Nov-2022	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) QC02	02-Nov-2022	04-Nov-2022	09-Nov-2022	✓	07-Nov-2022	14-Dec-2022	✓
Amber VOC Vial - Sulfuric Acid (EP080) QC02	02-Nov-2022	08-Nov-2022	16-Nov-2022	✓	08-Nov-2022	16-Nov-2022	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) QC02	02-Nov-2022	04-Nov-2022	09-Nov-2022	✓	07-Nov-2022	14-Dec-2022	✓
Amber VOC Vial - Sulfuric Acid (EP080) QC02	02-Nov-2022	08-Nov-2022	16-Nov-2022	✓	08-Nov-2022	16-Nov-2022	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) QC02	02-Nov-2022	08-Nov-2022	16-Nov-2022	✓	08-Nov-2022	16-Nov-2022	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP132) QC02	02-Nov-2022	07-Nov-2022	09-Nov-2022	✓	07-Nov-2022	17-Dec-2022	✓



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)							
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
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	6	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	6	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
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
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
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
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
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
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	6	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	6	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ 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).
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)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	In house: Referenced to USEPA 3640 (GPC Cleanup), 8270 GCMS Capillary column, SIM mode. This method is compliant with NEPM Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
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.
Sep. Funnel Extraction /Acetylation of Phenolic Compounds	ORG14-AC	WATER	In house: Referenced to USEPA 3510 (Extraction) / In-house (Acetylation): A 1L sample is extracted into dichloromethane and concentrated to 1 mL with exchange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES2239623

Client : GHD PTY LTD Contact : MR HENRY LUO Address : LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000 E-mail : henry.luo@ghd.com Telephone : +61 02 9239 7100 Facsimile : +61 02 9239 7199 Project : 2127234 Central Order number : 2127234 C-O-C number : ---- Site : Sampler : TERRY NHAM	Laboratory : Environmental Division Sydney Contact : Sarah Mathew Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 E-mail : sarah.mathew@alsglobal.com Telephone : +61-2-8784 8555 Facsimile : +61-2-8784 8500 Page : 1 of 3 Quote number : EB2020GHDSE0038 (EN/005) QC Level : NEPM 2013 B3 & ALS QC Standard
--	---

Dates

Date Samples Received : 03-Nov-2022 13:45	Issue Date : 03-Nov-2022
Client Requested Due Date : 10-Nov-2022	Scheduled Reporting Date : 10-Nov-2022

Delivery Details

Mode of Delivery : Client Drop Off	Security Seal : Not Available
No. of coolers/boxes : 1	Temperature : 8.6°C - Ice present
Receipt Detail : 	No. of samples received / analysed : 1 / 1

General Comments

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



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 - EP132B(PAH) Ultra Trace Polynuclear Aromatic Compounds	WATER - W-05 TRH/BTEXN/8 Metals
ES2239623-001	02-Nov-2022 00:00	QC02	✓	✓

Proactive Holding Time Report

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

[illegible]

CERTIFICATE OF ANALYSIS

Work Order : **ES2305429**
Client : **GHD PTY LTD**
Contact : **MR HENRY LUO**
Address : **LEVEL 15, 133 CASTLEREAGH STREET**
SYDNEY NSW, AUSTRALIA 2000
Telephone : **+61 02 9239 7100**
Project : **2127234 Central**
Order number : **2127234**
C-O-C number : **----**
Sampler : **TERRY NHAM/ EMILY SMITH**
Site :
Quote number : **EN/005**
No. of samples received : **1**
No. of samples analysed : **1**

Page : 1 of 5
Laboratory : Environmental Division Sydney
Contact : Sarah Mathew
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 20-Feb-2023 12:10
Date Analysis Commenced : 20-Feb-2023
Issue Date : 27-Feb-2023 09:32



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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
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.
- EP132: Where reported, Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Sample ID

				QC02	----	----	----	----
Sampling date / time				13-Feb-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2305429-001	-----	-----	-----	-----
Result				----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
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	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
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	----	----	----	----



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Sample ID

				QC02	----	----	----	----
Sampling date / time				13-Feb-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2305429-001	-----	-----	-----	-----
Result				----	----	----	----	----

