Ku-ring-gai Council

Phase 2 - Groundwater Investigation – Lindfield Village Hub

March 2019

Executive summary

GHD Pty Ltd (GHD) was commissioned by the Ku-ring-gai Council (Council) to conduct a supplementary Phase 2 groundwater investigation of the Lindfield Village Hub, located within the Lindfield town centre. GHD understands that Council is proposing to redevelop the Lindfield town centre as part of an urban renewal project to provide the community with new social infrastructure and services.

The objective of this groundwater investigation is to provide Council with additional site contamination information in line with the recommendations outlined in a previous Phase 2 detailed site investigation report. The outcomes of these are addressed throughout the report.

To achieve the required outcome, GHD's program consisted of the drilling of three boreholes, conversion of two of these to groundwater monitoring wells, and the monitoring of those wells in addition to two previously established groundwater wells.

Key findings from the investigation include the following:

- Drilling identified soil profiles and stratigraphic units consistent with weathered shales and sandstones of the Wianamatta Group, and also consistent with the findings of previous drilling investigations at the site. Site soils typically consist of mid grey-brown fine grained clays and silty clays.
- Minor gravelly-sandy fill and anthropogenic materials (up to 0.2 m bgl) were intersected in all holes, and are superimposed on a soil weathering profile up to 2.5 m bgl, which overlies weathered bedrock and fresh sandstone and shale bedrock.
- The predominant bedrock encountered at all three locations was competent sandstone (probable Ashfield Shale) with minor bands of interlaminated shales and siltstones. Fracturing, where present, was generally aligned along bedding planes and consisted of three to nine breaks per metre. No significant fault gouge was encountered.
- Asbestos in the form of asbestos containing material (ACM; bonded) fragments or fibre bundles (fibrous asbestos) was identified in fill material at two of the three boreholes and is likely the result of the historical and recent demolition of buildings containing asbestos fibre cement.
- The fibrous asbestos was detected in fill below hardstand, and as such there is unlikely to be a current complete source-pathway-receptor linkage to current site users. However, there is a potentially complete linkage for future maintenance workers and construction workers coming into contact with fill materials. There is also potential for migration of asbestos via dust generation from exposed fill during future construction work. The asbestos is likely to be constrained to the fill layer across the site.
- Preliminary waste classification of soils encountered during the investigation indicate that fill material across the site is likely to contain some asbestos. Soil containing asbestos will be classified be as Special Waste (Asbestos waste) for the purpose of off-site disposal. Where material needs to be removed off-site a more detailed waste classification and chemical assessment will need to be conducted to allow appropriate disposal of the materials.
- There were no exceedances of the relevant human health criteria for non-asbestos contaminants.

- The exceedances of ecological criteria for soils (zinc) were limited to the surface fill materials (0.1 – 0.2 m bgl) and are in line with background levels for zinc expected for this area. No exceedances were detected in samples analysed from below these depths, which indicates that the metal impacts are not leaching and unlikely to be a risk to local groundwater.
- The ADE (2016) investigation found some soil samples that exceeded given ecological criteria, however, GHD did not identify any on-site ecological receptors and, based on the results of this groundwater investigation, it is not considered that the metal impacts identified within the fill material at the site are significant enough to warrant remediation in the context of the proposed use.
- Groundwater was intersected between 4.20 m bgl in BH6, to 8.99 m bgl in GHD_BH1. Groundwater levels relative to AHD, indicate groundwater is highest in the east of the site at GHD_BH1A, and follows topography down towards the west of the site at BH6.
- Based on information provided to GHD by Council, it is understood that basement depth of the proposed development would be approximately 24 m bgl in the vicinity of GHD_BH1, and 20 m bgl in the vicinity of BH5. Given that groundwater was intersected at levels significantly shallower than this, it is expected that groundwater will be encountered during developments works, and dewatering will be required.
- Exceedances of freshwater GILs are noted at all groundwater monitoring locations for copper, lead, manganese, nickel, zinc and chromium. There are no ecological receptors identified on site or within the immediate within the vicinity of the site, therefore, these exceedances are deemed to constitute an acceptable level of risk for the site in the context of the current and proposed use.
- Groundwater is not abstracted within the vicinity of the site for any purpose, and there is considered to be no plausible source-pathway-receptor linkage for contaminants identified in groundwater to current or future receptors.
- As no other on-site ecological receptors were identified in the groundwater investigation and the metals impacts identified are unlikely to be migrating off-site, there is unlikely to be a pathway for the contamination to reach an ecological receptor. The risk to potential ecological receptors would therefore be considered to be minimal.
- Based on the currently available information on the site, and in accordance with the NSW EPA (2015) requirements with regards to duty to report a contaminated site, it is GHD's opinion that there is presently insufficient evidence to trigger reporting of this site to EPA.

Based upon the findings of this investigation as outlined above, the following recommendations are made in order to further assess or mitigate contamination risks associated with the site:

- Develop a Construction Environmental Management Plan (CEMP) during construction to manage soils and groundwater, including a plan for investigating and managing asbestos in site fill material and a dewatering plan for the site for development below the groundwater table. This plan will provide guidance on minimising contamination impacts to site workers, occupants and off-site receptors as a result of construction.
- A sampling program to assess the extent of asbestos in fill is recommended during site clearance to assess the volume of soil requiring specialist disposal. Disposal of soil waste containing asbestos will require classification of the waste as: Special Waste (Asbestos Waste), subject to confirmation of concentrations of chemical contaminants. All waste would require removal by a licenced waste disposal contractor to a suitably licenced facility.
- Following removal of asbestos impacts, all ground surfaces should be the subject of a visual clearance by a licenced asbestos assessor.

- While the presence of asbestos is considered unlikely to pose an unacceptable risk to current site users in the existing configuration in the short term prior to site redevelopment, GHD recommends that Council implement an Asbestos Management Plan for any intrusive works which may disturb fill material at the site.
- Based on the findings of this investigation, GHD do not consider that there is a need to prepare a standalone Remedial Action Plan (RAP) for site redevelopment.

This report is subject to, and must be read in conjunction with, the limitations set out Section 1.3 and the assumptions and qualifications contained throughout the Report.

Table of contents

Table index

Figure index

Appendices

1. Introduction

GHD Pty Ltd (GHD) was commissioned by the Ku-ring-gai Council (Council) to conduct a supplementary Phase 2 groundwater investigation of the Lindfield Village Hub, located within the Lindfield town centre, NSW (the site). The site is bound by Bent Street to the north, Beaconsfield Parade to the south, Woodford Lane to the east and residential properties to the west. It is currently occupied by two council car parks and a number of residential properties and vacant lots.

GHD understands that Council is proposing to redevelop the Lindfield town centre as part of an urban renewal project to provide the community with new social infrastructure and services.

Previous environmental and geotechnical investigations undertaken at the site include a Phase 2 DSI (ADE 2016), which was limited to site soil investigation, and a geotechnical investigation (Asset Geotechnical, 2016).

The purpose of this groundwater investigation is to provide Council with additional contamination information to address recommendations outlined in the ADE DSI report which include:

- installation and monitoring of a groundwater monitoring well along the eastern boundary adjacent to the dry cleaning business, and a well adjacent to the electrical substation
- Development of a RAP to address potential for soil and groundwater contamination

To achieve the required outcome, GHD's program consisted of the drilling of three boreholes, conversion of two of these to groundwater monitoring wells, and the monitoring of those wells in addition to two previously established groundwater wells

A site location plan is provided as Figure 1 in Appendix A.

1.1 Objective

The objectives of the groundwater investigation works at the site were to:

- Identify whether the site is likely to have been impacted by contamination from the Marcus Dry Cleaning business located at 346 Pacific Highway, Lindfield, and the electrical substation located at the southern end of the site on Beaconsfield Parade, Lindfield, and historical site operations in relation to the current and proposed future land uses.
- Assess the potential for identified contamination (if any) to have adverse impacts on human health, the environment and current or proposed building structures on-site.
- Where applicable, assess the potential effects of identified contaminants on soil and groundwater to off-site receptors.
- Identify any outstanding data gaps in relation to assessing the contamination status of the site.
- Identify if remedial measures are required to make the site suitable for the current or proposed future land uses.

1.2 Scope of work

The scope of works completed by GHD as part of this assessment, and in accordance with GHD's proposal (RFQ 79-2018 Proposal for Lindfield Village Hub, Groundwater Testing Services, dated 31 October 2018), are described below.

- Review of previous environmental and geotechnical investigations undertaken at the site, namely the ADE (2016) Phase 2 DSI report, and the Asset Geotechnical (2016) report. Copies of these reports were provided to GHD by Council.
- Site walkover to:
  - identify areas of potential contamination based on observation of surface conditions, and evidence of current or former potentially contaminating activities including existing business activities and waste disposal.
  - locate previously drilled wells BH6 (Douglas Partners) and BH5 (Asset Geotechnical), and assess their potential for use as monitoring wells.
- A review of published soils, acid sulphate soils, geology, hydrogeology, hydrology, topography, aerial photographs and EPA records.
- Utilities clearance of exploratory locations by a specialist contractor to enable safe subsurface boring.
- Drilling and sampling of three boreholes, GHD_BH1, GHD_BH1A and GHD_BH2, using a combination of hand augering (HA), machine single flight auger (SFA) drilling, and diamond coring (DC) to penetrate the bedrock to the depths prescribed by Council.
- Drilling of GHD_BH2 to the proposed depth of basement development (24 m bgl at GHD_BH1 and 21 m bgl at GHD_BH2), to provide rock core for geotechnical information as per Council request. Council later determined that it did not require geotechnical information to be collected from the boreholes. GHD_BH2 was backfilled after drilling due to the existing well BH5 adjacent to the position of GHD_BH2.
- Collection of disturbed soil samples and core, and description of strata encountered and screening of samples using a photo-ionisation detector (PID) for potential volatile organic compounds (VOCs).
- Installation of groundwater monitoring wells in GHD_BH1 (lower sandstone unit) and GHD_BH1A (upper shale unit).
- Groundwater monitoring of GHD_BH1, GHD_BH1A, BH5 and BH6.
- Survey of the collar locations of GHD_BH1, GHD_BH1A and GHD_BH2, and BH5 and BH6.
- Collection of soil and groundwater samples from new and pre-existing wells for analysis of contaminants of potential concern (COPC):
  - Soil - total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), metals (arsenic, cadmium, chromium, copper, mercury, nickel, lead, zinc, iron, manganese), asbestos, chlorinated solvents (VHC)
  - Waters - TRH, BTEX, PAH, VHC, PCB, metals (arsenic, cadmium, chromium, copper, mercury, nickel, lead, zinc, iron, manganese)
- Preparation of this groundwater investigation report in general accordance with the *Guidelines for Consultants Reporting on Contaminated Sites* (NSW OEH, 2011).
- Make recommendations for follow up actions, including development of a Remedial Action Plan (RAP), should it be required.

1.3 Limitations

This report has been prepared by GHD for Ku-ring-gai Council and *may only be used and relied on by Ku-ring-gai Council for the purpose agreed between GHD and the Ku-ring-gai Council as set out Section 8 of this report.*

GHD otherwise disclaims responsibility to any person other than Ku-ring-gai Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

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

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

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

GHD has prepared this report on the basis of information provided by Ku-ring-gai Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.
Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

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

2. Site information

2.1 Site identification

A site location plan showing the location of the property is provided as Figure 1 in Appendix A. A summary of available information pertaining to the site is presented in Table 1 and Table 2.

Table 1 Site location summary

Information	Details
Local Government Area	Ku-ring-gai Council
Site address	Lindfield town centre. Bound by Bent Street to the north, Beaconsfield Parade to the south, Woodford Lane to the east and residential properties to the west.
Site area	Approximately 1.34 hectares
Geographic Co-ordinates	330341 E, 6261206 N
Current Land Use	Public car parks, some residential properties and vacant lots

Table 2 Site zoning and legal identifiers

Lot Number	Deposited Plan Number	Zoning	Address
A	445535	B2 Local Centres	1 Woodford Lane, Lindfield
9	1090427	B2 Local Centres	2 Bent Street, Lindfield
10	3498	B2 Local Centres	4 Bent Street, Lindfield
3	667420	B2 Local Centres	6 Bent Street, Lindfield
1	724823	B2 Local Centres	8 Bent Street, Lindfield
1	980108	B2 Local Centres	10 Bent Street, Lindfield
5	666521	Part B2 Local Centres and part R4 High Density Residential	12 Bent Street, Lindfield
1	929131	B2 Local Centres	1B Beaconsfield Pde, Lindfield
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	1099330	B2 Local Centres	19 Drovers Way, Lindfield
		B2 Local Centres	Drovers Way between Beaconsfield Pde and rear of 6 Bent Street, Lindfield

Lot Number	Deposited Plan Number	Zoning	Address
		B2 Local Centres	Woodford Lane, Lindfield

The Ku-ring-gai Local Environment Plan 2015 (LEP), land zoning map is provided as Figure 3 in Appendix A.

2.2 Surrounding land use

Land adjacent to the site consists of the following:

- North: Bent Street, including a number of low density residential properties and vacant lots along the south side of the street, and mixed density residential properties, including Lindfield Manor Retirement Village, on the northern side of Bent Street
- East: Woodford Lane, including public car parks servicing the Lindfield town centre, and commercial properties between Woodford Land and Pacific Highway. Lindfield train station lies to the east of the site on Pacific Highway. A dry cleaning business is located at 346 Pacific Highway and is accessible from Woodford Lane.
- South: Beaconsfield Parade, including the Scouts Hall and the electrical substation at the southern end of the car park, and mixed residential and commercial properties along the south side of Beaconsfield Parade
- West: Drover's Way, including public car parks, some unused green space west of the car park and low density residential properties.

2.3 Proposed land use

Ku-ring-gai Council proposes to redevelop the site to create the Lindfield Village Hub (the Hub) (for further information on the proposed redevelopment, refer to: http://www.kmc.nsw.gov.au/Current_projects_priorities/Works_and_upgrades/Major_projects/Activate_Lindfield/Lindfield_Village_Hub)

The Hub is intended to be a mix of green open space, public plaza, and community buildings, retail and residential and underground car parking that will include:

- A 1,200 square metre (m^2) library
- A 1,250 m^2 community centre
- A 550 m^2 child care facility
- 3,900 m^2 of public space including a plaza, park and open space
- Residential apartments
- An underground supermarket and retail shops
- Basement car parking
- Dining and retail outlets

Following this redevelopment, site usage patterns are anticipated to differ from current, with increased availability of useable green space, and the development of a childcare facility on site. Potential for access to site soils in the proposed redevelopment scenario is unknown and is not provided on the Lindfield Hub information website provided by Council.

2.4 Environmental setting

2.4.1 Topography and drainage

Surveying of previous drilled boreholes (Asset Geotechnical 2016), indicates that surface RL across the site varies from approximately 94 metres (m) Australian Height Datum (AHD) in the north east of the site, sloping away to approximately 88 m AHD along the western boundary of the site. This was confirmed by surveying of the borehole collar relative levels (RLs) undertaken during the current site investigation works. Surface water runoff is therefore expected to be from the north-eastern boundary to the west and south-western boundary of the site.

Surface drainage is captured via stormwater drains, with any excess surface water runoff expected to follow local topography towards Little Blue Gum Creek, approximately 1.4 kilometres (km) to the west of the site. Little Blue Gum Creek ultimately flows into the Lane Cove River at a point 1.9 km south west of the site.

2.4.2 Soil landscapes

The *Soil Conservation Service of NSW 1:100,000 Soil Landscape Series Sheet 9130, Sydney (Chapman and Murphy, 1989)*, classifies the soil as Glenorie, and describes the soil and landscape as follows:

- Landscape: The landscape is comprised of undulating to rolling hills with local relief varying from 50 – 120 m AHD, with moderately inclined slopes of 10 – 15 % being the dominant landform (ADE 2016).
- Soils: The Glenorie (9130 gn) soils landscape includes soils that are shallow to moderately deep, with colours varying between red, brown and yellow-cream, and a tendency to being dry and slightly plastic (Chapman and Murphy, 1989). The soils are derived from the Ashfield Shale of the Triassic Wianamatta Group, which is characterised by laminate, dark grey siltstone, shale, calcareous claystone and coal.

2.4.3 Geology

According to the Sydney 1:100,000 scale *Geological Series Sheet SI 56-5* the site is underlain by the following geological unit outlined in Table 3.

Table 3 Published geology

Period	Group	Description
Triassic	(Rwa) Wianamatta Group	Ashfield Shale Minchinbury Sandstone Bringelly Shale

The Wianamatta Group is represented by the Ashfield Shale unit, which is typically described as a succession of *'Black to dark grey shale and laminate that contains some sandstone beds",* the Minchinbury Sandstone and the Bringelly Shale. No geological structures such as faults, folds, dykes or other structures are indicated at the site. The Wianamatta Group overlies the Triassic Hawkesbury Sandstone.

Localised fill, associated with the several generations of buildings constructed and demolished since 1943 is likely to be present across the site, as noted in Section 2.5.1. Fill material has been noted during previous on-site investigations which identified fill materials up to approximately one metre below ground level (m bgl), but is generally to 0.3 m bgl (ADE, 2016).

2.4.4 Hydrogeology

GHD conducted a review of existing groundwater bore records using the NSW Water Information Database on 21 January 2019. The search was conducted to identify registered groundwater bores in close proximity to the site, and to record information such as use and standing water level. No groundwater bores were identified within a 500 m radius of the site. The closest groundwater bore (GW023498) is located approximately 560 m to the north of the site near the intersection of Treatts Road with Lindfield Avenue. Groundwater was encountered with a standing water level of 6.80 m below ground level, as measured at the time of drilling in 1966. The next closest bore, GW1086792, is located approximately 1100 m to the south east of the site and is used for domestic purposes. The standing water level for this bore was recorded at 65 m bgl at the time of drilling in 2007. A summary of the bore search findings is presented in Table 4.

Table 4 Groundwater bores in the vicinity of the site

Bore ID	Purpose	Depth (m)	Standing water level (m)	Approximate distance from site	Driller's log
GW023498	General Use	8.22	6.80	560	0.0 – 6.70 m white sand 6.70 – 8.22 m white sand, fossilised shell fragments
GW108792	Domestic	174.00	65.00	1100	0.0 – 4.0 m clay 4.0 – 15.0 m shale 15.0 – 174 m sandstone with minor shale

2.4.5 Hydrology

The ground surface of the site is primarily sealed bitumen, with surface water runoff likely to enter the site stormwater drainage system prior to discharge. In the unsealed areas on the site, surface water would be expected to infiltrate the ground surface. The closest receiving water body is Little Blue Gum Creek as discussed above in Section 2.4.1.

Due to the urban environment surrounding the site, excess surface water from surrounding land and adjacent roads is also expected to enter the local stormwater drainage system.

2.4.6 Acid sulphate soils

The Ku-ring-gai LEP Acid Sulfate Soils Map – Sheet ASS_015 (see Figure 4, Appendix A), describes the site as having no acid sulphate soils. Approximately 60 m to the west of the site, the map shows Class 5 acid sulphate soils (ASS). ASS are not typically found in Class 5 areas, and no other class of soils is mapped within 1.5 km of the site. Land management activities are hence not likely to be affected by ASS materials at this site. Development consent is only required if works are conducted below five metres AHD, and if the water table is likely to be lowered below one metre AHD on adjacent Class 1, 2, 3, or 4 land.

2.5 Site history

2.5.1 Historical aerial photographs

A review of historical aerial photographs taken in 1943 using NSW Land and Property Information browser service SIX Maps, shows the site was covered by low density residential and commercial businesses at that time. There were no public car parks, and the properties facing onto the Pacific Highway extended through to Drovers Way which was then an unsealed laneway. Residences existed on the lots at 2, 4, 6, 10 and 12 Bent Street, and single residential properties were present on the north side of Bent Street.

Interrogation of the historical site photographs using Google Earth Pro show the area was developed for the existing public car parking prior to 2005, with Woodford Lane also in existence. By this time, the properties along the Pacific Highway had been reduced in extent to allow for the car park development. Single residential properties existed from 2 – 12 Bent Street, and the Lindfield Manor Retirement Village had replaced single residences on the north side of Bent Street.

Redevelopment of the site remained static until 2014, when the residences at 8 and 10 Bent Street were demolished to become vacant lots. This was followed by the demolition of 12 Bent Street during 2015. The property at 2 Bent Street was demolished during the second half of 2016. The residences at 4 and 6 Bent Street currently remain standing.

In summary, the site was developed for residential purposes prior to 1943, before being redeveloped primarily for public car parking to service the Lindfield town centre some time prior to 2005.

2.5.2 Regulatory information summary

The list of NSW contaminated sites notified to EPA was searched on 9 January 2019. According to the EPA, “A site will be on the Contaminated Land: Record of Notices only if the EPA has issued a regulatory notice in relation to the site under the *Contaminated Land Act 1997* (CLM Act).

The sites appearing on the “List of NSW contaminated sites notified to the EPA” indicate that the notifiers consider that the sites are contaminated and warrant reporting to the EPA. However, the contamination may or may not be significant enough to warrant regulation by the EPA. The EPA needs to review and, if necessary, obtain more information before it can make a determination as to whether the site warrants regulation.”

The search of the list of NSW contaminated sites notified to EPA identified a 7-Eleven (former Mobil) service station located at 238 Pacific Highway, Lindfield. The record notes that regulation of the service station site is not required under the Contaminated Land Management Act (CLM Act). Based on the undulating local topography and the distance to the site, it is considered unlikely that a contamination plume associated with the 7-Eleven site would have potential hydraulic impact on the site. This site is not listed on the Record of Notices.

No contaminated sites Record of Notices were identified within 500 m of the site.

2.6 Review of previous environmental investigations

In preparing this report, GHD has reviewed the following previous investigation reports provided by Council, which are relevant to the site:

- *Phase II Detailed Site Investigation Lindfield Community Hub. Lindfield NSW.* ADE Consulting Group July 2016
- *Proposed Mixed Use Development Lindfield Community Hub Project. Report on Geotechnical Investigation.* Asset Geotechnical December 2016.

Relevant information from these reports has been summarised below.