EP132B: Polynuclear Aromatic Hydrocarbons

3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	----	----	----	----
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	----	----	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	----	----	----	----
Acenaphthene	83-32-9	0.1	µg/L	<0.1	----	----	----	----
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	----	----	----	----
Anthracene	120-12-7	0.1	µg/L	<0.1	----	----	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	----	----	----	----
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	----	----	----	----
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	0.1	µg/L	<0.1	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	----	----	----	----
Chrysene	218-01-9	0.1	µg/L	<0.1	----	----	----	----
Coronene	191-07-1	0.1	µg/L	<0.1	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	0.1	µg/L	<0.1	----	----	----	----
Fluoranthene	206-44-0	0.1	µg/L	<0.1	----	----	----	----
Fluorene	86-73-7	0.1	µg/L	<0.1	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	----	----	----	----
Naphthalene	91-20-3	0.1	µg/L	<0.1	----	----	----	----
Perylene	198-55-0	0.1	µg/L	<0.1	----	----	----	----
Phenanthrene	85-01-8	0.1	µg/L	<0.1	----	----	----	----
Pyrene	129-00-0	0.1	µg/L	<0.1	----	----	----	----
^ Sum of PAHs	----	0.05	µg/L	<0.05	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	----	----	----	----

EP080S: TPH(V)/BTEX Surrogates

1,2-Dichloroethane-D4	17060-07-0	2	%	96.2	----	----	----	----
Toluene-D8	2037-26-5	2	%	100	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	93.9	----	----	----	----

EP132T: Base/Neutral Extractable Surrogates

2-Fluorobiphenyl	321-60-8	0.1	%	49.0	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	51.5	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	48.2	----	----	----	----



Surrogate Control Limits

Sub-Matrix: **WATER**

		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	43	135
Anthracene-d10	1719-06-8	48	138
4-Terphenyl-d14	1718-51-0	48	144

QUALITY CONTROL REPORT

Work Order : **ES2305429**

Page : 1 of 6

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 : 2127234 Central

Date Samples Received : 20-Feb-2023

Order number : 2127234

Date Analysis Commenced : 20-Feb-2023

C-O-C number : ----

Issue Date : 27-Feb-2023

Sampler : TERRY NHAM/ EMILY SMITH

Site :

Quote number : EN/005

No. of samples received : 1

No. of samples analysed : 1



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

This Quality Control Report contains the following information:

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

Signatories

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

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



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

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: 4884153)									
ES2305011-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.094	0.096	1.6	0% - 50%
ES2305493-001	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	0.003	0.003	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4884152)									
ES2305469-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2305011-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4884995)									
ES2305352-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2305376-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4884995)									
ES2305352-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2305376-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit

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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: 4884995)									
ES2305352-001	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	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
ES2305376-004	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
		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	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		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**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4884153)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.6	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	98.6	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.8	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.3	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.3	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	102	81.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 4884152)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	102	83.0	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4882951)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	63.5	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	90.0	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	91.0	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4884995)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	79.9	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4882951)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	67.1	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	95.4	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	95.6	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4884995)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	83.9	75.0	127
EP080: BTEXN (QCLot: 4884995)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	76.9	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	85.4	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	83.2	70.0	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	85.4	69.0	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	86.2	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	88.3	70.0	120
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 4883462)								
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	86.4	60.0	120
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	60.3	59.0	123
EP132: 7,12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	111	36.0	144



Sub-Matrix: **WATER**

Method: Compound				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
CAS Number	LOR	Unit	Result					
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 4883462) - continued								
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	70.2	64.0	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	84.4	64.0	126
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	73.8	65.0	127
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	86.8	64.0	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	85.6	64.0	126
EP132: Benzo(b+j)fluoranthene	205-99-2	0.1	µg/L	<0.1	2 µg/L	88.3	62.0	126
	205-82-3							
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	87.2	62.0	126
EP132: Benzo(g,h,i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	82.6	56.0	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	84.3	68.0	130
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	85.5	66.0	130
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	79.6	35.0	133
EP132: Dibenz(a,h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	83.6	58.0	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	93.0	65.0	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	74.3	64.0	124
EP132: Indeno(1,2,3-cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	84.1	57.0	127
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	55.4	54.0	128
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	85.0	66.0	130
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	77.0	65.0	129
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	95.1	66.0	128

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**

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: 4884153)							
ES2305011-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	90.9	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	88.4	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	86.1	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	85.7	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	106	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	90.5	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	96.6	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4884152)							
ES2304893-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	88.8	70.0	130

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Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4884995)							
ES2305352-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	104	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4884995)							
ES2305352-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	104	70.0	130
EP080: BTEXN (QCLot: 4884995)							
ES2305352-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	92.9	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	91.7	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	94.3	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	94.3	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	96.3	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	94.2	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