2.6.1 Summary of data from previous investigations

A review of the ADE (2016) report indicates that the site has been subject to a number of geotechnical and environmental investigations undertaken by ADE and Douglas Partners (DP) beyond the reports which were provided to GHD. In addition, Asset Geotechnical undertook a geotechnical investigation in late 2016. As some of these reports were not provided to GHD, where noted, the conclusions and summary below are not based on our interpretation, but refer to a summary in the ADE (2016) report:

The following is a summary of the work and conclusions,:

- In 2012 ADE undertook a Phase 1 Preliminary Site Investigation (PSI) (ADE (2016) summary) which concluded that, based on data and evidence collected during a desktop and site inspection, a Phase 2 DSI be undertaken to assess the type, degree and extent of potential contamination, and whether it posed a risk to human health or the environment (ADE 2016).
- In 2013, Douglas Partners completed a preliminary Phase 2 site investigation (ADE (2016) summary) with limited sampling, including the drilling of five boreholes to eight metres below ground level (bgl), One borehole (BH6), was converted to a groundwater monitoring well. The findings of the report suggested the site was suitable for continued and proposed use as a car park, with no requirement for a remedial action plan (RAP) for the development. A construction management plan was recommended to manage the disposal or re-use of excavated soils.
- In June 2016, ADE undertook a Phase 1 PSI (ADE (2016) summary) to investigate the land use history of the site and surrounding areas to identify past practices that may have potential to cause soil or groundwater contamination at the site. The investigation identified the following potential sources of contamination:

  – Vehicle emissions and leaking oil

  – Down-gradient migration of contaminants associated with the dry cleaning business (VHCs), and the electrical substations (PCBs)

  – Pesticides and insecticides used on vegetation in median strips

  – Placement of uncontrolled fill beneath the car park

  ADE (2016) recommended an intrusive investigation to assess the extent of potential contamination

- In July 2016, ADE carried out a Phase 2 DSI as follow up to the Phase 1 PSI. Their findings identified no samples with COPC that exceeded selected human health criteria, and several samples that exceeded selected ecological assessment criteria. Based on these findings, they recommended the following:
  - A groundwater investigation including installation and sampling of groundwater wells along the eastern boundary to target a dry cleaning business and electrical substation
  - Sampling of Douglas Partners groundwater monitoring well, BH6
  - Preparation of a RAP to remediate soil impacts identified as part of the DSI
- In December 2016, Asset Geotechnical undertook a geotechnical investigation to assess the surface and subsurface conditions and provide information including groundwater levels and dewatering requirements. They determined that groundwater levels are well above the proposed basement levels and would require groundwater control during development.

3. Data quality objectives

3.1 Overview

Data quality objectives (DQOs) have been established for this assessment to assist the design and implementation of data collection activities, to ensure the type, quantity and quality of data obtained are appropriate and address the project objectives. The DQO process described in the Guidelines for the NSW Site Auditor Scheme, 3rd edition (EPA, 2017) was adopted for this project. The DQO process involves seven steps:

- Step 1: State the problem
- Step 2: Identify the decision
- Step 3: Identify inputs to the decision
- Step 4: Define the study boundaries
- Step 5: Develop a decision rule
- Step 6: Specify limits on decision errors
- Step 7: Optimise the design for obtaining data

Description of each DQO step developed for this project is provided below.

3.2 Step 1: State the problem

The Phase 2 DSI completed by ADE (2016) identified several soil samples at the site with potential contamination exceeding their nominated ecological criteria. They also questioned the quality of the groundwater at the site, particularly along the eastern boundary, down gradient of the dry cleaning business and the electrical substation.

Data gaps identified during the desktop review completed by GHD included:

- The status of soil and groundwater contamination from the identified potential sources both on and off-site
- The degree and extent of contamination (if present).
- The potential presence of yet unidentified on-site or off-site contaminating sources.

The problem as it stands is that the site is proposed for redevelopment and the degree to which contamination may pose a risk to human health and/or environmental receptors both on and off-site as a result of the change in site condition is unknown.

3.3 Step 2: Identify the decisions

The decisions to be made at the end of this assessment are:

- Is there soil and/or groundwater contamination at the site which presents a potential risk to identified human health and ecological receptors associated with the proposed redevelopment of the site?
- Is there a need for further assessment, remediation and/or management of contamination (if identified)?
- Is there a requirement for further assessment and/or management of identified contamination?

3.4 Step 3: Identify inputs to the decision

The information considered in the decision making process comprised:

- Review of historical land uses and potential contamination sources identified at the site and on surrounding properties.
- The proposed redevelopment extent and scope.
- Published environmental information for the site, including geological and hydrogeological maps.
- Information obtained from previous investigations, listed in Section 2.6.1.
- Soil and groundwater analytical data obtained during the investigation, and comparison to applicable criteria for the proposed land use.
- Applicable guidelines, made or endorsed by NSW EPA under Section 60 of the *Contaminated Land Management Act 1997* (CLM Act).

3.5 Step 4: Define the study boundaries

The lateral investigation extent is the investigation area illustrated in Figure 2 (Sampling Location Plan), Appendix A.

The maximum vertical extent for soil and hard rock investigation was 24.85 m bgl at the base of GHD_BH1. The maximum screened depth for groundwater was 23 m bgl at GHD_BH1.

The temporal extent of the soil investigation was between 4 and 6 December 2018, with groundwater sampling undertaken on 14 December 2018.

3.6 Step 5: Develop a decision rule

The decision rules adopted in this detailed site investigation are as follows:

- The concentrations of contaminants of potential concern are to be assessed against adopted site investigation levels, which are sourced from NSW EPA endorsed guidelines with reference to site-specific exposure scenarios for permissible and proposed land use.
  - If concentrations of contaminants in soils, landfill gas and groundwater are below the adopted investigation levels, then contamination at the site will be considered unlikely to pose an unacceptable risk to identified receptors. In such case, no further investigation, remediation or management is required.
  - Conversely, when concentration(s) of contaminants of potential concern exceed the adopted site investigation levels, further assessment would be required to evaluate the need for additional investigation and / or remediation / management activities.

3.7 Step 6: Specify limits on decision errors

Two primary decision error types may occur due to uncertainties or limitations in the project data set:

- A sample / area may be deemed to pass the nominated criteria, when in fact it does not. This may occur if contamination is 'missed' due to limitations in the sampling plan, or if the project analytical data set is unreliable.
- A sample / area may be deemed to fail the nominated criteria, when in fact it does not. This may occur if the project analytical data set is unreliable, due to inappropriate sampling, sample handling, or analytical procedures.

The following aspects were considered when establishing the acceptable limits on decision errors:

- The null hypothesis for the project is: the sample / investigation area is deemed to be contaminated. Sufficient weight of evidence, via the uses of statistical analysis (e.g. 95% upper confidence limit of the mean (UCL)) and/or gathering of multiple lines of evidence (e.g. desktop review and laboratory analytical data), would be required to reject / disapprove the null hypothesis.
- A quality assurance / quality control (QA/QC) assessment evaluating the reliability and useability of data, which are expressed as five data quality indicators (DQI) discussed in Section 3.

3.7.1 Data quality indicators

The DQIs for sampling techniques and laboratory analysis of collected samples identifies the acceptable level of error for this investigation. The DQIs adopted in this investigation comprise five components, being precision, accuracy, representativeness, comparability and completeness. Detailed discussion of each component is provided below:

- Precision – measures the reproducibility of measurements under a given set of conditions. The precision of the data is assessed by calculating the Relative Percent Difference (RPD) between duplicate sample pairs.

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

Where Co = Analyte concentration of the primary sample
Cd = Analyte concentration of the duplicate sample

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

- Accuracy – measures the bias in a measurement system. Accuracy can be undermined by such factors as field contamination of samples, poor preservation of samples, poor sample preparation techniques and poor selection of analytical techniques by the analysing laboratory. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes, laboratory blanks and analyses against reference standards. The nominal “acceptance limits” on laboratory control samples are defined as follows:
  - Laboratory spikes – 60-130% recovery for metals / inorganics and 60-140% for organics.
  - Laboratory duplicates – Nominal RPD values of 30% or lower. Higher RPD values are generally considered acceptable when the result is close to the practical quantitation limit (PQL).
  - Laboratory Surrogates (Organics only) – 60% - 130% recovery.
  - Laboratory blanks - <PQL.
- Representativeness – expresses the degree which sample data accurately and precisely represents a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples in appropriate locations across the investigation area, and by using an adequate number of sample locations to characterise soil and groundwater at the investigation area. Consistent and repeatable sampling techniques and methods are utilised throughout the sampling.

- Completeness – defined as the percentage of measurements made which are judged valid measurements. The completeness goal is set at there being sufficient valid data generated during the study. If there is insufficient valid data, then additional data are required to be collected.
- Comparability – is a qualitative parameter expressing the confidence whether one data set can be compared with others. This is achieved through maintaining a level of consistency in techniques used to collect samples and ensuring analysing laboratories use consistent analysis techniques and reporting methods.

3.8 Step 7: Optimise the design for obtaining data

With due consideration given to the DQO steps described above, a sampling and analytical program was developed for the intrusive investigation programme to obtain information to address the decision questions set out in Section 3.3. The program comprised the following:

- Borehole drilling for soil investigation and sampling at three locations targeting the down gradient location of the dry cleaning business and the electrical substation. The sampling locations were determined based on a judgemental approach.
- Installation and monitoring of three monitoring wells for groundwater.
- Laboratory analysis of selected soil samples and groundwater samples for identified contaminants of potential concern. Samples were selected on the basis of:
  - The likelihood of contamination presence in surficial and shallow soils in the unsaturated zone.
  - Visual and olfactory indications of potential contamination presence observed during investigation, as well as PID screening results
- Assessment of data quality with reference to the specified DQIs to evaluate the reliability and useability of the obtained data.
- Assessment of laboratory analytical results against adopted criteria.

4. Basis for assessment

Based on information provided by Council to GHD outlining the scope of the proposed future land use, GHD understands that the proposed development will include a mixed use community hub with a library, community centre, childcare centre, public plaza, park and open space, residential apartments, dining and retail outlets, supermarket and basement parking. The exact locations of these amenities are currently unknown, hence GHD has chosen a conservative approach to the assessment criteria where appropriate.

4.1 Soil assessment criteria

The following provides a summary of the criteria selected for the assessment and the associated rationale. The specific assessment criteria are presented on the assessment tables provided Appendix E.

4.1.1 Chemicals and asbestos in soil

The assessment criteria have been adopted from the following guidelines made or endorsed by the NSW EPA:

Ecological criteria:

NEPM (2013) Ecological Investigation Levels (EILs); Ecological Screening Levels (ESLs) Urban Residential - Public Open Space

The nature of the site results in site usages that are best described under multiple EIL / ESL scenarios.

- ESL/EIL criteria for commercial and industrial land use may be applicable, however, public open space criteria have been adopted as it is protective of the most sensitive use in an unknown configuration.
- These ecological investigation levels were adopted for contaminants including TRHs, BTEX, metals, and some PAHs.
- The ecological investigation levels take into account direct contact pathways, including incidental ingestion and dermal contact. These levels are only applied to the upper 2 m of the soil profile.
- Site specific ecological investigation levels for specific metals were not calculated using background concentrations or soil quality; as a result the EILs used for copper, zinc and nickel are conservative Added Contaminant Limits (ACL).
- Given that the area is designed to include urban residential and public open space, these criteria have been conservatively adopted to take into consideration the landscaped areas where vegetation either exists or is proposed.

Human Health Criteria:

NEPM (2013) Health Investigation Levels (HILs) HIL A – residential with garden/accessible soil, including childcare centres; HIL B – residential with minimal opportunity for soil access; HIL C – public open space including parks and playgrounds

The nature of the site results in site usages that are best described under multiple HIL scenarios.

- The Health Investigation Level (HIL) A was adopted to reflect the inclusion of a child care centre as part of the proposed development
- HIL B was considered to reflect the proposed site development of multistorey residential dwellings with paved yard space and minimal opportunities for soil access
- HIL C was considered to reflect the site usage scenario of potential regular use of public greenspace areas for recreational purposes.

HIL A is the most conservative set of criteria and has been adopted here as a preliminary screen due to the planned presence of a childcare centre and the unknown layout of that centre.

NEPM (2013) Health Screening Levels (HSLs) A / B for Residential Vapour Intrusion, Sand (0-2m)

- The HSL D Commercial / Industrial criteria were considered based on the proposed design for basement car parking across the site. However, noting that a sensitive land use (residential including child care) is planned for development, and the layout of the site is unknown, HSL A/B criteria have been adopted here as a preliminary screen as the most conservative set of criteria.

CRC CARE (2011) Soil Vapour HSLs for Intrusive Maintenance Worker (Shallow Trench)

- Screening levels for petroleum hydrocarbons were considered for intrusive maintenance workers carrying out shallow trench works.
- The NEPM (2013) HSL A & B for petroleum hydrocarbons were adopted as the initial screening assessment criteria, as the HSL-A & B is more stringent than the CRC HSLs for intrusive maintenance workers.

CRC Care (2011) Soil HSLs for Direct Contact: Recreational / Open Space, Commercial / Industrial and Intrusive Maintenance Worker

- The nature of the proposed development results in site usages that may be described under multiple direct contact scenarios during and after construction.
- The recreational direct contact criteria were adopted to reflect the site usage scenario of the public with potential regular use of outdoor areas for recreational purposes.
- Intrusive maintenance worker criteria have been adopted to reflect the site usage scenario encountered during construction, particularly for those workers involved in the installation of utilities.

Asbestos in soil

In alignment with the DQOs set for this groundwater investigation, a preliminary assessment on asbestos in soil was undertaken for the site area (see Waste Classification report in Appendix E), where selected soil samples were screened for asbestos using a presence / absence protocol in laboratories. This analytical method does not allow quantification of asbestos concentrations in soil for comparison against the HSL criteria provided in NEPM (2013). Therefore the assessment criterion adopted in this groundwater investigation was based on positive or negative identification of asbestos in collected soil samples, as well as identification of asbestos on site during fieldworks.

Management limits

NEPM (2013) Management Limits for TRH –Residential, parkland and public open space – Coarse soils

- These management limits have been adopted to provide a conservative screening level for the identification of any potentially hazardous TRH contamination on the site with respect to installation of utilities.

Preliminary Waste Classification

NSW EPA (2014) Waste Classification Guidelines: Part 1 Classification of Waste

- The guidelines provide criteria for assessing the appropriate waste classification and subsequent disposal location for solid wastes. The classification process for non–liquid wastes focuses on the potential for the waste to release chemical contaminants into the environment through contact with liquids (leachates).
- Should the waste be found (or reasonably suspected) to contain asbestos then the material should be classified as special waste mixed with general solid, restricted solid or hazardous waste (as applicable) and managed accordingly. A waste classification report for disposal of excess drilling spoil from this investigation is located in Appendix E.

4.2 Groundwater assessment criteria

Following a groundwater bore search, no groundwater extraction bores were identified within 500 m of the site and no likely drinking water receptors are identified. Little Blue Gum Creek is the closest receptor at 1.4 km west of the site, with the site itself surrounded by low density residential or commercial development. With reference to these potential exposure pathways and receptors, the following groundwater assessment criteria were adopted:

Ecological Criteria

NEPM (2013) Groundwater Investigation Levels (GILs); (ANZECC 2000) Freshwater Quality (low to medium reliability) [1]

- The investigation levels for slightly – moderately disturbed fresh water aquatic ecosystems were adopted after consideration of the likely receptors of surface water leaving the site. A species protection level of 95% was adopted to reflect the urbanised setting of the area.

[1] *The ANZAST (2018) criteria were endorsed by NSW EPA under S105 of the CLM Act on 4 September 2018. At the same time the ANZECC (2000) water quality guidelines were revoked. While the ANZAST (2018) have been endorsed, preliminary review of these guidelines by GHD and others has identified a number of discrepancies with ANZECC (2000) which have yet to be clarified. As such, ANZECC (2000) criteria have still been adopted for the purposes of this report until the issues with ANZAST (2018) have been resolved.*

- Where no criteria for an analyte are provided in the NEPM GILs, ANZECC low reliability criteria have been adopted.

Human Health Criteria

NEPM (2013) Groundwater Investigation Levels (GILs); NHMRC ADWG (2011, updated 2018) health and aesthetic guidelines

- Although no registered drinking water abstraction has been identified in the local area, this receptor has been considered in accordance with NSW EPA guidelines.
- The ADWG are presented for comparative purposes only, as it is expected that groundwater and surface water at or leaving the site is unlikely to be consumed by humans.

NEPM (2013) Health Screening Levels (HSLs) HSL-A & B for residential vapour intrusion risks associated with petroleum hydrocarbons

- Various soil types were encountered at the site during the investigation. A conservative approach has been adopted, by adopting the screening levels applicable for coarse grained soil (i.e. sand) and a source depth of 2 to 4 m. This screening level reflects a more sensitive land use scenario than is proposed for the site, and is also protective of workers on-site in buildings as well as outdoors.

4.3 Aesthetic considerations

The site assessment requires balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity. The general assessment considerations include:

- That chemically discoloured soils or large quantities of various types of inert refuse, particularly if unsightly, may cause ongoing concern to site users.
- The depth of the materials, including chemical residues, in relation to the final surface of the site.
- The need for, and practicality of, any long-term management of foreign material.

5. Sampling and analysis program

5.1 General

The following section provides details of the sampling and analysis program that was developed to address the objectives and the scope of works for the project.

5.2 Workplace health and safety

GHD developed a site specific health safety and environment (HSE) Plan for the investigation works as part of the overall commitment to provide a healthy and safe working environment for staff and contractors. All work employed personal protection equipment (PPE) in accordance with GHD HSE requirements.

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

GHD also completed a site inspection prior to on-site intrusive works to finalise the proposed borehole locations, which included the following:

- Accessibility of each location was checked by GHD's site representative.
- Services clearance was undertaken by a professional underground services locator to further reduce the risk of intersecting subsurface services during the intrusive works, and Dial Before You Dig plans were also referenced.

5.3 Sampling locations and details

The following sections provide details of sampling locations at different stages of the investigation.

5.3.1 Soil Investigation

Intrusive soil investigations were conducted by GHD between 4 and 6 December 2018. The soil investigation works involved the drilling of three soil boreholes and the installation of two monitoring wells. The sampling locations are shown on Figure 2. Table 5 provides a summary of the investigation locations completed in this groundwater investigation.

Table 5 Summary of soil investigation locations

Location ID	Coordinates (MGA 56)		Hole Depth (m bgl)	Monitoring Well Screening Interval (m bgl)	Monitoring Well – Screened Lithology
	Easting	Northing			
GHD_BH1	330354.31	6261252.00	24.85	17 to 23 m bgl	Sandstone
GHD_BH1A	330353.24	6261252.39	13.0	7 to 13 m bgl	Silty shales
GHD_BH2	330354.54	6261228.69	20.95	N/A (backfilled)	N/A

N/A – not applicable

Borehole drilling

Three soil boreholes (BH) were drilled across the site. Investigation locations and their respective IDs are summarised in Table 5. Drilling was initially undertaken by hand augering

through shallow depths, followed by use of a truck mounted drilling rig with solid flight augers, and conventional diamond coring.

Two boreholes (BH1 and BH1A) were converted to monitoring wells (MW) as per Table 5. As discussed above drilling was undertaken using a truck mounted drilling rig.

Soil Sampling Method

Disturbed soil samples were collected from all soil sampling locations at the surface (0 to 0.2 m), 0.5 m, 1.0 m bgl and every half metre thereafter to auger refusal or to the top of the saturated zone. Additional samples were collected from cored sections in GHD_BH1 where olfactory evidence of contamination was suspected.

All samples were collected in accordance with GHD's Standard Field Operating Procedures to ensure that representative samples were collected, information was accurately recorded and quality control maintained throughout the investigation.

Soils penetrated during the investigation were described in general accordance with the Unified Soil Classification system, with features such as seepage, discolouration, staining, odours and other indications of contamination being noted.

A visual assessment was made of all samples for the potential presence of latent organic or asbestos contamination.

A small portion of soil was separated from each sample and placed in to zip lock bags for field vapour/headspace screening using a PID. Observed subsurface geological conditions, PID readings of collected soil samples and visual and olfactory evidence of potential contamination were recorded on the borehole logs.

Sample handling, storage and transportation

Samples for chemical analysis were immediately placed into glass jars, which were sealed with Teflon-lined plastic lids. Samples for asbestos screening analysis were placed into zip lock bags. Collected samples were then stored in ice-chilled cool boxes prior to and during transit to the nominated analytical laboratories.

Installation of groundwater monitoring wells

Groundwater monitoring wells, as listed in Table 5, were installed upon completion of drilling in selected boreholes. The monitoring wells were constructed using Class 18 PVC, 50 mm diameter casings and slotted screen sections. The well construction across the site comprised the following:

- The standpipe included a six metre section of slotted screen section at depths noted in Table 5, and solid casing sections from surface to the slotted screen
- Sand was used to backfill the well annulus around the screened section, from the base of the hole to 0.5 m above the top of the slotted screen.
- A bentonite plug up to 1.5 m was applied in the well annulus above the filter pack.
- Grout was used to backfill the remaining well annulus to 0.1 m bgl and the well annulus was secured with concrete.
- A gatic cover was used to protect the well at surface level.

The graphical depictions of the well construction details are presented in the borehole logs, (Appendix B).

5.3.2 Groundwater sampling

Groundwater sampling method

Prior to groundwater sampling, the selected groundwater monitoring wells were gauged (water level recorded). These wells were then purged until field analytes (pH, electrical conductivity (EC), redox potential (redox), dissolved oxygen (DO) and temperature) stabilised to within 10% between readings. Field analytes were measured with an appropriately calibrated field instrument. A calibration certificate for the instrument used is provided in Appendix C.

Following the stabilisation of the field analytes, the wells were sampled using the micro purge 'low flow' sampling method. Groundwater was purged until drawdown and physico-chemical parameters stabilised sufficiently for a representative sample to be collected.

All samples were collected in accordance with GHD's Standard Field Operating Procedures to ensure that representative samples were collected, information was accurately recorded and quality control maintained throughout the investigation.

5.4 Sample analytical program

Selected samples were submitted to the nominated NATA accredited laboratory (Eurofins|mgt, Sydney) for analysis for the contaminants of potential concern and a secondary laboratory (ALS) for duplicate analysis.

5.4.1 Soil analytical program

A summary of the soil analytical schedule is presented in Table 6.

Table 6 Summary of soil analytical program

Analyte	Number of primary soil samples analysed	Number of duplicate samples analysed	Total number of samples	Duplicate ratio	Trip Blanks	Trip Spikes
TRH	5	2	7	2:7	1	
BTEX	5	2	7	2:7	1	1
PAHs	5	2	7	2:7		
Phenols	5	2	7	2:7		
OCP/OPP	5	2	7	2:7		
PCBs	2	0	2	NA		
Metals (arsenic, cadmium, chromium, copper, iron, nickel, lead, zinc, mercury	5	2	7	2:7		
Asbestos	2	0	2	N/A		

5.4.2 Groundwater analytical program

A summary of the groundwater analytical schedule is presented in Table 7.

Table 7 Summary of groundwater analytical program

Analyte	Number of primary soil samples analysed	Number of duplicate samples analysed	Total number of samples	Duplicate ratio	Trip Blanks	Trip Spikes	Rinsate
TRH	4	2	6	1:3	1	1	2
BTEX	4	2	6	1:3	1	1	2
PAHs	4	2	6	1:3			2
Phenols	4	2	6	1:3			2
OCP/OPP	4	2	6	1:3			2
PCBs	1	1	2	1:2			1
Metals (arsenic, cadmium, chromium, copper, iron, nickel, lead, zinc, mercury	4	2	6	1:3			2

6. QA/QC data quality assessment

6.1 Overview

As identified in Section 3, GHD carried out the investigative works in accordance with robust QA/QC processes. These processes were undertaken in order to generate data that was as representative as possible of the prevailing site conditions at the relevant locations at the time of monitoring.

Information in relation to how these QA/QC processes have produced data that achieves this required outcome is provided in the following sections.

6.2 Field quality controls

6.2.1 General

All fieldwork was conducted in general accordance with GHD's standard field operating procedures, aimed at collecting all environmental samples using a set of uniform and systematic methods, as required by GHD's Quality Assurance system. Key requirements of these procedures included:

- Personnel completing the soil sampling and groundwater sampling works were appropriately trained and experienced.
- Appropriately trained and experienced staff documented site activities using notes on standard field forms such as daily and sampling logs.
- Decontamination procedures including the use of new disposable gloves for the collection of each sample, decontamination of any reusable sampling equipment between each sampling location and the use of dedicated sampling containers.
- Logging procedures – all samples were described using the Unified Soil Classification System: Field Procedure.
- Calibration procedures – all items field monitoring equipment were appropriately calibrated where applicable, and calibration sheets are provided (see Appendix C)
- Sample identification procedures – collected samples were immediately transferred to sample containers of appropriate material and preservation for the required laboratory analysis. All sample containers were clearly labelled with a sample number, sample location, sample depth, sample date and sampler's initials. The sample containers were transferred to an esky for sample preservation prior to and during shipment to the testing laboratories.
- Chain of custody information requirements – Chain-of-custody forms were completed and forwarded to the relevant testing laboratories for the collected samples as required.
- Duplicates were assessed by calculating the Relative Percentage Difference (RPD) between the primary and split / duplicate samples. These results are discussed in Sections 6.3.1 and 6.4.2.

6.2.2 Field quality control

Field quality control procedures used during the project comprised the collection and analysis of the following:

- **Intra-laboratory (blind) duplicates:** Comprise a single sample that is divided into two separate sampling containers. Both samples are sent anonymously to the project laboratory. Blind duplicates provide an indication of the analytical precision of the laboratory, but are inherently influenced by other factors such as sampling techniques and sample media heterogeneity. Blind duplicates were collected and analysed during the investigation at a frequency of at least 4%.
- **Inter-laboratory (blind) duplicates:** Comprise a single sample that is divided into two separate sampling containers. Both samples are sent anonymously to the project laboratory and an additional laboratory. Blind duplicates provide an indication of the analytical precision of the project laboratory, but are inherently influenced by other factors such as sampling techniques and sample media heterogeneity. Blind duplicates were collected and analysed during the investigation at a frequency of at least 40%.
- **Rinsate:** A sample collected from the laboratory-prepared, analyte-free water after it is used to rinse over decontaminated field sampling equipment. The rinsate sample is used to assess the adequacy of the decontamination process. Rinsate blanks should have no detectable concentrations of COPC. , Approximately one rinsate sample per day was taken from re-usable sampling equipment. All rinsate samples were analysed by the primary laboratory (Eurofins|mgt). These results are also discussed in 6.3.1 and 6.4.1
- **Trip blank:** A sample prepared by the primary laboratory, free of volatile contaminants. The trip blank accompanies the primary samples during transits from the site to the laboratory. The trip blank is analysed for BTEXN and TRH C_6-C_{10} compounds, and results are used to assess the potential of cross-contamination of volatile contaminants during transportation of samples. Trip blanks should have no detectable concentrations of COPC. Approximately one trip blank was analysed per sample batch sent to the laboratory.
- **Trip spike**: A sample prepared by the laboratory containing pure deionised water spiked with known concentrations of the analytes of interest (including BTEXN and TRH C_6-C_{10} compounds) to determine precision in the laboratory, and results are used to assess the potential of loss of volatile contaminants during transportation of samples. Adopted recovery limits are 70-130%

6.2.3 Laboratory programme

Laboratory Information

The primary laboratory used was Eurofins|mgt who have adopted their internal procedures and NATA accredited methods in accordance with their quality assurance system.

The secondary laboratory was Australian Laboratory Services (ALS) who have adopted their internal procedures and NATA accredited methods in accordance with their quality assurance system.

Laboratory QA/QC

Laboratory quality control procedures used during the project included:

Laboratory Duplicate Samples: The analytical laboratory collects duplicate sub samples from one sample submitted for analytical testing at a rate equivalent to one in twenty samples per analytical batch, or one sample per batch if less than twenty samples are analysed in a batch.

A laboratory duplicate provides data on the analytical precision and reproducibility of the test result.

Spiked Samples: An authentic field sample is 'spiked' by adding an aliquot of known concentration of the target analyte(s) prior to sample extraction and analysis. A spike documents the effect of the sample matrix on the extraction and analytical techniques. Spiked samples will be analysed for each batch where samples are analysed for organic chemicals of concern.

Certified Reference Standards: A reference standard of known (certified) concentration is analysed along with a batch of samples. The Certified Reference Standard (CRS) or Laboratory Control Spike provides an indication of the analytical accuracy and the precision of the test method and is used for inorganic analyses.

Surrogate Standard / Spikes: These are organic compounds which are similar to the analyte of interest in terms of chemical composition, extractability, and chromatographic conditions (retention time), but which are not normally found in environmental samples. These surrogate compounds are 'spiked' into blanks, standards and samples submitted for organic analyses by gas-chromatographic techniques prior to sample extraction. Surrogate Standard/Spikes provide a means of checking that no gross errors have occurred during any stage of the test method leading to significant analyte loss.

Method Blank: Usually an organic or aqueous solution that is as free as possible of analytes of interest to which is added all the reagents, in the same volume, as used in the preparation and subsequent analysis of the samples. The reagent blank is carried through the complete sample preparation procedure and contains the same reagent concentrations in the final solution as in the sample solution used for analysis. The reagent blank is used to correct for possible contamination resulting from the preparation or processing of the sample.

The individual testing laboratories conducted an assessment of their laboratory QA/QC programme internally; however the results were also independently reviewed and assessed by GHD.

Laboratory duplicate samples should return RPDs within the NEPM acceptance criteria of ±30%. Percent recovery is used to assess spiked samples and surrogate standards. Percent recovery; although dependent on the type of analyte tested, concentrations of analytes and sample matrix; should normally range from about 70-130%. Method (laboratory) blanks should return analyte concentrations as 'not detected'.

6.3 Soil

6.3.1 Field QA/QC

As part of the GHD QA/QC program, one duplicate sample and one inter-laboratory duplicate sample were taken for GHD_BH1. In addition, two soil rinsate samples and a trip blank and trip spike sample were sent for analysis.

Soil RPDs

Relative percentage differences (RPDs) were calculated with the following criteria adopted for acceptability based on data quality objectives outlined in Section 3.

- RPDs have only been considered where at least one concentration of the duplicate pair is greater than ten times the estimated quantitation limit (EQL).
- GHD has adopted a nominal acceptance criterion of 30% RPD for field duplicates and splits for inorganics and a nominal acceptance criterion of 50% RPD for field duplicates and splits for organics.

- However, it is noted that these criteria will not always be achieved, particularly in heterogeneous soil or fill materials, or at low analyte concentrations. In such cases, this does not necessarily indicate a problem with the data.
- The soil RPD results are presented in Appendix I with the exceedances of the adopted acceptance criteria above discussed below.

The soils samples presented in Table 8 below were found to exceed the adopted acceptance criteria presented above.

Table 8 Soil RPDs - Exceedance of adopted assessment criteria

Primary Sample	Duplicate Sample	Analyte/s
BH1_0.5	BH1_0.5ID	Arsenic
BH1_0.5	BH1_0.5ID	Iron
BH1_0.5	BH1_0.5ID	Zinc

GHD has reviewed the data in respect of the identified RPD exceedances and notes the following:

- The vast majority of RPDs were within adopted criteria.
- The exceedances were recorded for inter-laboratory duplicates analysed by ALS. All duplicate samples analysed by Eurofins|mgt were within RPD limits for the same samples.
- The maximum concentration from duplicate pair results was adopted for the purposes of the assessment.
- Where RPD exceedances were recorded, both samples in a pair returned results well below the adopted human health criterion.

Soil rinsate

Two soil rinsate samples were taken from equipment used for soil sampling. No concentrations were reported above the relevant laboratory limit of reporting (LOR), indicating the potential for cross contamination between soil samples to affect the interpretation of soil data is very low, and acceptable.

Trip blank

One trip blank was sent to the laboratory during the investigation and was tested for BTEXN and TRH (C_6 – C_{10}). No concentrations were reported above the relevant laboratory limit of reporting (LOR), indicating the potential for volatile cross contamination to be low and acceptable.

Trip spike

One trip spike sample was sent to the laboratory during the investigation and tested for BTEXN and TRH (C_6 – C_{10}). All recoveries were within the nominated acceptance criteria.

6.3.2 Laboratory QA/QC

Holding Times

All analytes were extracted within the reported holding times of the laboratories.

Laboratory programme

The NATA certified laboratories utilised for this assessment (Eurofins|mgt and ALS) undertook their own quality assurance and quality control procedures for sample analysis. GHD has reviewed the internal laboratory control data provided within the laboratory reports (refer to Appendix F).

All quality assurance sample analysis undertaken by the laboratories passed their own quality assurance and control procedures.

6.3.3 Conclusion

Overall, the results of the QA/QC programme for soil are considered to indicate an acceptable degree of confidence in the analytical programme completed. The analytical data set for soil is considered to be valid and acceptable to base conclusions on the contamination status of the site.

6.4 Groundwater

6.4.1 Field QA/QC

As part of the GHD QA/QC programme, one inter-laboratory and one intra-laboratory field duplicate sample were analysed for four primary samples during the investigation.

Groundwater RPDs

Relative percentage differences (RPDs) were calculated with the following criteria adopted for acceptability based on data quality objectives outlined in Section 4:

- RPDs have only been considered where a concentration is greater than ten times the EQL.
- GHD has adopted a nominal acceptance criterion of 30% RPD for field duplicates and splits for inorganics and a nominal acceptance criterion of 50% RPD for field duplicates and splits for organics.
- However, it is noted that these criteria will not always be achieved, particularly in heterogeneous materials (such as waters impacted with NAPL), or at low analyte concentrations. In such cases, this does not necessarily indicate a problem with the data.

The groundwater RPD results are presented in Appendix I with the exceedances of the adopted acceptance criteria above shown in Table 9 and discussed below.

Table 9 Groundwater RPDs - Exceedances of adopted assessment criteria

Primary Sample	Duplicate Sample	Analyte/s
BH5	QC02	Copper
BH5	QC02	Zinc

GHD has reviewed the data in respect of the identified RPD exceedances and notes the following:

- The vast majority of RPDs were within adopted criteria.
- The exceedances were recorded for inter-laboratory duplicates analysed by ALS. All intra-laboratory duplicate samples analysed by Eurofins|mgt were within RPD limits for the same samples.
- The maximum concentration from duplicate pair results was adopted for the purposes of the assessment.
- Where RPD exceedances were recorded, both samples in the pair returned results above the ANZECC 2000 Freshwater (95% ecological protection) adopted criterion. This uncertainty is not considered to impact the findings of the assessment.

Groundwater rinsate

Two groundwater rinsate samples were taken from equipment used for groundwater sampling. No concentrations were reported above the relevant LOR, indicating the potential for cross contamination between samples to affect the interpretation of groundwater data is very low.

Trip Blank

A single trip blank was sent to the laboratory during the investigation and was tested for BTEXN and TRH (C_6 – C_{10}). No concentrations were reported above the relevant LOR, indicating low and acceptable potential for volatile cross contamination during sample transport and handling. .

Trip Spike

A single trip spike was sent to the laboratory during the investigation and was tested for BTEXN and TRH (C_6 – C_{10}). All recoveries were within the acceptance criteria.

6.4.2 Laboratory QA/QC

Holding times

All analytes for groundwater were extracted within the technical holding times of the laboratory.

Laboratory programme

The NATA certified laboratories utilised for this assessment (Eurofins|mgt and ALS) undertook their own quality assurance and quality control procedures for sample analysis. GHD has reviewed the internal laboratory control data provided within the laboratory reports (refer Appendix F).

All quality assurance sample analysis undertaken by the laboratories passed their own quality assurance and control procedures.

6.4.3 Conclusion

The results of the QA/QC programme for groundwater are considered to indicate that there is an acceptable degree of confidence in the data from the analytical programme completed. Overall, the analytical data set for groundwater is considered to be valid and acceptable to base conclusions on the contamination status of the site.

6.5 Summary of QA/QC assessment

Overall the QA/QC programme for soil and groundwater is considered to indicate an acceptable degree of confidence in the analytical programme completed. Overall, the combined analytical data set is considered to be valid and acceptable to base conclusions on the contamination status of the site.

7. Investigation results

7.1 Overview

Soil and groundwater data have been compared to the adopted assessment criteria presented in Section 4 for the purposes of assessing the potential risk posed by contamination to current and future users of the site. The tables detailed in Appendix E provide a comparison of the data to the adopted assessment criteria for soil, groundwater and landfill gas.

7.2 Field observations – soil and core

Three boreholes, GHD_BH1, GHD_BH1A and GHD_BH2 were drilled on site from 4 – 6 December 2018. Borehole logs are provided in Appendix B.

Natural rock and soils, where encountered reflect those detailed on the geological and soil landscape maps for the site and described in Sections 2.4.2 and 2.4.3. Minor fill (up to 0.2 m) in the form of imported gravelly sand material was observed in all sampling locations. Waste materials as a result of historical demolition activities were observed in all locations. Anthropogenic materials observed within the fill material include suspected asbestos containing materials (ACM) bitumen, concrete, terracotta and brick fragments.

At all locations, the depth of soil to weathered bedrock is approximately 0.2 - 2.5 m bgl The natural residual soil beneath the thin fill layer consists of clays weathered from the underlying shale and siltstone bedrock.

Competent bedrock was encountered in GHD_BH1 and GHD_BH2 from approximately 13 m bgl and consisted predominantly of sandstone layers with minor interlaminated shales and siltstones.

Fractures in core at GHD_BH1 and GHD_BH2 were commonly aligned along bedding planes at angles of 5 – 55 degrees to the horizontal core axis. Fault gouge along fracture planes was observed rarely, and no slickenstriations were observed, suggesting little movement along fracture planes. The sandstone was fairly competent with three to nine breaks per metre, and breaks were commonly only one millimetre wide. It is possible that some of the breaks were induced during the coring and handling process, and are not the result of ground movement.

7.2.1 Visual and olfactory indications of contamination

Fragments of suspected ACM were observed in surface fill material at all three boreholes. This is considered likely to be the result of the historical demolition of building materials located on the site prior to its development as the existing car park and as from the demolition of the house at 2 Bent Street. No naturally occurring asbestiform minerals were observed in the soil or core.

Photo-ionisation detector (PID) measurements were taken at 0.5 m intervals for the augered samples for each borehole, and additional PID measurements were taken along randomly selected fractures in the cored sections. High PID measurements taken from GHD_BH1 core were supported by olfactory evidence of hydrocarbons, and are suspected to be due to the use of hydrocarbon lubricant during drilling operations. This is supported by the chemical results discussed in Section 7.4.4.

7.3 Groundwater monitoring event

Groundwater well development was undertaken on 6 December 2018, and a subsequent groundwater monitoring event was undertaken at the site on 14 December 2018. Four wells were sampled, including GHD_BH1, GHD_BH1A, BH5 and BH6.

7.3.1 Depth to groundwater and flow direction

Groundwater levels were recorded in the six groundwater monitoring wells prior to sampling during the groundwater monitoring round conducted on 14 December 2018. Groundwater was encountered at between 4.20 and 8.99 m bgl. Groundwater level measurements are summarised in Table 10 below.

Table 10 Groundwater depth

Monitoring Well ID	Standing Water Level (m bgl)	Top of Pipe (m AHD)	Natural surface elevation (m AHD)	Standing Water Level (m AHD)
GHD_BH1	8.998	94.67	94.73	85.68
GHD_BH1A	6.120	94.67	94.71	88.55
BH5	5.350	93.69	93.77	88.34
BH6	4.200	89.65	89.73	85.45

It should be noted that GHD_BH1 was screened at a deeper interval to monitor the groundwater in the sandstone unit beneath the shale, and therefore groundwater is deeper for this well (in order to screen for dense non-aqueous phase liquids) than in the adjacent GHD_BH1A, which is screened in the higher shale unit.

As expected, the groundwater was intersected at a lower relative level (RL) in the wells towards the western end of the car park, and groundwater flow is inferred to follow the topography from east to west.

7.3.2 Groundwater quality

Groundwater was purged and sampled from the four monitoring wells in Table 10. Groundwater parameters were measured (i.e. DO, EC, pH, redox) prior to sampling and are summarised in Table 11. A copy of the groundwater sampling field sheets are provided in Appendix D.

Table 11 Field-measured groundwater quality results

Monitoring Well ID	Volume purged (L)	DO (ppm)	EC (µS/cm)	Redox (mV)	pH	Temp (°C)	Colour / Turbidity
GHD_BH1	6.0	0.27	3107	-17.4	5.96	19.8	Brown-grey with sediment
GHD_BH1A	6.0	0.21	2935	-85.6	6.06	20.1	Brown, cloudy
BH5	8.0	0.28	491.9	89.3	5.52	20.7	Brown/grey cloudy. Possible sheen
BH6	6.0	0.16	720	165.1	5.23	19.1	Brown, cloudy

Stabilised field water quality analytes measured during monitoring indicated that groundwater at the site is slightly acidic with pH values ranging between pH 5.23 and pH 7.06.

The dissolved oxygen levels were recorded at low concentrations across the site ranging from 0.08 to 1.86 ppm, indicating anaerobic conditions.

Electrical conductivity readings indicate the water is fresh to brackish.

7.3.3 Visual and olfactory indications of groundwater contamination

No olfactory indicators were noted during the groundwater monitoring event, although a possible sheen was observed for BH5 potentially indicating the presence of hydrocarbons. This was not supported by the analytical results which are discussed further in Section 7.4.

7.4 Laboratory analytical results

A summary of the laboratory results for soil and groundwater samples collected from the site are presented in Appendix E and laboratory analytical certificates are provided in Appendix F.

7.4.1 Soil Chemical Assessment

There were only two exceedances of adopted criteria for the soils. These were both for zinc against the NEPM (2013) EIL for Urban Residential – Public Open Space, shown in Table 12 below.

Table 12 Soil criteria exceedances

Sample ID	Criterion Type	Added Contaminants Limit – Zinc (mg/kg)	Zinc exceedance (mg/kg)
GHD_BH1_0.2	EIL – Urban Residential – Open Space	70	160
GHD_BH2_0.1	EIL – Urban Residential – Open Space	70	150

The zinc concentrations elevated above the screening level in these two samples are potentially related to the natural soil characteristics of the fill material.

No measurement of soil pH, CEC or clay content were made for the site, as a result site specific EIL levels for copper, nickel and zinc have not been calculated. The lowest and therefore most conservative screening levels have been applied for the purposes of this assessment. It is noted that for a near neutral pH soil with a low CEC, the observed concentrations of zinc would likely be below a site specific EIL.

7.4.2 Asbestos

Chrysotile and amosite asbestos were detected in fibre cement fragments, and chrysotile asbestos was detected in loose fibre bundles from GHD_BH1 and GHD_BH2, confirming visual observations of suspected ACM fragments during drilling. No respirable fibres were detected. Both samples were taken from fill intervals at or just below surface. Soil sampling was not undertaken on GHD_BH1A, however suspected ACM fragments were noted during logging and, given its close proximity to GHD_BH1, the presence of ACM is considered likely.

7.4.3 Preliminary waste classification assessment

Two samples exceeded the NSW EPA (2014) General Solid Waste criteria for lead as shown in Table 13 below, and presented in Appendix E.

Table 13 Waste classification criteria exceedances

Analyte	Exceedance Trigger Value (mg/kg)	Sample ID	Analytical Value
Lead	100	GHD_BH1	200
		GHD_BH2	100

The preliminary and indicative waste classification indicates all samples collected from the bores are classified as General Solid Waste (GSW) according to the guidelines, with the exception of lead at GHD_BH1 and GHD_BH2. If a waste's specific contaminant concentration test value exceeds the contaminant (SCC) threshold value set for general solid waste (CT1), further assessment using the toxicity characteristic leaching procedure (TCLP) test may be used. Given the low levels of lead exceedance, it is likely that the TCLP would produce results that remain within the classification for GSW for these samples, however this would need to be confirmed by testing on waste streams produced during any development works.

Excess soils generated as a part of this investigation were secured within three drums on the site for storage before disposal. One representative sample was collected from the drums for laboratory analysis for waste classification purposes for off-site disposal. The waste classification sample results are provided in Appendix E.

The chemical concentrations from the drum soil sample (WC1) were compared to the NSW EPA (2014) General Solid Waste criteria The results showed that all metals and TPH concentrations detected were below the maximum values of specific contaminant concentrations (SCC) for classification without TCLP (CT1), with the exception of nickel which was 43 mg/kg. TCLP analysis was undertaken on sample WC1 for nickel with a concentration of 0.14 mg/L detected. This is below the maximum leachable concentration (TCLP1) criteria for nickel of 2 mg/L (Table 2 in the NSW EPA guidelines, 2014).

Asbestos was not detected in the waste classification sample, however, asbestos was detected in the two samples from GHD_BH1 and GHD_BH2 respectively. Given that the excess soil from these boreholes was collected in the waste drums, it is reasonable to assume the waste drums could contain asbestos materials.

Based on the results of the laboratory analyses, the waste classification in accordance with the NSW EPA (2014) *Waste Classification Guidelines* for the soil tested indicates the materials within the three drums were classified as: Special Waste (Asbestos waste). The drums were disposed of at a suitably licenced facility (see Appendix G for waste tracking documents).

7.4.4 Groundwater chemical assessment

A review of groundwater exceedances identified results above NEPM 2013 Fresh Water GILs for copper, lead, manganese, nickel, zinc and chromium. Exceedances are reported in Table 14 below and included in Appendix E.

No exceedances of NEPM 2013 HSL criteria were reported for the site.

Table 14 Groundwater criteria exceedances - ANZECC 2000 FW Medium-Low Reliability, NEPM 2013 Table 1C GILs, Fresh Waters, NEPM 2013 Table 1(A) HSL A/B Sand (2 - 4 m)

Analyte	Exceedance Trigger Value (mg/L)	Sample ID	Analytical Value (mg/L)
Copper	0.0014 [1, 2]	BH5 (QC02) BH6 GHD_BH1A	0.062 0.022 0.057
Iron	0.3[1]	BH5 BH6 GHD_BH1 GHD_BH1A	3.2 1.2 44 58
Lead	0.0034 [1, 2]	BH5 (QC02)	0.004
Manganese	1.7 [1,] 1.9 [2]	BH5 BH6 GHD_BH1 GHD_BH1A	3.7 5.5 2.1 5.8
Nickel	0.011 [1, 2]	BH5 (QC02) BH6 GHD_BH1 GHD_BH1A	0.028 0.047 0.035 0.084
Zinc	0.008 [1, 2]	BH5 (QC02) BH6 GHD_BH1 GHD_BH1A	0.127 0.14 0.072 0.17
Chromium	0.001 [2]	BH5 BH6	0.001 0.002

1. ANZECC 2000 Fresh Water Medium-Low Reliability

2. NEPM 2013 Table 1C GILs, Fresh Waters

As outlined in Table 15 below, exceedances of the ADWG 2011 Aesthetic (v3.5 updated 2018) criteria are reported for iron and manganese for all samples. An aesthetic criterion is not provided in the ADWG for nickel.