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Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR HENRY LUO	Telephone	: +61-2-8784 8555
Project	: 2127234 Central	Date Samples Received	: 20-Feb-2023
Site	:	Issue Date	: 27-Feb-2023
Sampler	: TERRY NHAM/ EMILY SMITH	No. of samples received	: 1
Order number	: 2127234	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	1	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	6	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) QC02	13-Feb-2023	----	----	----	21-Feb-2023	12-Aug-2023	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) QC02	13-Feb-2023	----	----	----	23-Feb-2023	13-Mar-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) QC02	13-Feb-2023	20-Feb-2023	20-Feb-2023	✓	24-Feb-2023	01-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) QC02	13-Feb-2023	22-Feb-2023	27-Feb-2023	✓	22-Feb-2023	27-Feb-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) QC02	13-Feb-2023	20-Feb-2023	20-Feb-2023	✓	24-Feb-2023	01-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) QC02	13-Feb-2023	22-Feb-2023	27-Feb-2023	✓	22-Feb-2023	27-Feb-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) QC02	13-Feb-2023	22-Feb-2023	27-Feb-2023	✓	22-Feb-2023	27-Feb-2023	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP132) QC02	13-Feb-2023	20-Feb-2023	20-Feb-2023	✓	22-Feb-2023	01-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)							
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	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	1	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	6	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
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	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	1	100.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
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	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	1	100.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
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	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	1	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	6	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ 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).
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)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	In house: Referenced to USEPA 3640 (GPC Cleanup), 8270 GCMS Capillary column, SIM mode. This method is compliant with NEPM Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
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.
Sep. Funnel Extraction /Acetylation of Phenolic Compounds	ORG14-AC	WATER	In house: Referenced to USEPA 3510 (Extraction) / In-house (Acetylation): A 1L sample is extracted into dichloromethane and concentrated to 1 mL with exchange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES2305429

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	: 2127234 Central	Page	: 1 of 3
Order number	: 2127234	Quote number	: EB2020GHDSE0038 (EN/005)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	:		
Sampler	: TERRY NHAM/ EMILY SMITH		

Dates

Date Samples Received	: 20-Feb-2023 12:10	Issue Date	: 20-Feb-2023
Client Requested Due Date	: 27-Feb-2023	Scheduled Reporting Date	: 27-Feb-2023

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 6.6°C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- 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 - EP132B(PAH) Ultra Trace Polynuclear Aromatic Compounds	WATER - W-05 TRH/BTEXN/8 Metals
ES2305429-001	13-Feb-2023 00:00	QC02	✓	✓

Proactive Holding Time Report

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

[illegible]



CHAIN OF CUSTODY
ALS Laboratory:
please tick →

DADELADE 21 Buma Road, Pootah SA 5095
Ph. 08 8350 0690 E. adeelaide@alsglobal.com
CLERISBAIE 32 Shant Street, Stirling QLD 4053
Ph. 07 3243 7222 E. samples.clerisbaie@alsglobal.com
CLGADSTONE 46 Callamondra Drive, Clinton QLD 4680
Ph. 07 7471 5900 E. gladstone@alsglobal.com

DMACKAY 78 Halbow Road, Mackay QLD 4740
Ph. 07 4844 0177 E. mackay@alsglobal.com
DUNEBOURNE 24 Wyeat Road, Springvale VIC 3171
Ph. 03 8549 9900 E. samples.dunebourne@alsglobal.com
DUNDEE 27 Sydney Road, Mudgee NSW 2850
Ph. 02 8372 6736 E. mudgee@alsglobal.com

DUNEDUNE 277 200 Woodpark Road, Smithfield NSW 2164
Ph. 02 8784 8555 E. smithfield@alsglobal.com
DUNEDUNE 14-15 Chery Court, Brisbane QLD 4018
Ph. 07 4796 0500 E. townsville.environmental@alsglobal.com
DUNEDUNE 98 Kemp Street, Wodonga NSW 2580
Ph. 02 4223 3123 E. parkville@alsglobal.com

CLIENT: GHD Pty Ltd

OFFICE: Sydney

PROJECT: 2127234 Central

ORDER NUMBER: 2127234

PROJECT MANAGER: Henry Luo

CONTACT PH: 02 9239 7044 / 0414 090 002

SAMPLER: Terry Nham / Emily Smith

SAMPLER MOBILE: 0403 261 883

COC emailed to ALS? (YES / NO)

EDD FORMAT (or default): ESDAT

Email Reports to: terry.nham@ghd.com emily.smith@ghd.com

Email Invoice to (will default to PM if no other addresses are listed):

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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

EN06/020

STANDARD TAT

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?

Yes

No

Free ice / frozen ice bricks present upon receipt? Yes

No

Random Sample Temperature on Receipt: °C

Other comment:

COC SEQUENCE NUMBER (Circle)

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TOTAL

Telephone : + 61-2-8784 8555



Environmental Division
Sydney
Work Order Reference
ES2305429

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airtight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisphosphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airtight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solids; B = Unpreserved Bag.