Nickel and manganese analytical results were above ADWG 2011 Health (v3.5 updated 2018) criteria for all samples.

Table 15 Groundwater criteria exceedances – ADWG 2011 (updated 2018) Aesthetic values, ADWG 2011 (updated 2018) Health values

Analyte	Exceedance Trigger Value (mg/L)	Sample ID	Analytical Value (mg/L)
Iron	0.3 [1]	BH5	3.2
		BH6	1.2
		GHD_BH1	44
		GHD_BH1A	58
Nickel	0.02 [2]	BH5 (QC02)	0.028
		BH6	0.047
		GHD_BH1	0.035
		GHD_BH1A	0.084
Manganese	0.1 [1] 0.5 [2]	BH5	3.7
		BH6	5.5
		GHD_BH1	2.1
		GHD_BH1A	5.8

1. ADWG 2011 Aesthetic (v3.5 updated 2018)

2. ADWG 2011 Health (v3.5 updated 2018)

Further discussion of the risk from these chemicals is discussed in Section 8.

8. Discussion of results and conceptual site model

8.1 Assessment of exposure risks for on-site receptors

8.1.1 Soils

Ecological

There were two occurrences of zinc exceeding the NEPM 2013 EIL for Urban Residential / Public Space. Both of these samples were taken at near surface at the base of fill and are likely to represent soil components of the fill material. No elevated levels of zinc were found in the underlying soils and it is therefore considered unlikely that zinc is leaching down through the soil profile, and does not pose a risk to potential ecological receptors.

Background ranges of zinc in soil, taken from the Field Geologist's Manual, compiled by D.A. Berkman, Third Revised Edition (1995), indicate the average abundance of zinc in shale is 160 parts per million, and zinc in soil is 300 ppm. The zinc analysed in soils on site is therefore likely attributable to background levels, rather than indicative of contamination.

Schedule B2 of the NEPM (2013) notes that "a pragmatic risk based approach should be taken in applying EILs and ESLs in residential and commercial/industrial land use settings". As a result EIL exceedances are considered very unlikely to present a constraint to the planned site use, and remediation in this respect is not considered to be warranted.

Human Health

Based on the criteria discussed in Section 4.1, there were no exceedances of adopted human health criteria (for non-asbestos contamination) on site.

Council have advised GHD that in all variations of the master plan for the proposed redevelopment, the planned childcare centre is not at ground level and any outdoor areas associated with it are confined to rooftops or elevated terraces. A conservative approach was adopted to reflect the uncertainty of the plans, and irrespective of the location of the childcare centre, there are no chemical COPC of potential human health concern.

Asbestos

The presence of chrysotile and amosite asbestos in fibre cement fragments and fibre bundles was confirmed by laboratory analysis of two fill samples. Neither sample contained respirable asbestos fibres. The source of the asbestos is likely due to demolition waste of the house at 2 Bent Street, and the properties that were demolished prior to development of the existing car park. It is anticipated that additional asbestos may be present in fill at the site and will require management and/or removal during site development. It is noted that the non-bonded (i.e. fibrous asbestos) was detected in fill below hardstand, and as such there is unlikely to be a current complete source-pathway-receptor linkage to current site users. However there is a potentially complete linkage for future maintenance workers and construction workers coming into contact with fill materials. There is also potential for migration of asbestos via dust generation during future construction work.

The asbestos is likely constrained to the fill layer across the site. A sampling program to assess the extent of ACM is recommended during site clearance to assess the volume of soil requiring specialist disposal.

Disposal of soil waste containing asbestos will require classification of the waste as: Special Waste (Asbestos Waste) and require removal by a licenced waste disposal contractor to a suitable licenced facility.

Summary

With consideration of the investigation findings, no evidence of soil impacts from the dry cleaning business or the electrical substation were found during this investigation. However, it is likely that fill soils across the site contain some asbestos and will require management and validation via visual clearance by a licenced asbestos assessor during development. The risk posed by asbestos during construction will require management under a Construction and Environmental Management Plan (CEMP).

8.1.2 Groundwater

Exceedances of freshwater GILs are noted at all groundwater monitoring locations for copper, lead, manganese, nickel, zinc and chromium. There are no identified ecological receptors on–site therefore, these exceedances are considered to constitute an acceptable level of risk for the site.

No groundwater is currently or proposed to be abstracted on-site for drinking water, and it is not anticipated that the groundwater sampled will be used for drinking water purposes. The use of the drinking water guidelines provide a conservative approach to assessing human health risks associated with direct interaction with the water. Therefore, although there are some exceedances of iron, nickel and manganese ADWG health and aesthetic values, they are not considered significant to the current and proposed site usage. These metal exceedances are considered more likely to be indicative of background quality of marine shale aquifers, as opposed to contamination.

At present there is no groundwater abstraction on site for any purpose, and there is no existing source-pathway-receptor linkage for contaminants identified in groundwater to current or future receptors. Incidental interaction with groundwater during the construction of the proposed site redevelopment is also likely to be low risk, but should be identified through occupational health and safety management plans, which would be expected to include measures such as personal protective equipment (PPE) and good hygiene practises (e.g. hand washing). In the longer term, the potential for future abstraction of groundwater at the site for potable purposes is considered unlikely given the availability of a reticulated potable water supply.

With consideration of the above, the likelihood for groundwater at the investigated location to constitute an unacceptable risk to current and potential on-site receptors is considered to be low and acceptable.

8.2 Assessment of exposure risks to off-site receptors and from off-site sources

8.2.1 Soils

Based on the hardstand cover existing across the majority of the site, and the grassed and vegetated cover in the remaining areas, the potential for impacts to off-site receptors is considered to be limited.

Potential for movement of soil contaminants off site via windblown dust or surface runoff is limited. As such, there is not considered to be a complete source-pathway-receptor linkage for off-site receptors of soil contamination and the off-site exposure risk is considered to be low. However, as noted above the potential for asbestos migration via dust generation during construction will require management under a CEMP.

The closest potential off-site sources of soil contamination are Marcus Dry Cleaning business located at 346 Pacific Highway, Lindfield, and the electrical substation located at the southern end of the site on Beaconsfield Parade, Lindfield. No exceedances of COPC related to these potential contamination sources were observed during this investigation.

8.2.2 Groundwater

Exceedances of ANZECC 2000 (95%) and freshwater GILs are noted at all groundwater monitoring locations for copper, lead, manganese, nickel, zinc and chromium.

Ecological receptors to the site are limited as the site and surrounding area have been heavily disturbed by historical activities. The eventual ecological receptor of the site is the Little Blue Gum Creek, which is approximately 1.4 km west of the site at the closest point.

The distance between the site and potential receptors, the low levels of identified groundwater contaminants and the impacted land between the site and the receptors are considered to result in the overall risk posed by groundwater contamination on site to off-site ecological receptors being low and acceptable.

No abstraction bores for drinking water have been identified on or in the vicinity of the site, while the site and the surrounding area have access to the Sydney town water supply.

Overall the potential for off-site exposure risk is considered low given:

- Limited number and small magnitude of exceedance groundwater contaminants which are likely indicative of background metal concentrations
- The generally urbanised land surrounding the site, with associated diffuse sources of groundwater pollution;
- Absence of groundwater abstraction in the surrounding area
- Distance to potentially more sensitive down gradient receptors in the Little Blue Gum Creek (1.4 km to the west) and the Lane Cover River (1.9 km south-west).

As for the soils, the closest potential off-site sources of groundwater contamination are Marcus Dry Cleaning business located at 346 Pacific Highway, Lindfield, and the electrical substation located at the southern end of the site on Beaconsfield Parade, Lindfield. No exceedances of COPC related to these potential contamination sources were reported during this investigation.

In addition, there is a 7-Eleven service station (former Mobil) site, located approximately 300 m south of the site at its closest point. Based on results at BH5 which is at the southern end of the site, and the local topography which suggest groundwater from the 7-Eleven site is not likely to flow towards the site, there does not appear to be any impact to groundwater related to this potential off-site source of contamination.

8.3 Risks to services and buried structures

Certain contaminants, such as TRH and other organic compounds, pose a potential risk to buried services, including via the permeation of water supply pipes. Overall, the risk from identified soil and groundwater contamination to current and proposed site services and buried structures is considered negligible.

8.4 Remaining data gaps

- The extent of asbestos contamination in fill across the site is currently unknown. Given the likelihood that soils across the site are impacted by asbestos, further asbestos investigation will be required during construction and the risk posed by asbestos during construction will require management under a Construction and Environmental Management Plan (CEMP).
- The level of airborne and soil asbestos contamination has not been determined, and will require consideration during construction to assess the requirement for the Duty to Report at that time.

8.5 Duty to report

The NSW EPA (2015) Guidelines on the Duty to Report Contamination under the *Contaminated Lands Act 1997* require notification under the following circumstances:

- The level of the contaminant in, on, or under the soil is equal to or above a level of contamination set out in Schedule B1 of the NEPM (2013) or other approved guideline value with respect to a current or approved use of the land, and people have been, or foreseeably will be, exposed to the contaminant; or
- The contamination meets a criterion prescribed by the regulations; or
- The contaminant or a by-product has entered, or will foreseeably enter, neighbouring land, the atmosphere, groundwater or surface water, and is above, or will foreseeably be above, a level of contamination set out in the NEPM (2013) or other approved guidelines and will foreseeably continue to remain equal to or above that level.

The NSW EPA (2015) guidelines also state that there is no duty to report under the following conditions:

- widespread diffuse urban pollution that is not attributed to a specific industrial, commercial or agricultural activity
- sites with contaminants that are at levels above the triggers but are equal to, or below, the ambient background concentration

With regard to asbestos in, or on, soil, the EPA guidelines state that notification is required where:

- friable asbestos is present in or on soil on the land

AND

- the level of asbestos (% weight for weight) in an individual soil sample is equal to or above the health screening level of friable asbestos in soil (0.001%) specified in Section 4.8, Schedule B1 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC 2013)

AND

- a person has been, or foreseeably will be, exposed to elevated levels of asbestos fibres by breathing them into their lungs

Laboratory testing identified loose fibre bundles of asbestos in a sample from GHD_BH2, which meets the definition of friable asbestos (NEPM, 2013). This soil asbestos contamination is considered to result from poor demolition practices, and meets the first reporting trigger. With regard to the second trigger, the concentration of asbestos in an individual sample has not been tested and is therefore unknown. No airborne asbestos testing has been undertaken to determine the exposure levels, however, the site is covered by hardstand or grass and it is considered unlikely that airborne levels would exceed the concentration criterion in the guidelines under current site use.

In addition, according to the Department of Health (2009) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, if concentrations of asbestos fines (AF) and fibrous asbestos (FA) might exceed 10% of the amount of asbestos as would be determined by using ACM alone, it is deemed to be significant. The guidelines state “If AF arises from co-located ACM, DOH considers that this will not exceed 10% of the ACM even if the ACM is primarily very small pieces arising from severe mechanical action.” In this instance, the fibre bundle was detected at the same location as ACM fragments, and is therefore considered to be co-located. As such it is considered unlikely that friable asbestos at the site will exceed 10% of the total asbestos on site, and therefore would not be deemed to be significant.

Based on the currently available information on the site, and in accordance with the NSW EPA (2015) requirements with regards to duty to report a contaminated site, it is GHD’s opinion that there is presently insufficient evidence to trigger a duty to report requirement for this site.

9. Conclusions and recommendations

9.1 Conclusions

Based on a review of available previous site investigation data supplied by Council, information contained within this assessment, and with reference to the objectives outlined in Section 1.1, the following conclusions are made (subject to the limitations outlined in Section 1.3):

- Drilling identified soil profiles and stratigraphic units consistent with weathered shales and sandstones of the Wianamatta Group, and also consistent with the findings of previous drilling investigations at the site. Site soils typically consist of mid grey-brown fine grained clays and silty clays.
- Minor gravelly-sandy fill and anthropogenic materials (up to 0.2 m bgl) were intersected in all holes, and are superimposed on a soil weathering profile up to 2.5 m bgl, which overlies weathered bedrock and fresh sandstone and shale bedrock.
- The predominant bedrock encountered at all three locations was competent sandstone (probable Ashfield Shale) with minor bands of interlaminated shales and siltstones. Fracturing, where present, was generally aligned along bedding planes and consisted of three to nine breaks per metre. No significant fault gouge was encountered.
- Asbestos in the form of ACM fragments or fibre bundles was confirmed in fill material at two of the three boreholes and is likely the result of the historical and recent demolition of buildings containing fibre cement.
- A review of historical aerial photographs, and preliminary waste classification of soils encountered during the investigation indicate that fill material across the site is likely to contain asbestos. Soil containing asbestos will likely be classified be as Special Waste (Asbestos waste) for the purpose of off-site disposal. Where material needs to be removed off-site a more detailed waste classification and chemical assessment will need to be conducted to allow appropriate disposal of the materials
- There were no exceedances of the relevant human health criteria for non-asbestos contaminants.
- The exceedances of ecological criteria for soils (zinc) were limited to the surface fill materials (0.1 – 0.2 m bgl) and are in line with background levels for zinc expected for this area. No exceedances were detected in samples analysed from below these depths, which indicates that the metal impacts are not leaching and unlikely to be a risk to local groundwater.
- The ADE (2016) investigation found some soil samples that exceeded given ecological criteria, however, GHD did not identify any on-site ecological receptors and, based on the results of this groundwater investigation, it is not considered that the metal impacts identified within the fill material at the site are significant enough to warrant remediation in the context of the proposed use.
- Groundwater was intersected between 4.20 m bgl in BH6, to 8.99 m bgl in GHD_BH1. Groundwater levels relative to AHD, indicate groundwater is highest in the east of the site at GHD_BH1A, and follows topography down towards the west of the site at BH6.
- Based on information provided to GHD by Council, it is understood that basement depth of the proposed development would be approximately 24 m bgl in the vicinity of GHD_BH1, and 20 m bgl in the vicinity of BH5. Given that groundwater was intersected at levels significantly shallower than this, it is expected that groundwater will be encountered during developments works, and dewatering will be required.

- Exceedances of freshwater GILs are noted at all groundwater monitoring locations for copper, lead, manganese, nickel, zinc and chromium. There are no ecological receptors identified on site or within the immediate within the vicinity of the site, therefore, these exceedances are deemed to constitute an acceptable level of risk for the site in the context of the current and proposed use.
- Groundwater is not abstracted within the vicinity of the site for any purpose, and there is considered to be no plausible source-pathway-receptor linkage for contaminants identified in groundwater to current or future receptors.
- As no other on-site ecological receptors were identified in the groundwater investigation and the metals impacts identified are unlikely to be migrating off-site, there is unlikely to be a pathway for the contamination to reach an ecological receptor. The risk to potential ecological receptors would therefore be considered to be minimal.
- Based on the currently available information on the site, and in accordance with the NSW EPA (2015) requirements with regards to duty to report a contaminated site, it is GHD's opinion that there is presently insufficient evidence to trigger reporting of this site to EPA.
- Based on the findings of this investigation, GHD do not consider that there is a need to prepare a standalone Remedial Action Plan (RAP) for site redevelopment.

9.2 Recommendations

Based upon the findings of this investigation as outlined above, the following recommendations are made in order to further assess or mitigate contamination risks associated with the site:

- Develop a Construction Environmental Management Plan (CEMP) during construction to manage soils and groundwater, including a plan for investigating and managing asbestos in site fill material and a dewatering plan for the site for development below the groundwater table. This plan will provide guidance on minimising contamination impacts to site workers, occupants and off-site receptors as a result of construction.
- A sampling program to assess the extent of asbestos in fill is recommended during site clearance to assess the volume of soil requiring specialist disposal. Disposal of soil waste containing asbestos will require classification of the waste as: Special Waste (Asbestos Waste) and require removal by a licenced waste disposal contractor to a suitable licenced facility.
- Following removal of asbestos impacts, all ground surfaces should be the subject of a visual clearance by a licenced asbestos assessor.
- While the presence of asbestos is considered unlikely to pose an unacceptable risk to current site users in the existing configuration in the short term prior to site redevelopment, GHD recommends that Council implement an Asbestos Management Plan for any intrusive works which may disturb fill material at the site.

10. References

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Appendices

Appendix A - Figures

LEGEND

- Site Boundary (Approximate)
- Roads
- Railway

0 50 100 150 200 250 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

Kur-ring-gai Council
Lindfield Village Hub

Job Number 21-27850
Revision A
Date 19 Dec 2018

Site Location Plan

Figure 1

G:\21\27850\GIS\Maps\Deliverables\21_27850_Z001_LINDFIELD_Site_Location_Plan.mxd

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Data source: Aerial imagery - sixmaps 2018, NSW LPI DTDB 2012 and 2015. Created by:tnham

LEGEND

- Site Boundary (Approximate)
- Lot Boundary / Cadastre
- Roads
- Borehole (GHD, Dec 2018)
- Groundwater Well (GHD, Dec 2018)
- Existing Groundwater Well

0 5 10 15 20 25 30

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

Kur-ring-gai Council
Lindfield Village Hub

Job Number	21-27850
Revision	A
Date	19 Dec 2018

Investigation Locations

Figure 2

G:\21\27850\GIS\Maps\Deliverables\21_27850_Z002_LINDFIELD_Investigation_Locations.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

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Data source: Aerial imagery - sixmaps 2018, NSW LPI DTDB 2012 and 2015. Created by:tnham

Ku-ring-gai Local Environmental Plan (Local Centres) 2012

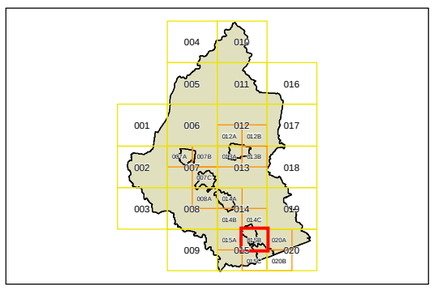
Land Zoning Map - Sheet LZN_015B

Zone

- B2 Local Centre
- B4 Mixed Use
- B5 Business Development
- E2 Environmental Conservation
- E4 Environmental Living
- R2 Low Density Residential
- R3 Medium Density Residential
- R4 High Density Residential
- RE1 Public Recreation
- SP1 Special Activities
- SP2 Infrastructure

Cadastre

Cadastre 11/10/2016 © Land and Property Information (LPI)



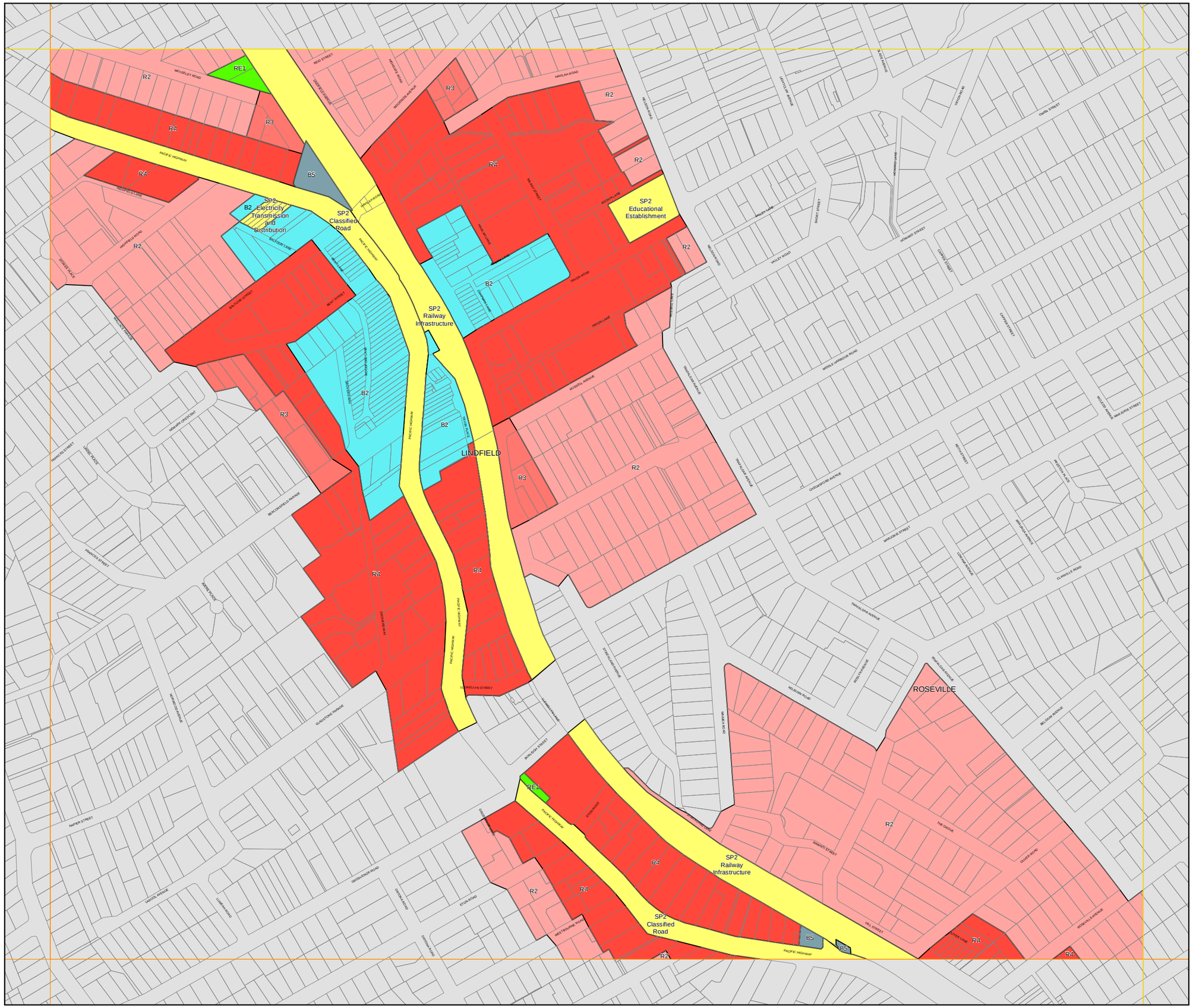
N

0 50 100 150 200 m

Scale: 1:5,000 @ A3

Projection: GDA 1994
MGA Zone 56

Map identification number: 4500_CEN_LZN_015B_005_20161011



Ku-ring-gai Local Environmental Plan 2015

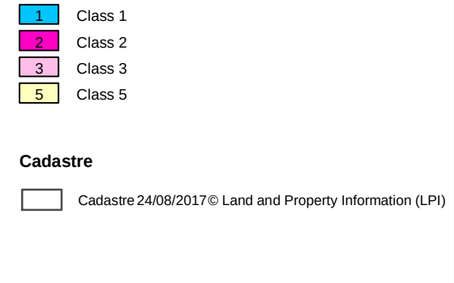
Acid Sulfate Soils Map - Sheet ASS_ 015

Acid Sulfate Soils

- 1 Class 1
- 2 Class 2
- 3 Class 3
- 5 Class 5

Cadastre

Cadastre 24/08/2017© Land and Property Information (LPI)



N

Projection: GDA 1994
MGA Zone 56

0 100 200 300 400 m

Scale: 1:10,000 @ A3

Map identification number: 4500_COM_ASS_015_010_ 20170824

KILLARA
LINDFIELD
ROSEVILLE
RYDE LGA
RYDE LGA
WILLOUGHBY LGA
1
3
3
5

Appendix B – Soil borehole logs

SOIL DESCRIPTION

GHD
Specialist Services in Geotechnical Engineering, Geology, Field/Laboratory Testing and Hydrogeology
www.ghd.com/global/services/geotechnical/

This procedure involves the description of a soil in terms of its visual and tactile properties, and relates to both laboratory samples and field exposures as applicable. A detailed soil profile description, in association with local geology and experience, will facilitate the initial (and often complete) site assessment for engineering purposes.

The method involves an evaluation of each of the items listed below and is in general agreement with both Australian Standard AS 1726 (the Site Investigation Code) and ASTM D2487 and D2488.

MOISTURE

The moisture condition of the soil is most applicable for cohesive soils as a precursor to the assessment of consistency and workability. The moisture condition is described as:-

Dry (dusty, dry to the touch) ***Slightly Moist*** ***Moist*** (damp, no visible water) ***Very Moist*** or ***Wet*** (visible free water, saturated condition)

In addition, the presence of any seepage or free water is noted on the testhole logs.

COLOUR

Colour is important for correlation of data between testholes and during subsequent excavation operations. The prominent colour is noted, followed by (spotted, mottled, streaked etc.) then secondary colours as applicable. Colour is usually described at as-received moisture condition, though both wet and dry colours may also be appropriate.

CONSISTENCY / DENSITY INDEX

This assessment is based on the effort required to penetrate and/or mould the soil, and is an indicator of shear strength.

Granular soils are generally described in terms of density index as listed in AS 1726. These soils are inherently difficult to assess and normally a penetration test procedure (SPT, DCP or CPT) is used in conjunction with published correlations. Alternatively, in-situ density tests can be conducted in association with minimum and maximum densities performed in the laboratory.

Term	Symbol	Density Index (%)
Very Loose	VL	< 15
Loose	L	15 - 35
Medium Dense	MD	35 - 65
Dense	D	65 - 85
Very Dense	VD	>85

Cohesive soils can be assessed by direct measurement (shear vane, CPT etc), or estimated approximately by tactile means and/or the aid of a geological pick as given on the following table. It is emphasised that a “design shear strength” must take cognisance of the mode of testing and the in-situ moisture content with the possible variations of moisture with time.

Term	Symbol	Tactile Properties	Undrained Strength S_u (kPa)
Very Soft	VS	Extrudes between fingers when squeezed in hand	<12
Soft	S	Easily penetrated by thumb about 30-40 mm. Pick head can be pushed in up to shaft.	12-25
Firm	F	Penetrated by thumb 20-30mm with moderate effort. Sharp end of pick pushed in 30-40mm.	25-50
Stiff	St	Indented by thumb about 5mm with moderate effort. Pick pushed in up to 10mm.	50-100
Very Stiff	VSt	Readily indented by thumb nail. Slight indentation produced by pushing pick into soil.	100-200
Hard	H	Difficult to indent with thumb nail. Requires power tools for excavation.	>200

STRUCTURE/OTHER FEATURES

The soil structure is generally applicable to cohesive soils and mainly refers to the presence or absence of joints and layering. Typical terms use are intact (no joints), fissured (closed joints), shattered (open joints), slickensided (polished joints indicative of movement), and stratified/laminated. In addition, the presence of other features (ferricrete nodules, timber inclusions) should also be noted as applicable.

For granular soils, an assessment of grading (well, uniform or poor), particle size (fine, medium etc.) and angularity and shape may also be given.

SOIL TYPE

The soil is described in terms of its estimated grain size composition and the tactile behaviour (plasticity of any fines (less than *0.06 mm)). This system does not differentiate on grading below 0.06 mm, in accordance with the Unified Soil Classification (USC) procedure.

However, in some situations a soil can exhibit different characteristics between the undisturbed and disturbed/remolded condition (eg. ‘sand’ sized particles which break down a clay). The Soil Type generally relates to the latter state but the former condition should be noted where applicable.

Furthermore, as most natural soils frequently are combinations of various constituents, the primary soil is described and modified by minor components. In brief, the system is as follows:-

Coarse Grained Soils		Fine Grained Soils	
% Fines	Modifier	% Coarse	Modifier
<5	omit, or use “trace”	<15	omit, or use “trace”
5-12	describe as “with clay/silt” as applicable	15-30	described as “with sand/gravel” as applicable
>12	prefix soil as “silty/clayey” as applicable	>30	prefix soil as “sandy/gravelly” as applicable

(*The 200# sieve (0.075 mm) is commonly used in practice to differentiate between fine and coarse grained soils).

Note: For soils containing both sand and gravel the minor coarse fraction is omitted if less than 15%, or described as “with sand/gravel” as applicable when greater than 15%.

The appropriate USC symbol may also be given after the soil type description in accordance with ASTM D2487 and D2488.

ORIGIN

An attempt is made, where possible, to assess origin (transported, residual, pedogenic, or fill etc.) since this assists in the judgement of probable engineering behaviour. This assessment is generally restricted to field logging activities. An interpretation of landform is a useful guide to the origin of transported soils (e.g. colluvium, talus, slide debris, slope wash, alluvium, lacustrine, estuarine, aeolian and littoral deposits) while local geology and remnant fabric will assist identification of residual soils.

Ref: DS6.5.1.1 Issue 1.7 Date: 13/03/2012

ROCK DESCRIPTION

GHD
Specialist Services in Geotechnical Engineering, Geology, Field/Laboratory Testing and Hydrogeology
www.ghd.com/global/services/geotechnical/

This method is based on Australian Standard AS 1726 and is orientated to the field logging of diamond drill core, but may be used for the profiling of natural exposures and cuttings, as applicable. The procedure involves a visual and tactile assessment of the rock mass and the nature of defects within it in order to facilitate a prediction of engineering behaviour.

DESCRIPTION: Rock Type is described on the basis of origin (sedimentary, metamorphic and igneous) with the common types listed below:-

Sedimentary				Metamorphic	Igneous				
Clastic	**Non clastic (chemical)**	**Non clastic (organic)**	**Pyroclastic**			**Acid**	**Intermediate**		**Basic**
Conglomerate Sandstone Siltstone Shale Claystone	Limestone Chert Gypsum Salt	Coal Some Limestone	Tuff Agglomerate Volcanic Breccia	Slate Phyllite Schist Quartzite Gneiss	Extrusive	Rhyolite	Trachyte	Andesite	Basalt
					Intrusive (medium grained)	Quartz Porphyry	Porphyry	Porphyrite	Dolerite
					(coarse grained)	Granite	Syenite	Diorite	Gabbro

Colour is given to assist in rock identification and the interpolation of field data. Colour is usually described at as-received moisture condition, though both wet and dry colours may also be appropriate.

Texture refers to the degree of crystallinity and granularity (grain size) and the fabric relationship between the constituents of a rock. Often only grain size is given for simplified descriptions of certain sedimentary rocks.

Structure and texture are commonly used synonymously in describing rocks since there is no clear delineation between terms. In general, structure refers to large-scale features recognisable in the field (banding, lineation, massive, porphyritic, schistose etc.). For sedimentary rocks in particular, the thickness of sedimentary layering (bedding) is described as:-

Thinly laminated	<6mm	very thinly bedded	20-60mm	medium bedded	0.2-0.6m	very thickly bedded	>2m
Laminated	6-20mm	thinly bedded	60-200mm	thickly bedded	0.6-2m		

In addition, mineral composition, hardness, alteration, cementation is given as applicable.

WEATHERING: The assignment of weathering is somewhat subjective. Weathering assists identification and does not imply engineering behaviour. No distinction is drawn between chemical weathering and alteration for most engineering purposes. These procedures are collectively described as "weathering" using the following terms which do not describe the related strength change. This system is general, and in this format may not apply to all rock types. Carbonate rocks generally do not conform to this classification.

Term	Symbol	Definition
Completely Weathered	CW	Residual soil with rock fabric not visible.
Extremely Weathered	EW	The rock exhibits soil-like properties though the texture of the original rock is still evident.
Highly Weathered	HW	Limonite staining or colour change affects the whole of the rock mass and other signs of chemical or physical decomposition are evident.
Moderately Weathered	MW	Staining extends throughout the whole of the rock mass and the original colour is no longer recognisable.
Slightly Weathered	SW	Partial staining or discolouration of the rock mass, usually by limonite, has taken place.
Fresh	Fr	Rock mass unaffected by weathering.

ESTIMATED STRENGTH: This refers to the strength of the rock substance and not that of the rock mass. The strength of the rock substance is estimated by the Point Load Strength Index $I_S(50)$ and refers to the strength measured in the direction normal to the bedding for sedimentary rocks. A field guide is given below:-

Term	Symbol	$I_S(50)$ MPa	Field Guide (The core refers to a 150mm long x 50mm dia. sample)
Extremely Low	EL	<0.03	Remoulded by hand to a material with soil properties.
Very Low	VL	0.03-0.1	May be crumbled in the hand. Sandstone is "sugary" and friable.
Low	L	0.1-0.3	The core may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.
Medium	M	0.3-1.0	The core may be broken by hand with considerable difficulty. Readily scored with knife.
High	H	1-3	The core cannot be broken by unaided hands, can be slightly scratched or scored with knife.
Very High	VH	3-10	The core may be broken readily with hand held hammer. Cannot be scratched with knife.
Extremely High	EH	>10	The core is difficult to break with hand held hammer. Rings when struck with a hammer.

DEFECTS: This important feature can control the overall engineering behaviour of a rock mass. All types of natural fractures across which the core is discontinuous are noted. These fractures include bedding plane partings, joints and other defects but exclude artificial fractures such as drilling breaks. The nature of the defects (joints, bedding partings, seams, zones and veins) is also noted with description, orientation, infilling or coating, shape, roughness, thickness, etc. given generally in accordance with AS 1726. The spacing of natural fractures excludes bedding partings unless there is evidence that they were separated prior to drilling. This notwithstanding, bedding partings maybe considered as planes of weakness in an engineering assessment.

Ref: DS6.5.2.1 Issue 1.7 Date: 13/03/2012

CORE LOG SHEET NOTES

GHD
Specialist Services in Geotechnical Engineering,
Geology, Field/Laboratory Testing and Hydrogeology
www.ghd.com/global/services/geotechnical/

The intention of Core Log Sheets is to present factual information measured from the core or as recorded in the field. Some interpretative information is inevitable in the location of core loss, description of weathering and identification of drilling induced fractures. This should be noted in the use of Core Log Sheets and remembered in their utilisation.

DRILLING AND CASING

The types of drilling used to advance the drill hole are recorded for relevant intervals. The types of drilling may include: NMLC coring, NQTT (NQ triple tube wire line), HW, HX, NW and NX casing, wash boring (tri-cone roller bit, TC drag bit, TC blade bit), or auger drilling (V-bit, TC drag bit).

The relevant progress is shown by abbreviated dates in the column.

WATER

Water lost or water made during drilling is recorded and subsequent readings of water levels in the borehole or piezometers are recorded here with dates of observation.

DRILL DEPTH AND CORE LOSS

Drilling intervals are shown by depth increments and horizontal marker lines. Core loss is measured as a percentage of the drill run. If the location of the core loss is known or strongly suspected, it is shown in a region of the column bounded by dashed horizontal lines. If unknown, core loss is assigned to the bottom of a coring run.

SAMPLES AND FIELD TESTS

The location of samples taken for testing or the location of field tests are indicated by the appropriate symbol from the GLOSSARY OF SYMBOLS Standard Sheet (or as applicable for the project) and are shown at the relevant location or over the relevant depth interval.

DEPTH (RL)

Changes in rock types or the locations of piezometer tips, samples, test intervals or other depths are shown as appropriate in terms of depth from the hole collar or in terms of RL.

For inclined holes the depths shown on the log refer to the drilled length along the borehole. The RL, where used, is the only transformed reference to true vertical depth.

STRATA

Rock types are presented graphically using the symbols shown on the GLOSSARY OF SYMBOLS Standard Sheet or as assigned for the project.

DESCRIPTION

The rock type is described in accordance with the ROCK DESCRIPTION Standard Sheet.

WEATHERING

Weathering is described, by code letters, in accordance with the ROCK DESCRIPTION Standard Sheet. A weathering term or range of terms is usually assigned to various strata.

It is noted, however, that the assignment of a term of weathering is subjective and is normally used for identification and does not imply engineering behaviour (such behaviour being controlled principally by rock substances strength and defect frequency - collectively, rock mass strength). Consequently, boundaries are often not shown and weathering may even not be reported where potentially misleading.

ESTIMATED STRENGTH

The strength of the rock substance is estimated by a combination of Point Load testing and tactile appraisal in accordance with the ROCK DESCRIPTION Standard Sheet. The estimated strength is presented in a histogram form. Both axial and diametric point load test results can be presented using the symbols on the GLOSSARY OF SYMBOLS Standard Sheet and the variation between axial and diametric values is indicative of anisotropy or fissility of the rock unit.

NATURAL FRACTURES

The identification of natural fractures requires an endeavour to exclude drilling induced breaks in the core and, as such, can be somewhat subjective. Natural fractures exist prior to coring the rock, whereas artificial fractures occur either during coring, during placing core in the core boxes, or during examination or transportation, or core after being boxed.

The log of Natural Fractures is presented as a combination of Fracture Spacing, Visual and Description columns. Coding is presented on the GLOSSARY OF SYMBOLS Standard Sheet.

ROCK QUALITY DESIGNATION (RQD) INDEX OPTION

The Core Log Sheet has an optional field column to record the RQD index. For certain projects, such as tunnelling or underground mining investigations, rock mass ratings or classifications can be required as part of the design process. The Rock Quality Designation (RQD) Index forms a component of these rock mass ratings and provides a quantitative estimate of rock mass quality from rock core logs. The core must be a minimum of 54.7mm diameter (although NMLC-sized core is probably OK) for derivation of an RQD index.

The RQD index is expressed as a percentage of intact rock core (excludes extremely weathered rock/residual soil) greater than 100 mm in length over the total selected core length. The total selected core length should be based on identifiable engineering geological domain characteristics. Should this not be practicable, RQD can be measured on a per run basis.

Ref: DS6.2.1 Issue 1.6 Date: 13/03/2012

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE GHD_BH2

Client Ku-ring-gai Council
Project Lindfield Village Hub
Project No. 2127850
Site Lindfield Village Hub
Location Woodford Lane, Lindfield, NSW
Date Drilled 04/11/2018

Drill Co. Stratacore Drilling
Driller T. Redman
Rig Type Drill Techniques DT4
Drill Method HA / SFA / DC
Total Depth (m) 20.95
Diameter (mm) 100

Easting 330354.54
Northing 6261128.69
Grid Ref GDA94_MGA_zone_56
Elevation 93.72
Logged By E.Harrison
Checked By J. Curry

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	9.9	GHD_BH2_0-0.2			Gravelly SAND, low plasticity, coarse to fine grained, medium grey-brown, fine to coarse gravels (FILL).	D	L	no odour, no staining, bonded acm fragments, gravels, bitumen, organic matter, minor rootlets.	93.5
		9.6	GHD_BH2_0.2-0.4							
0.5		10.1	GHD_BH2_0.4-0.5			CLAY, medium plasticity, fine grained, reddish-brown, fine clays (NATURAL - RESIDUAL SOIL).	D	L		
		9.7	GHD_BH2_0.5-1.0							93
1		10.1	GHD_BH2_1.0-1.5						no odour, no staining, fine grained, reddish-brown clays.	92.5
1.5	SFA	10.9	GHD_BH2_1.5-2.0			CLAY, medium plasticity, fine grained, cream, fine clays (NATURAL - RESIDUAL SOIL).	SM	L	no odour, no staining, fine grained, creamy clays.	92
2		11.0	GHD_BH2_2.0-2.5							91.5
2.5		12.5	GHD_BH2_2.5-3.0							91
3		13.2	GHD_BH2_3.0-3.5							90.5
3.5		7.3	GHD_BH2_3.5-4.0							90
4		9.4	GHD_BH2_4.0-4.5			CLAY, medium plasticity, fine grained, medium grey-brown (NATURAL - WEATHERED BEDROCK).	SM	F	no odour, no staining.	89.5
4.5		11.8	GHD_BH2_4.5-5.0							89
5		11.7	GHD_BH2_5.0-5.5							88.5
5.5		12.7	GHD_BH2_5.5-6.0			SHALE, medium plasticity, fine to medium grained, medium grey-brown, siltstone fragments (NATURAL - WEATHERED BEDROCK).	VM	L	no odour, no staining, fine grained, dark grey shale fragments with fine grained dark grey clays, minor siltstone.	88
6		7.8	GHD_BH2_6.0-6.5							87.5
6.5		10.0	GHD_BH2_6.5-7.0							87
7		9.8	GHD_BH2_7.0-7.5							86.5
7.5		11.4	GHD_BH2_7.5-8.0							86
8		14.6	GHD_BH2_8.0-8.5							85.5
8.5		15.8	GHD_BH2_8.5-9.0							85
9		8.9	GHD_BH2_9.0-9.5							84.5
9.5		12.2	GHD_BH2_9.5-10.0							84

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
10		14.3	GHD_BH2_10.0-10.5							83.5
10.5		7.4	GHD_BH2_10.5-11.0							83
11						Clayey SANDSTONE, medium grained, pale grey, siltstone fragments, minor clay (NATURAL - BEDROCK).	W		no odour, no staining, wet, silty sandstone with clays.	82.5
11.5										82
12										81.5
12.5										81
13										80.5
13.5										80
14										79.5
14.5										79
15										78.5
15	DC	0.5	GHD_BH2_15.50-15.51			Silty SHALES, fine to medium grained, pale-dark grey, siltstone (NATURAL - BEDROCK).	SM		no odour, no staining, finely laminated silstone and interlaminated shale/mudstone.	78
16						Silty SANDSTONE, fine to coarse grained, pale-dark grey, minor clay and silt, 2 breaks / m fracture spacing (NATURAL - BEDROCK).	D		no odour, no staining, graded, cross bedded, very competent sandstone and siltstone, with minor interlaminated shale.	77.5
16		0.4	GHD_BH2_16.36-16.37							77
16.5										76.5
17										76
17.5										75.5
18										75
18.5										74.5
19										74
19.5		0.5	GHD_BH2_19.56-19.57							73.5
20		0.5	GHD_BH2_20.20-20.21							73
20.5										72.5
21						Termination Depth at: 20.95 m. Terminated at target depth.				
21.5										

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

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BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL GHD_BH1

Client Ku-ring-gai Council
Project Lindfield Village Hub
Project No. 2127850
Site Lindfield Village Hub
Location Woodford Lane, Lindfield, NSW
Date Drilled 05/11/2018

Drill Co. Stratacore Drilling
Driller T. Redman
Rig Type Drill Techniques DT4
Drill Method HA / SFA / DC
Total Depth (m) 24.85
Diameter (mm) 100

Easting, Northing 330354.31, 6261252
Grid Ref GDA94_MGA_zone_56
Elevation 94.73
Collar RL 94.67
Logged By E.Harrison
Checked By J. Curry

B.C.L No. N/A **Casing** 50mm PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Gatic

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	3.2	GHD_BH1_0-0.2				Gravelly SAND, low plasticity, coarse to fine grained, dark brown and grey, fine to coarse gravels (FILL).	D	L	no odour, no staining, bonded acm fragments, gravels, terracotta, bitumen, organic matter, minor rootlets.	94.5
		2.3	GHD_BH1_0.2-0.4					SM	L		
0.5		1.2	GHD_BH1_0.4-0.5					M	ST		94
		5.7	GHD_BH1_0.5-1.0				Clayey Gravelly SAND, low plasticity, coarse to fine grained, pale brown and cream, fine to coarse gravels, fine clays (FILL).				
1		10.9	GHD_BH1_1.0-1.5							no odour, no staining, fill and natural soil.	93.5
1.5	SFA	6.0	GHD_BH1_1.5-2.0				CLAY, high plasticity, fine grained, pale cream (NATURAL - RESIDUAL SOIL).	SM	ST	no odour, no staining, plastic, sticky clay.	
		5.0	GHD_BH1_2.0-2.5				CLAY, medium plasticity, fine to medium grained, dark brown, silt (NATURAL - RESIDUAL SOIL).			no odour, no staining, weathered shales.	93
2											92.5
2.5		8.9	GHD_BH1_2.5-3.0								92
3		8.7	GHD_BH1_3.0-3.5								91.5
3.5		7.4	GHD_BH1_3.5-4.0								91
4		7.7	GHD_BH1_4.0-4.5								90.5
4.5		8.8	GHD_BH1_4.5-5.0								90
5		9.0	GHD_BH1_5.0-5.5		Grout						89.5
5.5		7.6	GHD_BH1_5.5-6.0								89
6		6.6	GHD_BH1_6.0-6.5				Silty SHALE, medium plasticity, fine to medium grained, brown-grey, siltstone, sandstone (NATURAL - WEATHERED BEDROCK).	SM	ST	no odour, no staining, weathered, interlaminated shales and siltstones.	88.5
6.5		9.2	GHD_BH1_6.5-7.0								88
7		5.8	GHD_BH1_7.0-7.5								87.5
7.5		11.2	GHD_BH1_7.5-8.0								87
8		8.6	GHD_BH1_8.0-8.5								86.5
8.5		6.2	GHD_BH1_8.5-9.0								86
9		5.7	GHD_BH1_9.0-9.5	▼							85.5
9.5		8.6	GHD_BH1_9.5-10.0				Silty CLAY, high plasticity, fine grained, dark brown, siltstone (NATURAL - BEDROCK)	VM	ST	no odour, no staining, sticky, plastic clays weathered from shales	85

Notes SWL at 8.998 mbTOC (14/11/2018)

This log is not intended for geotechnical purposes.

Drilling Abbreviations

AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler

Moisture Abbreviations

D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated

Consistency Abbreviations

Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense

Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
10.5		9.8	GHD_BH1_10.0-10.5								84.5
		7.7	GHD_BH1_10.5-11.0								
11		2.0	GHD_BH1_11.0-11.5								84
11.5											83.5
12							CLAY, low plasticity, fine grained, medium grey, siltstone, sandstone (NATURAL - BEDROCK).	W		no odour, no staining, wet returns - liquid, flowing clays with occasional sandstone bands.	83
12.5					Grout						82.5
13											82
13.5											81.5
14							Clayey Silty SAND, low plasticity, medium grained, medium grey (NATURAL - BEDROCK).	W		no odour, no staining, wet returns - sandstone.	81
14.5											80.5
15							Silty CLAY, low plasticity, fine grained, medium - dark grey, siltstone (NATURAL - BEDROCK).	W		no odour, no staining, wet returns - shales with interlaminated siltstone.	80
15.5											79.5
16					Bentonite						79
16.5	DC										78.5
17											78
17.5		0.3	GHD_BH1_17.60-17.61				Silty SANDSTONE, fine to coarse grained, pale - dark gery, siltstone, shale, 4 breaks / m fracture spacing (NATURAL - BEDROCK).	D		no odour, no staining, competent, graded sandstones with interlamined layers of sitlstone and occasional shale.	77.5
18											77
18.5											76.5
19		0.1	GHD_BH1_18.85-18.86		Sand						76
19.5											75.5
20											75
20.5		64.9	GHD_BH1_20.25-20.26								74.5
21											74
21.5		144.1	GHD_BH1_21.05-21.06								73.5
		50.0	GHD_BH1_21.80-21.81								73

Notes SWL at 8.998 mbTOC (14/11/2018)

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL GHD_BH1

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
22											72.5
22.5		60.3	GHD_BH1_22.50-22.51								72
		32.0	GHD_BH1_22.80-22.81								
23											71.5
23.5		8.9	GHD_BH1_23.50-23.51		Sand		SILTSTONE, fine to medium grained, pale grey, 6 breaks / m fracture spacing (NATURAL - BEDROCK).	D		no odour, no staining, calcareous, graded siltstone and sandstone. competent rock..	71
24											70.5
24.5											70
25							Termination Depth at: 24.85 m. Terminated at target depth.				69.5
25.5											69
26											68.5
26.5											68
27											67.5
27.5											67
28											66.5
28.5											66
29											65.5
29.5											65
30											64.5
30.5											64
31											63.5
31.5											63
32											62.5
32.5											62
33											61.5
33.5											61

Notes SWL at 8.998 mbTOC (14/11/2018)

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL GHD_BH1A

Client Ku-ring-gai Council
Project Lindfield Village Hub
Project No. 2127850
Site Lindfield Village Hub
Location Woodford Lane, Lindfield, NSW
Date Drilled 06/11/2018

Drill Co. Stratacore Drilling
Driller T. Redman
Rig Type Drill Techniques DT4
Drill Method HA / SFA
Total Depth (m) 13
Diameter (mm) 100

Easting, Northing 330353.24, 6261252.39
Grid Ref GDA94_MGA_zone_56
Elevation 94.71
Collar RL 94.67
Logged By E.Harrison
Checked By J. Curry

B.C.L No. N/A **Casing** 50mm PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Gatic

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	8.8	GHD_BH1A_0-0.2				Gravelly SAND, low plasticity, coarse to fine grained, dark brown and grey, fine to coarse gravels (FILL).	D	L	no odour, no staining, bonded acm fragments, gravels, terracotta, bitumen, organic matter, minor rootlets.	94.5
		11.7	GHD_BH1A_0.2-0.4					SM	L		
0.5		7.9	GHD_BH1A_0.4-0.5					M	ST		94
		9.0	GHD_BH1A_0.5-1.0				Clayey Gravelly SAND, low plasticity, coarse to fine grained, pale brown and cream, fine to coarse gravels, fine clays (FILL).				
1		12.3	GHD_BH1A_1.0-1.5							no odour, no staining, fill and natural soil.	93.5
1.5	SFA						CLAY, high plasticity, fine grained, pale cream (NATURAL - RESIDUAL SOIL).	SM	ST	no odour, no staining, plastic, sticky clay.	93
2		10.2	GHD_BH1A_2.0-2.5				Clayey SHALE, medium plasticity, fine to medium grained, dark brown, silty inclusions (NATURAL - RESIDUAL SOIL).			no odour, no staining, weathered shales.	
2.5		12.4	GHD_BH1A_2.5-3.0		Grout						92.5
3		9.2	GHD_BH1A_3.0-3.5								92
3.5		8.8	GHD_BH1A_3.5-4.0								91.5
4		14.8	GHD_BH1A_4.0-4.5								91
4.5		17.1	GHD_BH1A_4.5-5.0								90.5
5		16.9	GHD_BH1A_5.0-5.5								90
5.5		12.4	GHD_BH1A_5.5-6.0		Bentonite		Silty SHALE, medium plasticity, fine grained, pale-medium brown, silt (NATURAL - RESIDUAL SOIL).	SM	F	no odour, no staining, weathered shales. minor oxidation on fragment surfaces.	89.5
6		12.5	GHD_BH1A_6.0-6.5	▼							89
6.5		19.2	GHD_BH1A_6.5-7.0								88.5
7		17.9	GHD_BH1A_7.0-7.5								88
7.5		17.2	GHD_BH1A_7.5-8.0								87.5
8		16.7	GHD_BH1A_8.0-8.5		Sand		Silty CLAY, medium plasticity, fine grained, dark-medium brown, siltstone (NATURAL - RESIDUAL SOIL).	SM	F	no odour, no staining, weathered shales with occasional interlaminated siltstone bands.	87
8.5		22.3	GHD_BH1A_8.5-9.0								86.5
9		21.9	GHD_BH1A_9.0-9.5								86
9.5		13.7	GHD_BH1A_9.5-10.0								85.5
10											85

Notes SWL at 6.120 mbTOC (14/11/2018)

This log is not intended for geotechnical purposes.

Drilling Abbreviations

AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler

Moisture Abbreviations

D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated

Consistency Abbreviations

Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense

Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
10.5		9.7	GHD_BH1A_10.0-10.5		Sand						84.5
		10.7	GHD_BH1A_10.5-11.0								
11											84
11.5											83.5
12											83
12.5											82.5
13											82
13.5							Termination Depth at: 13.00 m. Terminated at target depth.				81.5
14											81
14.5											80.5
15											80
15.5											79.5
16											79
16.5											78.5
17											78
17.5											77.5
18											77
18.5											76.5
19											76
19.5											75.5
20											75
20.5											74.5
21											74
21.5											73.5
											73

Notes SWL at 6.120 mbTOC (14/11/2018)

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

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Appendix C – Equipment calibration sheets

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-106575

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
	Recharge OK?	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
Pump	Operation	✓	
	Filter	✓	
	Flow	✓	
	Valves, Diaphragm	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	PID	✓	10.6 ev
Alarms	Beeper	✓	Low: 50ppm; High: 100ppm; TWA: N/A; STEL: N/A
	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	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		98ppm Isobutylene	NATA	SY137		96.7ppm

Calibrated by: Sarah Lian

Calibration date: 3/12/2018

Next calibration due: 1/06/2019

PID Field Calibration Sheet

PID Type: Phocheck Tiger.

PID Serial Number:

PID Supplier: Airmet Scientific.

S:\Services\Contaminated Land\Field\Field Book Sheets\[PID Field Sheet.xls]Sheet1

Calibration or Check	Date	Time	Task	Air (ppm)	Isobutylene Gas (ppm)	Correction Factor
	3/12	7.05am	BH 6 Douglas Partners neil test	0·044		
	5/12	9.05am	Bump Test 100ppm isoButylene	0.095	101.8pm	
	6/12.	1235pm	Bump Test 100ppm isoButylene	0.053.	96.75pm	

CLIENTS PEOPLE PERFORMANCE

Daily Record Sheet

001

Client: Ku-ring-gai Council		Job No: 2127850	
Job Name: Limited Hub		Date: 3/12	
GHD Representative:	E Harrison	Arrival Time: ~~7~~ am	Departure Time:
Weather Conditions:	(Please circle) Fine Overcast Light Rain Heavy Rain Other_____		
Works Being Undertaken:			

Personnel/Contractor(s) Present (List all); Inducted into GHD H&SP?	Inducted	Arrival Time	Departure Time

Photographs Taken: (Please circle) Yes No If Yes, list below or attach photo register.

Location	Time	Record of Activities / Issues Encountered / Discussions with Client/Contractors / Sketch / Notes
		Upper carpark near substation
		BH5 (Asset Geotech)
		8.20am
		SWL = 5.18m BGL
		Base of well = 12.92m BGL
		PID on opening = 0.11
		1.0 litres bailed SWL 6.73 mBGL @ 8.55am.
		PID = 0.001 @ 8.50am
		11.40am SWL = 6.25m BGL
		12.25 SWL - 5.87m BGL

4.35m

Is a Notice of Proposed Variation, Variation Order or Site Instruction Required? (Please circle) Yes No

Provide Details:

Further Inspection and/or Testing Required on above Work:	

Are there any H&S requirements to be considered for future works?
Has the site been reinstated suitably (left clean and tidy)?

CLIENTS PEOPLE PERFORMANCE

Daily Record Sheet

001

Client: Kurrung-gai Council		Job No: 2127850	
Job Name: Lindfield		Date: 3/12	
GHD Representative:	E. Harrison	Arrival Time: 7.00am	Departure Time:
Weather Conditions:	(Please circle) (Fine) Overcast Light Rain Heavy Rain Other_____		
Works Being Undertaken:			

Personnel/Contractor(s) Present (List all); Inducted into GHD H&SP?	Inducted	Arrival Time	Departure Time

Photographs Taken: (Please circle) Yes No If Yes, list below or attach photo register.

Location	Time	Record of Activities / Issues Encountered / Discussions with Client/Contractors / Sketch / Notes
		Lower Carpark
		- Dipped BH6 (Douglas Partners)
		SWL = 4.27m BGL
		Base of well = 8.29m BGL
		PID on opening = 0.0 ppm
		Bailed 10 volumes at 8.10am
		SWL = 5.90m BGL
		- opaque, light grey cloudy water
		- no odour

Is a Notice of Proposed Variation, Variation Order or Site Instruction Required? (Please circle) Yes No

Provide Details:

Further Inspection and/or Testing Required on above Work:	

Are there any H&S requirements to be considered for future works?
Has the site been reinstated suitably (left clean and tidy)?

Oil / Water Interface Meter

Instrument Geotech Interface Meter (30M)
Serial No. 4442

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: Alinta **Alinta Furnell**

Calibration date: **12/12/2018**

Next calibration due: **10/02/2019**

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 18J104331

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
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 10.00		pH 10.00		318140	pH 9.89
2. pH 7.00		pH 7.00		317272	pH 7.03
3. pH 4.00		pH 4.00		320612	pH 4.06
4. mV		231.8mV		325420/324357	231.9mV
5. EC		2.76mS		320326	2.74mS
6. D.O		0.00ppm		10175	0.00ppm
7. Temp		20.7°C		MultiTherm	21°C

Calibrated by: Sarah Lian **Sarah Lian**

Calibration date: **13/12/2018**

Next calibration due: **12/01/2019**

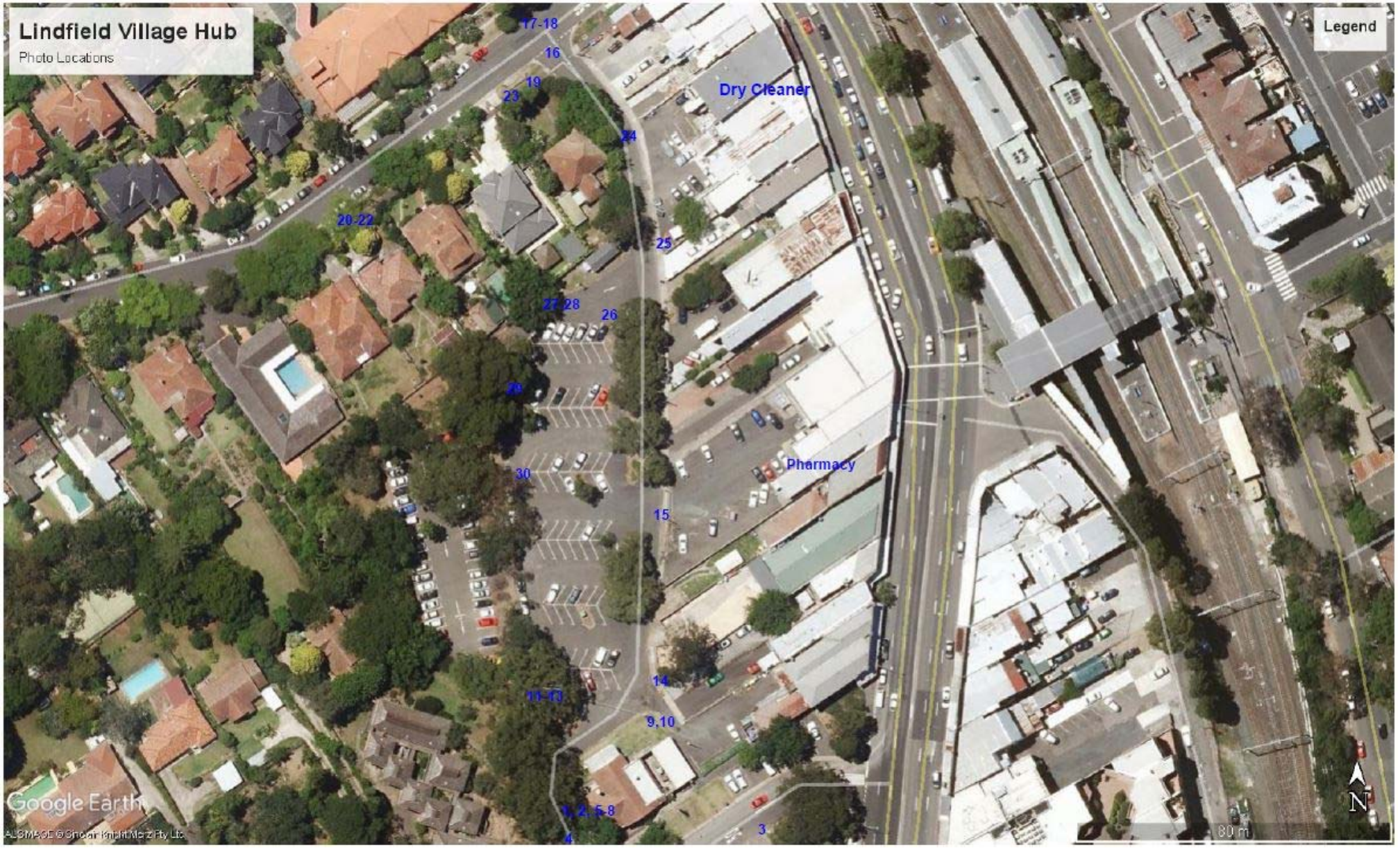
Appendix D – Field records and photos

Lindfield Village - preliminary site visit photo index

Photo	Direction looking	Description
Lindfield-1	down	Well at base of Sydney Council Electric Substation buildings
Lindfield-2	north	West side of Sydney Council Electric Substation buildings, south entrance to car park
Lindfield-3	north	Sydney Council Electric Substation buildings from Beaconsfield Pde
Lindfield-4	north	West side of Sydney Council Electric Substation buildings, south entrance to car park rom Beaconsfield Pde
Lindfield-5	down	Well at base of Sydney Council Electric Substation buildings
Lindfield-6	down	Well at base of Sydney Council Electric Substation buildings
Lindfield-7	down	Well at base of Sydney Council Electric Substation buildings – well filled with dirt
Lindfield-8	down	Well at base of Sydney Council Electric Substation buildings
Lindfield-9	west	From north east side of substation, back to carpark – proposed area for drillhole
Lindfield-10	west	From north east side of substation, back to carpark – proposed area for drillhole
Lindfield-11	south	Towards substation buildings and entrance to carpark from Beaconsfield Pde
Lindfield-12	south	Towards substation buildings and entrance to carpark from Beaconsfield Pde
Lindfield-13	north-east	From Beaconsfield Pde entrance back across proposed location for drillhole. Could not located previously drilled well
Lindfield-14	south-west	Towards substation buildings –showing overhead powerline
Lindfield-15	east	Towards Lindfield pharmacy from Woodford Lane
Lindfield-16	east	Along Woodford Lane from Bent St entrance, looking back to dry cleaners and pool equipment businesses
Lindfield-17	south-east	From Bent St, looking into Woodford Land, showing dry cleaner location wrt demolished house where previously drilled borehole was located. This borehole was not discovered due to dense overgrowth.
Lindfield-18	south-west	Along Bent St from corner with Woodford Lane. Showing vacant block, 2 houses, then more vacant land as you head west.
Lindfield-19	south	2 Bent St – now vacant land. Securely fenced, overgrown. Could not located borehole from street view.
Lindfield-20	south-west	Vacant blocks 8-12 Bent St
Lindfield-21	south-west	Vacant blocks 8-12 Bent St
Lindfield-22	south-west	Vacant blocks 8-12 Bent St
Lindfield-23	east	View from 2 Bent St toward dry cleaners
Lindfield-24	east	Woodford Lane – businesses directly east of 2 Bent St
Lindfield-25	west	Woodford Lane – from 2 rear of 2 Bent St
Lindfield-26	north-east	Rear of 2 Bent St, dry cleaners, from car park
Lindfield-27	east	Rear of 2-4 Bent St from car park, towards dry cleaners
Lindfield-28	east	Rear of 2-4 Bent St from car park, towards dry cleaners
Lindfield-29	west	View of entrance into lower car park from upper car park. All day parking
Lindfield-30	south	View towards Beaconsfield Pde entrance

Lindfield Village Hub Preliminary Site Visit: 26 October 2018

Site Photo Locations



Lindfield Village - Drilling program photo index

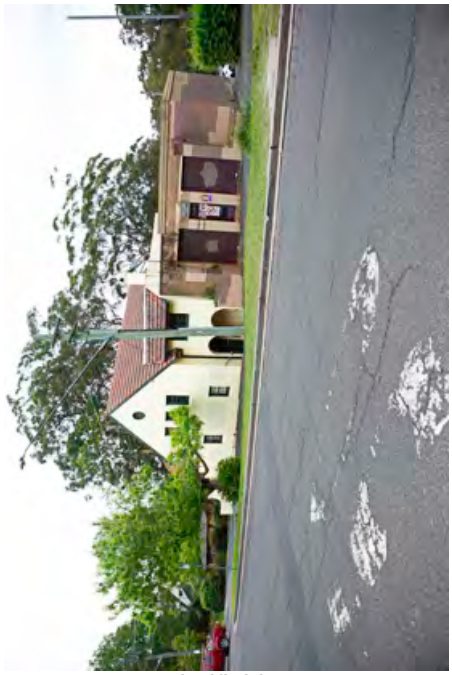
	Photo ID	Borehole	Depth (metres)	Notes
	Lindfield_BH1-9937	GHD_BH1	0.2	Fill material with suspected ACM
	Lindfield_BH1-9938	GHD_BH1	0.4	
	Lindfield_BH1-9939	GHD_BH1	0.5	Duplicate and triplicate included
	Lindfield_BH1-9940	GHD_BH1	1.0	
	Lindfield_BH1-9941	GHD_BH1	1.5	
	Lindfield_BH1-9942	GHD_BH1	2.0	
	Lindfield_BH1-9943	GHD_BH1	2.5	
	Lindfield_BH1-9944	GHD_BH1	3.0	
	Lindfield_BH1-9945	GHD_BH1	3.0	
	Lindfield_BH1-9946	GHD_BH1	3.5	
	Lindfield_BH1-9947	GHD_BH1	4.0	
	Lindfield_BH1-9949	GHD_BH1	4.5	
	Lindfield_BH1-9950	GHD_BH1	5.0	
	Lindfield_BH1-9953	GHD_BH1	5.5	
	Lindfield_BH1-9954	GHD_BH1	6.0	
	Lindfield_BH1-9955	GHD_BH1	6.5	
	Lindfield_BH1-9956	GHD_BH1	7.0	
	Lindfield_BH1-9957	GHD_BH1	7.5	
	Lindfield_BH1-9958	GHD_BH1	8.0	
	Lindfield_BH1-9959	GHD_BH1	8.5	
	Lindfield_BH1-9960	GHD_BH1	9.0	
	Lindfield_BH1-9969	GHD_BH1	9.5	
	Lindfield_BH1-9970	GHD_BH1	10.0	
	Lindfield_BH1-9971	GHD_BH1	10.5	
	Lindfield_BH1-9972	GHD_BH1	11.0	
	Lindfield _BH1-9982	GHD_BH1	16.5 - 21.0	Core
	Lindfield_BH1-9997	GHD_BH1	21.0 - 24.85	Core
	Lindfield_BH1-9999	GHD_BH1	23.6	Core
	Lindfield_BH1-10001	GHD_BH1	24.2	Core
	Lindfield_BH1-10002	GHD_BH1	17.0	Core
	Lindfield_BH1A-0003	GHD_BH1A	0.2	Fill material with suspected ACM
	Lindfield_BH1A-0004	GHD_BH1A	0.4	
	Lindfield_BH1A-0005	GHD_BH1A	0.5	
	Lindfield_BH1A-0006	GHD_BH1A	1.0	
	Lindfield_BH1A-0008	GHD_BH1A	1.5	
	Lindfield_BH1A-0009	GHD_BH1A	2.0	
	Lindfield_BH1A-0011	GHD_BH1A	2.5	
	Lindfield_BH1A-0012	GHD_BH1A	3.0	
	Lindfield_BH1A-0013	GHD_BH1A	3.5	
	Lindfield_BH1A-0014	GHD_BH1A	4.0	
	Lindfield_BH1A-0015	GHD_BH1A	4.5	
	Lindfield_BH1A-0016	GHD_BH1A	5.0	
	Lindfield_BH1A-0017	GHD_BH1A	5.5	
	Lindfield_BH1A-0018	GHD_BH1A	6.0	
	Lindfield_BH1A-0019	GHD_BH1A	6.5	
	Lindfield_BH1A-0020	GHD_BH1A	7.0	
	Lindfield_BH1A-0021	GHD_BH1A	7.5	
	Lindfield_BH1A-0022	GHD_BH1A	8.0	
	Lindfield_BH1A-0024	GHD_BH1A	8.5	
	Lindfield_BH1A-0026	GHD_BH1A	9.0	

	Photo ID	Borehole	Depth (metres)	Notes
	Lindfield_BH1A-0030	GHD_BH1A	10.5	
	Lindfield_BH1A-0031	GHD_BH1A	11.0	
	Lindfield_BH1A-0035	GHD_BH1A		BH1A well
	Lindfield_BH2-9870	GHD_BH2		Suspected ACM
	Lindfield_BH2-9871	GHD_BH2	0.1	Fill material with suspected ACM
	Lindfield_BH2-9872	GHD_BH2	0.4	
	Lindfield_BH2-9873	GHD_BH2	0.4	
	Lindfield_BH2-9875	GHD_BH2	0.5	
	Lindfield_BH2-9876	GHD_BH2	1.0	
	Lindfield_BH2-9878	GHD_BH2	1.5	
	Lindfield_BH2-9879	GHD_BH2	2.0	
	Lindfield_BH2-9880	GHD_BH2	2.5	
	Lindfield_BH2-9881	GHD_BH2	3.0	
	Lindfield_BH2-9882	GHD_BH2		2.0m, 2.5m, 3.0m piles
	Lindfield_BH2-9885	GHD_BH2		Suspected ACM from 0.1m
	Lindfield_BH2-9886	GHD_BH2		Suspected ACM from 0.1m
	Lindfield_BH2-9889	GHD_BH2	3.5	
	Lindfield_BH2-9891	GHD_BH2	4.0	
	Lindfield_BH2-9892	GHD_BH2	4.5	
	Lindfield_BH2-9893	GHD_BH2	5.0	
	Lindfield_BH2-9894	GHD_BH2	5.5	
	Lindfield_BH2-9895	GHD_BH2	6.0	
	Lindfield_BH2-9896	GHD_BH2	6.5	
	Lindfield_BH2-9897	GHD_BH2	7.0	
	Lindfield_BH2-9898	GHD_BH2	7.5	
	Lindfield_BH2-9900	GHD_BH2	8.0	
	Lindfield_BH2-9902	GHD_BH2	8.5	
	Lindfield_BH2-9903	GHD_BH2	9.0	
	Lindfield_BH2-9904	GHD_BH2	9.5	
	Lindfield_BH2-9906	GHD_BH2	10.0	
	Lindfield_BH2-9911	GHD_BH2		Drilling GHD_BH6
	Lindfield_BH2-9913	GHD_BH2		Drilling GHD_BH7
	Lindfield_BH2-9918	GHD_BH2	10.5	Wet returns
	Lindfield_BH2-9919	GHD_BH2	12.0	Wet returns
	Lindfield_BH2-9927	GHD_BH2	15.2 - 20.95	Core
	Lindfield_BH2-9928	GHD_BH2	15.2 - 20.95	Core
	Lindfield_BH2-9929	GHD_BH2	15.2 - 20.95	Core
	Lindfield_BH2-9931	GHD_BH2	15.2 - 20.95	Core
	Lindfield_BH2-9933	GHD_BH2	20.3	Core
	Lindfield_BH2-9935	GHD_BH2	20.5	Core
	Lindfield_BH2-9936	GHD_BH2	20.5	Core
	IMG_9698	BH5		
	IMG_9699	BH6		
	IMG_9700			Proposed sites for GHD_BH2
	IMG_9701			Proposed sites for GHD_BH2
	IMG_9702			Proposed sites for GHD_BH2
	IMG_9703			Proposed sites for GHD_BH2
	IMG_9708			Proposed site for GHD_BH3
	IMG_9709			Proposed site for GHD_BH3
	IMG_9710	BH6		
	IMG_9712			Proposed site for GHD_BH3

	Photo ID	Borehole	Depth (metres)	Notes
	IMG_9718			Proposed site for GHD_BH1
	IMG_9719			Proposed site for GHD_BH1
	IMG_9725			Drilling GHD_BH2
	IMG_9733			2 Bent Street prior to drilling
	IMG_9738	GHD_BH2		
	IMG_9739	GHD_BH2		
	IMG_9745	GHD_BH2		
	IMG_9746	GHD_BH2		
	IMG_9748	GHD_BH2		
	IMG_9749	GHD_BH2		
	IMG_9750	GHD_BH2		
	IMG_9781	BH6		Gatic cover repair
	IMG_9782	BH6		Gatic cover replacement
	IMG_9783	GHD_BH1, GHD_BH1A		2 Bent St, 3 waste drums
	IMG_9785	GHD_BH1, GHD_BH1A		2 Bent St, 2 waste drums
	IMG_9786	GHD_BH1, GHD_BH1A		
	IMG_9788	GHD_BH1		
	IMG_9789	GHD_BH1A		
	IMG_9790			2 Bent St, 1 waste drum
	IMG_9791			2 Bent St, 2 waste drums
	IMG_9792			2 Bent St, after drilling completion


Lindfield-1


Lindfield-2


Lindfield-3

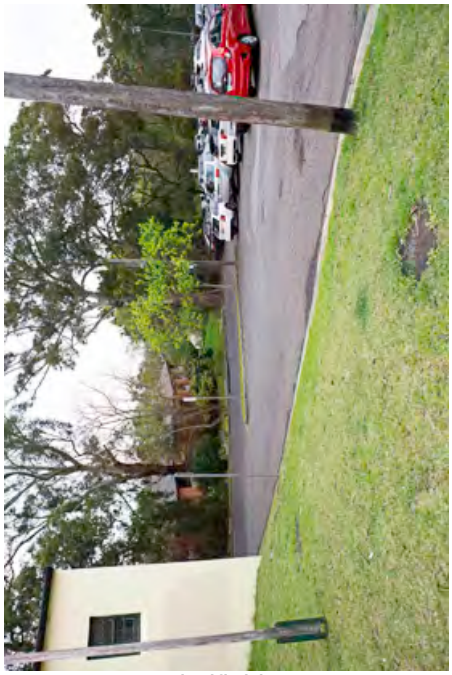

Lindfield-4


Lindfield-5


Lindfield-6


Lindfield-7

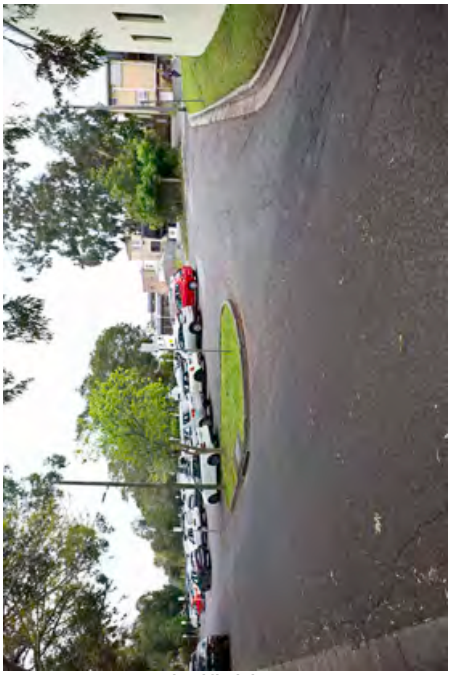

Lindfield-8

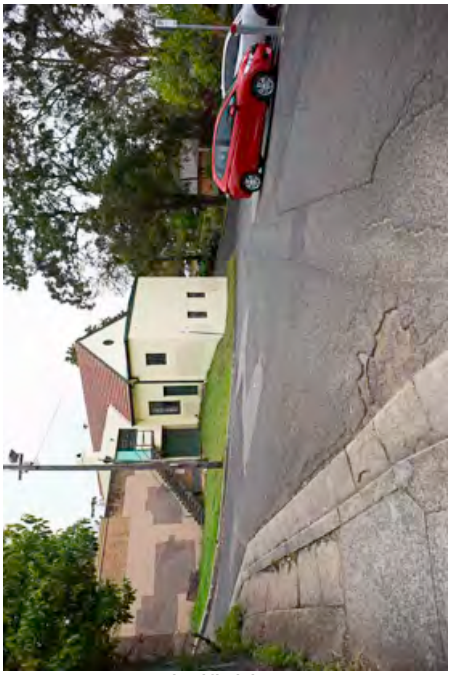

Lindfield-9

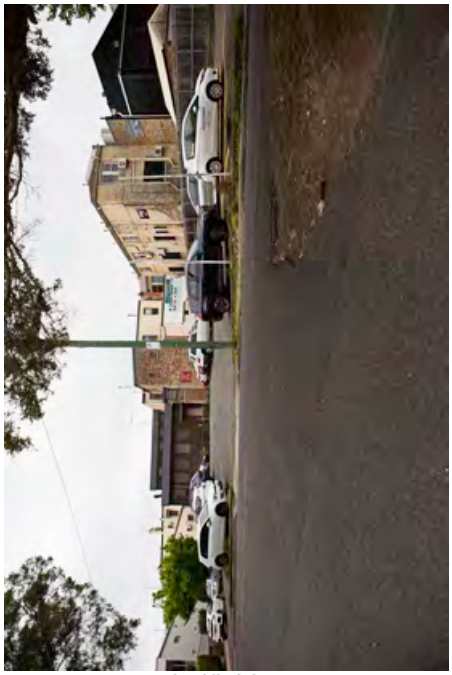

Lindfield-10


Lindfield-11


Lindfield-12


Lindfield-13


Lindfield-14


Lindfield-15


Lindfield-16


Lindfield-17


Lindfield-18

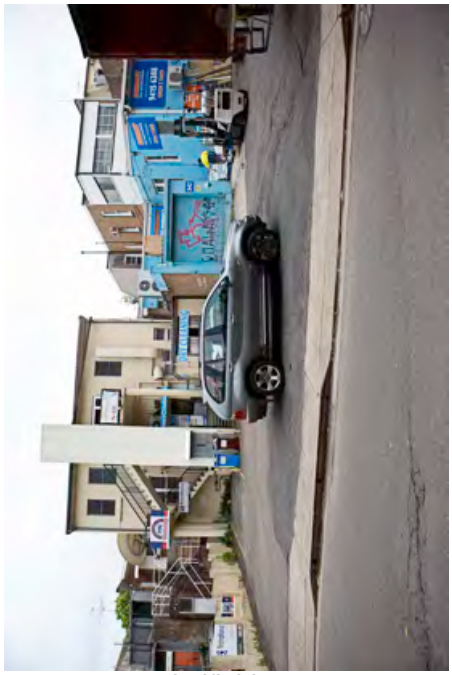

Lindfield-19

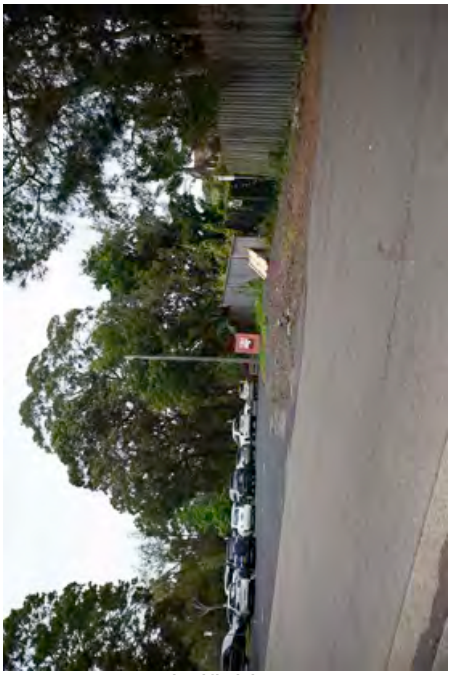

Lindfield-20

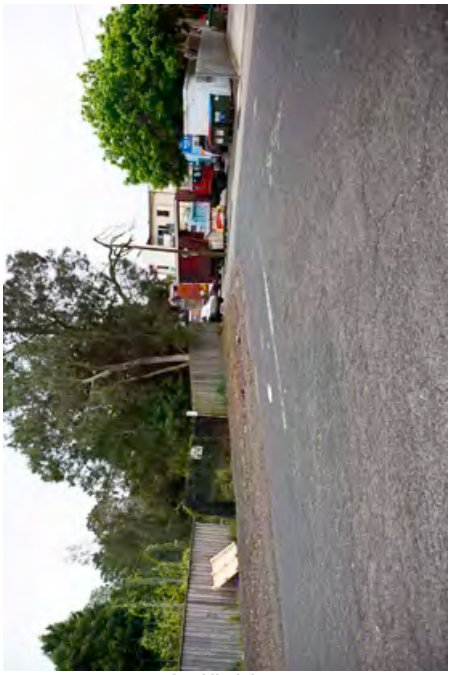

Lindfield-21

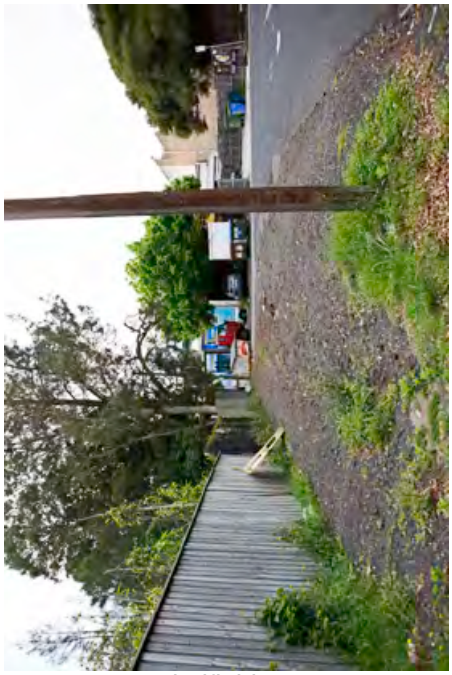

Lindfield-22


Lindfield-23


Lindfield-24

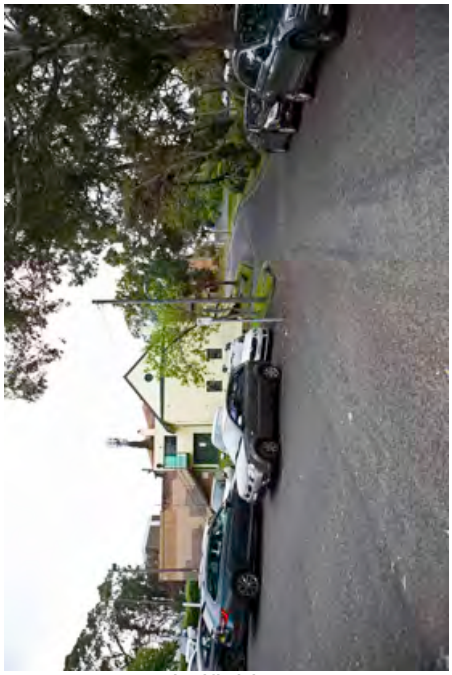

Lindfield-25


Lindfield-26


Lindfield-27

Lindfield-28

Lindfield-29

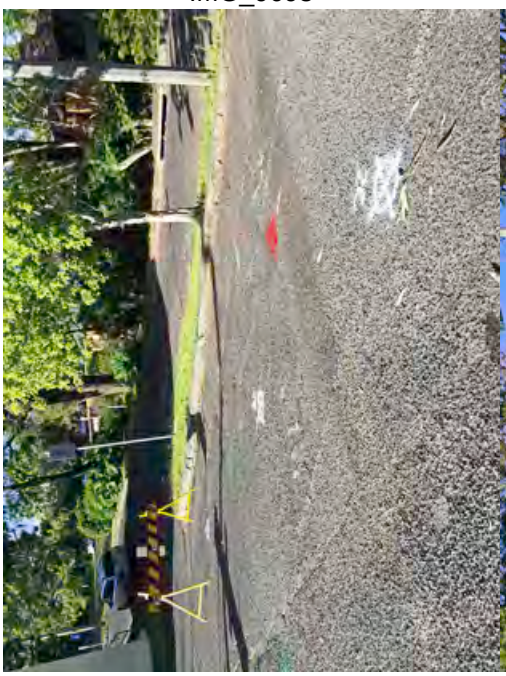


Lindfield-30

IMG_9698

IMG_9699

IMG_9700



IMG_9701

IMG_9702

IMG_9703

IMG_9708

IMG_9709

IMG_9710

IMG_9712

IMG_9718

IMG_9719

Lindfield_BH2-9870

Lindfield_BH2-9871

Lindfield_BH2-9872

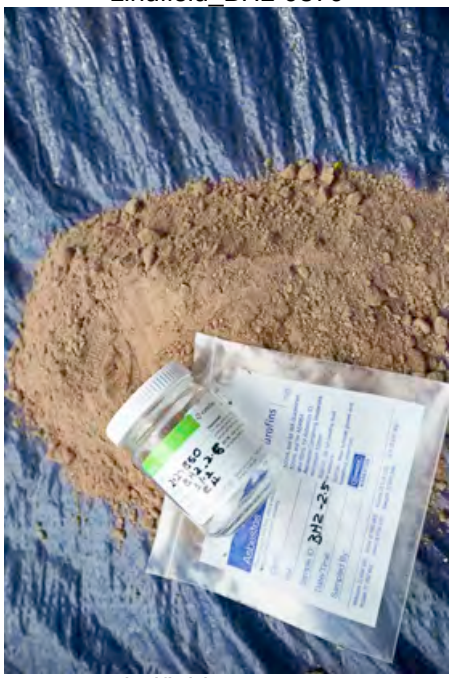

Lindfield_BH2-9873


Lindfield_BH2-9875


Lindfield_BH2-9876


Lindfield_BH2-9878

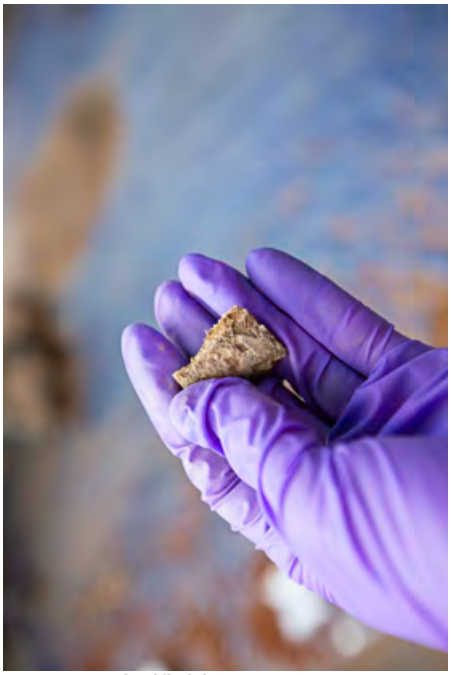

Lindfield_BH2-9879


Lindfield_BH2-9880


Lindfield_BH2-9881


Lindfield_BH2-9882


Lindfield_BH2-9885


Lindfield_BH2-9886

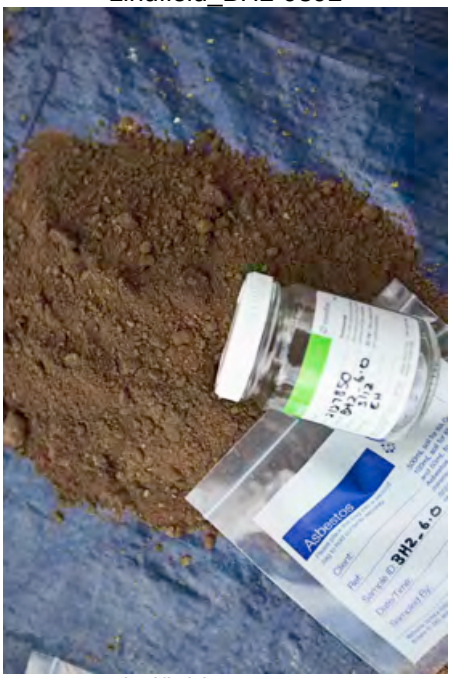
Lindfield_BH2-9889

Lindfield_BH2-9891

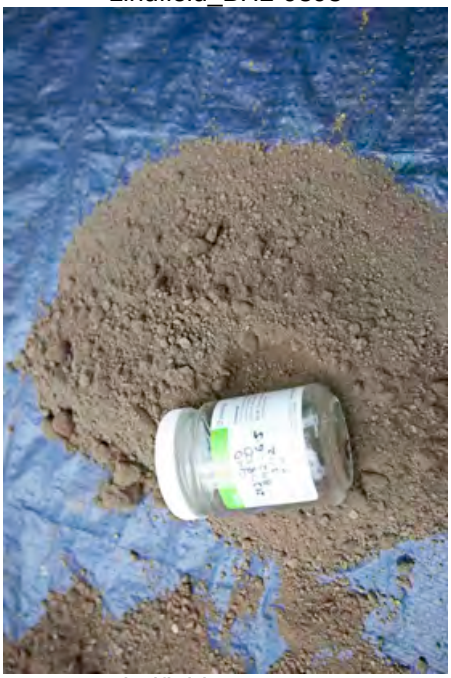
Lindfield_BH2-9892

Lindfield_BH2-9893

Lindfield_BH2-9894



Lindfield_BH2-9895


Lindfield_BH2-9896


IMG_9725


Lindfield_BH2-9897


Lindfield_BH2-9898


Lindfield_BH2-9900


Lindfield_BH2-9902


Lindfield_BH2-9903


Lindfield_BH2-9904


Lindfield_BH2-9906

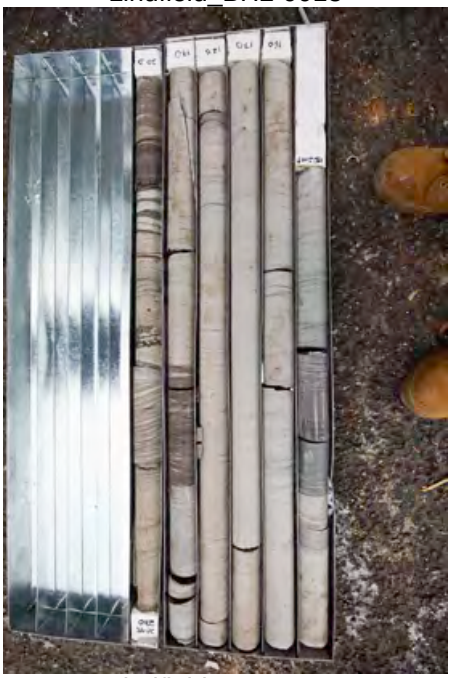

Lindfield_BH2-9911


Lindfield_BH2-9913

Lindfield_BH2-9918

Lindfield_BH2-9919

IMG_9733



Lindfield_BH2-9927

Lindfield_BH2-9928

Lindfield_BH2-9929

Lindfield_BH2-9931

Lindfield_BH2-9933

Lindfield_BH2-9935

Lindfield_BH2-9936

IMG_9738

IMG_9739

Lindfield_BH1-9937

Lindfield_BH1-9938

Lindfield_BH1-9939

Lindfield_BH1-9940

Lindfield_BH1-9941

Lindfield_BH1-9942

Lindfield_BH1-9943

Lindfield_BH1-9944

Lindfield_BH1-9945

Lindfield_BH1-9946


Lindfield_BH1-9947

Lindfield_BH1-9949

Lindfield_BH1-9950

Lindfield_BH1-9953


Lindfield_BH1-9954


Lindfield_BH1-9955


Lindfield_BH1-9956


Lindfield_BH1-9957


Lindfield_BH1-9958


Lindfield_BH1-9959


Lindfield_BH1-9960


Lindfield_BH1-9969


Lindfield_BH1-9970


Lindfield_BH1-9971

Lindfield_BH1-9972

IMG_9745

IMG_9746

IMG_9748

IMG_9749

IMG_9750

Lindfield_BH1-9982

Lindfield_BH1-9997

Lindfield_BH1-9999

Lindfield_BH1-10001

Lindfield_BH1-10002

IMG_9781

IMG_9782

Lindfield_BH1A-0003

Lindfield_BH1A-0004

Lindfield_BH1A-0005

Lindfield_BH1A-0006

Lindfield_BH1A-0008


Lindfield_BH1A-0009


Lindfield_BH1A-0011


Lindfield_BH1A-0012


Lindfield_BH1A-0013

Lindfield_BH1A-0014


Lindfield_BH1A-0015


Lindfield_BH1A-0016

Lindfield_BH1A-0017


Lindfield_BH1A-0018


Lindfield_BH1A-0019


Lindfield_BH1A-0020


Lindfield_BH1A-0021


Lindfield_BH1A-0022


Lindfield_BH1A-0024


Lindfield_BH1A-0026


Lindfield_BH1A-0030


Lindfield_BH1A-0031


Lindfield_BH1A-0035

IMG_9783

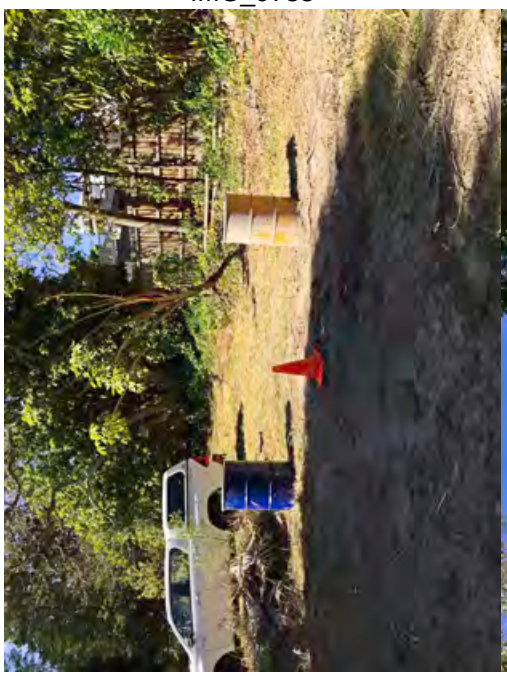
IMG_9785

IMG_9786

IMG_9788

IMG_9789

IMG_9790



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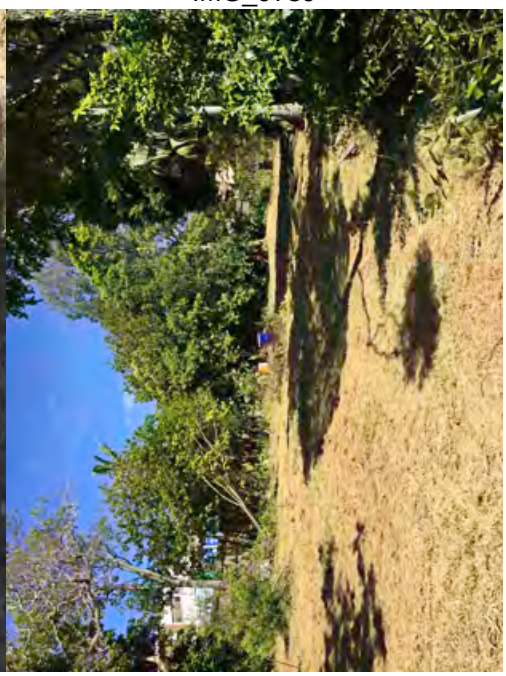

IMG_9792

17/12/2018

Terry Nham
GHD
Level 15, 133 Castlereagh Street
Sydney NSW

RE: Monitoring Well survey at Woodford Lane carpark, Lindfield

Terry,

Please find below a table of the monitoring wells that have been surveyed on December 14, 2018. The preferred method used, as discussed with you, to acquire this information is through GPS (RTK) and Total Station (by resection from GPS established survey controls), and is based on the Map Grid of Australia (MGA) and the Australian Height Datum (AHD).

Monitoring Well ID	Eastings	Northings	Top of Pipe RL	Natural Surface RL
BH01	330354.31	6261252.00	94.67	94.73
BHO1A	330353.24	6261252.39	94.67	94.71
BH02	330354.54	6261128.69	-	93.72
BH05	330356.27	6261120.12	93.69	93.77
BH06	330306.73	6261179.76	89.65	89.73

If you require further information please do not hesitate to contact us.

Sincerely,

Callum Ellis
Subsurface Utility Surveyor

0447 778 913
c.ellis@veris.com.au

Purging and Sampling Record

Bore ID: GND-BH1

Job Information	Sampling Information	Bore Information
Client: Ku-ring-gai Council	Purge Method: Micropurge	SWL: 8.798 m
Project: Lindfield Village Hub	Sample Method: "	Logic Check:
Proj. No.: 21-27850	WQ Meter Type: YSI	Screen: From: to: m
Sampler: T. Nham	Flow Cell: Y / N	Pump Depth: 23.0 m
Date: 14/12/18	WLevel Meter Type: Dip / Fox / Int.Fce / Gge	Stick Up: m
Round December 2018		NAPL Check:
		Bore Diam.: 50 mm
		Ref.datum:
		Well Cap Secure? Yes
		Bore Depth: 23.30 m

Field Filtered? Y / N (filter vessel, disposable filter/syringe)

Time (.....)	Volume (L)	SWL mbtoc	Dis.Oxygen (.....)	Elec.Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	Temp (°C)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		*stable*	*+/- 10%*	*+/- 3%*	*+/- 0.05 pH*	*+/- 10 mV*	-		
11:26	1	9.21	0.35	3047	6.27	-48.1	20.0		Dark grey, sediment.
11:30	2	9.35	0.34	3118	6.00	-17.8	19.8		"
11:34	3	9.46	0.31	3137	6.00	-18.4	19.8		"
11:38	4	9.46	0.46	3144	5.95	-18.7	19.9		"
11:42	5	9.40	0.37	3118	5.93	-20.8	19.9		"
11:45	6	9.48	0.27	3107	5.96	-27.4	19.8		"

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

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

6 bottles, metals filtered

Bottle cap had to change halfway.

Purge Volumes

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

*Double for gravel pack

Purging and Sampling Record

GHD

Bore ID: BH1A

Job Information	Sampling Information	Bore Information
Client: Ku-ring-gai Council	Purge Method: Peri	SWL: 6.120 m Logic Check: ✓
Project: Lindfield Village Hub	Sample Method: Peri	Screen: From: ..... to: ..... m Stick Up: ..... m
Proj. No.: 21-27850	WQ Meter Type: YSI	NAPL Check: ✓ Bore Diam.: 50 mm
Sampler: T. Nham	Flow Cell: Y / N Pump Depth: 12.0 m	Ref.datum: ..... Well Cap Secure? Yes
Date: 14/12/18	WLevel Meter Type: Dip / Fox / Int.Fce / Gge	Bore Depth: 12.36 m
Round December 2018	Field Filtered? Y / N (filter vessel, disposable filter/syringe)	

Time (.....)	Volume (L)	SWL mbtoc	Dis.Oxygen (.....)	Elec.Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	Temp (°C)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		stable	+/- 10%	+/- 3%	+/- 0.05 pH	+/- 10 mV	-		
10:17	1	6.49	0.38	2926	6.02	-41.7	20.1		Brown cloudy
10:21	2	6.88	0.26	2925	6.04	-60.1	20.1		"
10:24	3	7.01	0.23	2928	6.04	-65.3	20.1		"
10:28	4	7.21	0.20	2931	6.05	-74.2	20.1		"
10:32	5	7.42	0.20	2931	6.05	-79.0	20.1		"
10:36	6	7.58	0.21	2935	6.06	-84.6	20.1		"

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

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

6 bottles, metals filtered

Purge Volumes

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

*Double for gravel pack

Purging and Sampling Record

GHD MANAGEMENT ENGINEERING ENVIRONMENT

Bore ID: BH5

Job Information	Sampling Information	Bore Information
Client: Ku-ring-gai Council	Purge Method: Peri	SWL: 5.350 m — Logic Check: /
Project: Lindfield Village Hub	Sample Method: Peri	Screen: From: / to: m — Stick Up: / m
Proj. No.: 21-27850	WQ Meter Type: YSI	NAPL Check: / — Bore Diam.: 50 mm
Sampler: T. Nham	Flow Cell: Y / N — Pump Depth: 12.5 m	Ref.datum: / — Well Cap Secure? Yes
Date: 14/12/18	WLevel Meter Type: Dip / Fox / Int.Fce / Gge	Bore Depth: 12.93 m
Round December 2018	Field Filtered? Y / N (filter vessel, disposable filter/syringe)	

Time (.....)	Volume (L)	SWL mbtoc	Dis.Oxygen (.....)	Elec.Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	Temp (°C)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		*stable*	*+/- 10%*	*+/- 3%*	*+/- 0.05 pH*	*+/- 10 mV*	-		
7:41	1	5.56	0.59	486.3	5.50	91.8	20.7		Brown/Grey cloudy - possible sheen
7:45	2	5.61	0.33	482.6	5.49	94.6	20.7		"
7:48	3	5.61	0.50	482.2	5.48	97.3	20.8		"
7:51	4	5.61	0.46	487.9	5.49	95.4	20.7		"
7:54	5	5.61	0.46	488.7	5.50	94.6	20.7		"
7:58	6	5.61	0.37	490.2	5.51	92.6	20.7		"
8:02	7	5.61	0.28	495.9	5.53	89.2	20.7		"
8:06	8	5.61	0.29	491.5	5.52	89.3	20.7		"

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

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

DUP5 QC01 / QC02 6+6+6 bottles
Metals filtered.

Purge Volumes

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

*Double for gravel pack

Purging and Sampling Record

Bore ID: BH6

Job Information	Sampling Information	Bore Information
Client: Ku-ring-gai Council	Purge Method: Peri	SWL: 4.200 m — Logic Check: ✓
Project: Lindfield Village Hub	Sample Method: Peri	Screen: From: ✓ to: ✓ m — Stick Up: ✓ m
Proj. No.: 21-27850	WQ Meter Type: YSI	NAPL Check: ✓ — Bore Diam.: 50 mm
Sampler: T. Nham	Flow Cell: Y / N — Pump Depth: 7.5 m	Ref.datum: ✓ — Well Cap Secure? Yes
Date: 14/12/18	WLevel Meter Type: Dip / Fox / Int.Fce / Gge	Bore Depth: 8.04 m
Round December 2018	Field Filtered? Y / N (filter vessel, disposable filter/syringe)	

Time (.....)	Volume (L)	SWL mbtoc	Dis.Oxygen (.....)	Elec.Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	Temp (°C)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		*stable*	*+/- 10%*	*+/- 3%*	*+/- 0.05 pH*	*+/- 10 mV*	-		
9:25	1	4.41	0.39	637	5.10	167.9	19.0		Dark/cloudy.
9:29	2	4.48	0.31	676	5.01	177.7	19.0		"
9:33	3	4.60	0.19	646	5.12	173.1	19.1		"
9:37	4	4.65	0.17	672	5.15	170.3	19.1		"
9:41	5	4.69	0.16	703	5.19	167.4	19.1		"
9:44	6	4.73	0.16	728	5.23	165.1	19.1		"

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

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

6 bottles, Metals filtered

Purge Volumes

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

*Double for gravel pack

Appendix E – Summary of analytical results and QA/QC

Appendix E
RPD Field Duplicates - Groundwater

Field Duplicates (water)
Filter: ALL

SDG		14-Dec-18	14-Dec-18			14-Dec-18	ALSE-Sydney 17-Dec-18			
Field ID		BH5	QC01	**RPD**		BH5	QC02		**RPD**	
Sampled Date/Time		14/12/2018	14/12/2018			14/12/2018	14/12/2018			
Method_Type	**ChemName**	**Units**	**EQL**							
Heavy Metal	Arsenic (Filtered)	mg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0	
	Cadmium (Filtered)	mg/L	0.0002 : 0.0001 (Interlab	<0.0002	<0.0002	0	<0.0002	<0.0001	0	
	Chromium (III+VI) (Filtered)	mg/L	0.001	0.001	<0.001	0	0.001	<0.001	0	
	Copper (Filtered)	mg/L	0.001	0.002	0.003	40	**0.002**	**0.062**	**188**	
	Iron (Filtered)	mg/L	0.05	3.2	3.1	3	3.2	2.85	12	
	Lead (Filtered)	mg/L	0.001	<0.001	<0.001	0	<0.001	0.004	120	
	Manganese (Filtered)	mg/L	0.005 : 0.001 (Interlab)	3.7	3.7	0	3.7	3.4	8	
	Mercury (Filtered)	mg/L	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	0	
	Nickel (Filtered)	mg/L	0.001	0.023	0.023	0	0.023	0.028	20	
	Zinc (Filtered)	mg/L	0.005	0.054	0.055	2	**0.054**	**0.127**	**81**	
al										
Organic	Naphthalene (BTEXN)	µg/l	10	<10	<10	0	<10			
Volatile	Benzene	µg/l	1	<1	<1	0	<1	<1	0	
	Toluene	µg/l	1 : 2 (Interlab)	<1	<1	0	<1	<2	0	
	Ethylbenzene	µg/l	1 : 2 (Interlab)	<1	<1	0	<1	<2	0	
	Xylene (o)	µg/l	1 : 2 (Interlab)	<1	<1	0	<1	<2	0	
	Xylene (m & p)	µg/l	2	<2	<2	0	<2	<2	0	
	Xylene Total	µg/l	3 : 2 (Interlab)	<3	<3	0	<3	<2	0	
Organic	F1 (C6-C10 minus BTEX)	µg/l	20	<20	<20	0	<20	<20	0	
	C6-C10 Fraction	µg/l	20	<20	<20	0	<20	<20	0	
	F2 (>C10-C16 minus Naphthalene)	µg/l	50 : 100 (Interlab)	<50	<50	0	<50	<100	0	
	>C10-C16 Fraction	µg/l	50 : 100 (Interlab)	<50	<50	0	<50	<100	0	
	F3 (>C16-C34 Fraction)	µg/l	100	<100	<100	0	<100	<100	0	
	F4 (>C34-C40 Fraction)	µg/l	100	<100	<100	0	<100	<100	0	
	>C10-C40 (Sum of Total)	µg/l	100	<100	<100	0	<100	<100	0	
	C6-C9 Fraction	µg/l	20	<20	<20	0	<20	<20	0	
TPH	C10-C14 Fraction	µg/l	50	<50	<50	0	<50	<50	0	
	C15-C28 Fraction	µg/l	100	<100	<100	0	<100	<100	0	
	C29-C36 Fraction	µg/l	100 : 50 (Interlab)	<100	<100	0	<100	<50	0	
	C10-C36 (Sum of Total)	µg/l	100 : 50 (Interlab)	<100	<100	0	<100	<50	0	
PAH	Acenaphthene	µg/l	1	<1	<1	0	<1	<1	0	
	Acenaphthylene	µg/l	1	<1	<1	0	<1	<1	0	
	Anthracene	µg/l	1	<1	<1	0	<1	<1	0	
	Benz(a)anthracene	µg/l	1	<1	<1	0	<1	<1	0	
	Benzo(a) pyrene	µg/l	1 : 0.5 (Interlab)	<1	<1	0	<1	<0.5	0	
	Benzo[b+j]fluoranthene	µg/l	1	<1	<1	0	<1	<1	0	
	Benzo(k)fluoranthene	µg/l	1	<1	<1	0	<1	<1	0	
	Benzo(g,h,i)perylene	µg/l	1	<1	<1	0	<1	<1	0	
	Chrysene	µg/l	1	<1	<1	0	<1	<1	0	
	Dibenz(a,h)anthracene	µg/l	1	<1	<1	0	<1	<1	0	
	Fluoranthene	µg/l	1	<1	<1	0	<1	<1	0	
	Fluorene	µg/l	1	<1	<1	0	<1	<1	0	
	Indeno(1,2,3-c,d)pyrene	µg/l	1	<1	<1	0	<1	<1	0	
	Naphthalene-PAH	µg/l	1	<1	<1	0	<1			
	Phenanthrene	µg/l	1	<1	<1	0	<1	<1	0	
	Pyrene	µg/l	1	<1	<1	0	<1	<1	0	
	PAHs (Sum of total) - Lab calc	µg/l	1 : 0.5 (Interlab)	<1	<1	0	<1	<0.5	0	
VOC	1,1-dichloroethane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,2,3-trichloropropane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,2-dibromoethane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,3-dichlorobenzene	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Bromodichloromethane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Bromoform	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Chlorodibromomethane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	cis-1,3-dichloropropylene	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Dibromomethane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Iodomethane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Trichloroethene	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Tetrachloroethene	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	trans-1,3-dichloropropylene	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	trans-1,2-dichloroethene	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Trichlorofluoromethane	µg/l	1 : 50 (Interlab)	<1	<1	0	<1	<50	0	
	Bromomethane	µg/l	1 : 50 (Interlab)	<1	<1	0	<1	<50	0	
PCB	Arochlor 1016	µg/l	1	<1	<1	0	<1			
	Arochlor 1221	µg/l	1	<1	<1	0	<1			
	Arochlor 1232	µg/l	1	<1	<1	0	<1			
	Arochlor 1242	µg/l	1	<1	<1	0	<1			
	Arochlor 1248	µg/l	1	<1	<1	0	<1			
	Arochlor 1254	µg/l	1	<1	<1	0	<1			
	Arochlor 1260	µg/l	1	<1	<1	0	<1			
	PCBs (Total)	µg/l	1	<1	<1	0	<1	<1	0	
VOC	Chlorinated hydrocarbons EPAVic	µg/l	5	<5	<5	0	<5			
	Other chlorinated hydrocarbons (Total)	µg/l	5	<5	<5	0	<5			
	1,1,1,2-tetrachloroethane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,1,1-trichloroethane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,1,2,2-tetrachloroethane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,1,2-trichloroethane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,1-dichloroethene	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,2-dichlorobenzene	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,2-dichloroethane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,2-dichloropropane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,3-dichloropropane	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	1,4-dichlorobenzene	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Carbon tetrachloride	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Chlorobenzene	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Chloroform	µg/l	5	<5	<5	0	<5	<5	0	
	Chloromethane	µg/l	1 : 50 (Interlab)	<1	<1	0	<1	<50	0	
	cis-1,2-dichloroethene	µg/l	1 : 5 (Interlab)	<1	<1	0	<1	<5	0	
	Dichloromethane	µg/l	1	<1	<1	0	<1			
	Vinyl chloride	µg/l	1 : 50 (Interlab)	<1	<1	0	<1	<50	0	

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**High RPDs are in bold (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 E
RPD Field Duplicates - Soil

Field Duplicates (soil)
Filter: ALL

SDG	5-Dec-18	5-Dec-18		5-Dec-18	ALSE-Sydney 07-Dec-18	
Field ID	BH1_0.5	BH1_0.5D	RPD	BH1_0.5	BH1_0.5ID	RPD
Sampled Date/Time	5/12/2018	5/12/2018		5/12/2018	5/12/2018	

Method_Type	ChemName	Units	EQL						
Inorganic	Moisture Content (%)	%	1	20	19	5	20		
Heavy Metal	Arsenic	mg/kg	2 : 5 (Interlab)	4.4	3.3	29	4.4	7	46
	Beryllium	mg/kg	2 : 1 (Interlab)	<2	<2	0	<2	<1	0
	Boron	mg/kg	10 : 50 (Interlab)	<10	<10	0	<10	<50	0
	Cadmium	mg/kg	0.4 : 1 (Interlab)	<0.4	<0.4	0	<0.4	<1	0
	Chromium (III+VI)	mg/kg	5 : 2 (Interlab)	11	8.4	27	11	10	10
	Cobalt	mg/kg	5 : 2 (Interlab)	<5	<5	0	<5	<2	0
	Copper	mg/kg	5	15	15	0	15	18	18
	Iron	mg/kg	20 : 50 (Interlab)	4100	3500	16	4100	6480	45
	Lead	mg/kg	5	17	13	27	17	13	27
	Manganese	mg/kg	5	<5	<5	0	<5	<5	0
	Mercury	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Nickel	mg/kg	5 : 2 (Interlab)	<5	<5	0	<5	<2	0
	Selenium	mg/kg	2 : 5 (Interlab)	<2	<2	0	<2	<5	0
	Zinc	mg/kg	5	<5	<5	0	<5	7	33
al									
Organic	Naphthalene (BTEXN)	mg/kg	0.5	<0.5	<0.5	0	<0.5		
Volatile	Benzene	mg/kg	0.1 : 0.2 (Interlab)	<0.1	<0.1	0	<0.1	<0.2	0
	Toluene	mg/kg	0.1 : 0.5 (Interlab)	<0.1	<0.1	0	<0.1	<0.5	0
	Ethylbenzene	mg/kg	0.1 : 0.5 (Interlab)	<0.1	<0.1	0	<0.1	<0.5	0
	Xylene (o)	mg/kg	0.1 : 0.5 (Interlab)	<0.1	<0.1	0	<0.1	<0.5	0
	Xylene (m & p)	mg/kg	0.2 : 0.5 (Interlab)	<0.2	<0.2	0	<0.2	<0.5	0
	Xylene Total	mg/kg	0.3 : 0.5 (Interlab)	<0.3	<0.3	0	<0.3	<0.5	0
Organic	F1 (C6-C10 minus BTEX)	mg/kg	20 : 10 (Interlab)	<20	<20	0	<20	<10	0
	C6-C10 Fraction	mg/kg	20 : 10 (Interlab)	<20	<20	0	<20	<10	0
	F2 (>C10-C16 minus Naphthalene)	mg/kg	50	<50	<50	0	<50	<50	0
	>C10-C16 Fraction	mg/kg	50	<50	<50	0	<50	<50	0
	F3 (>C16-C34 Fraction)	mg/kg	100	<100	<100	0	<100	<100	0
	F4 (>C34-C40 Fraction)	mg/kg	100	<100	<100	0	<100	<100	0
	>C10-C40 (Sum of Total)	mg/kg	100 : 50 (Interlab)	<100	<100	0	<100	<50	0
	C6-C9 Fraction	mg/kg	20 : 10 (Interlab)	<20	<20	0	<20	<10	0
TPH	C10-C14 Fraction	mg/kg	20 : 50 (Interlab)	<20	43	73	<20	<50	0
	C15-C28 Fraction	mg/kg	50 : 100 (Interlab)	<50	56	11	<50	<100	0
	C29-C36 Fraction	mg/kg	50 : 100 (Interlab)	<50	52	4	<50	<100	0
	C10-C36 (Sum of Total)	mg/kg	50	<50	151	100	<50	<50	0
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(a) pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo[b+j]fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Chrysene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Fluorene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Naphthalene-PAH	mg/kg	0.5	<0.5	<0.5	0	<0.5		
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	PAHs (Sum of total) - Lab calc	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Total 8 PAHs (as BaP TEQ)(half LOR) - Lab Calc	mg/kg	0.5	0.6	0.6	0	0.6	0.6	0
	Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc	mg/kg	0.5	1.2	1.2	0	1.2	1.2	0
VOC	1,1-dichloroethane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,2,3-trichloropropane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,2-dibromoethane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,3-dichlorobenzene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Bromodichloromethane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Bromoform	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Chlorodibromomethane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	cis-1,3-dichloropropylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Dibromomethane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Iodomethane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Trichloroethene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Tetrachloroethene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	trans-1,3-dichloropropylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	trans-1,2-dichloroethene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Trichlorofluoromethane	mg/kg	0.5 : 5 (Interlab)	<0.5	<0.5	0	<0.5	<5	0
	Bromomethane	mg/kg	0.5 : 5 (Interlab)	<0.5	<0.5	0	<0.5	<5	0
	Chlorinated hydrocarbons EPAVic	mg/kg	0.5	<0.5	<0.5	0	<0.5		
	Other chlorinated hydrocarbons (Total)	mg/kg	0.5	<0.5	<0.5	0	<0.5		
	1,1,1,2-tetrachloroethane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,1,1-trichloroethane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,1,2,2-tetrachloroethane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,1,2-trichloroethane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,1-dichloroethene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,2-dichlorobenzene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,2-dichloroethane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,2-dichloropropane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,3-dichloropropane	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	1,4-dichlorobenzene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Carbon tetrachloride	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Chlorobenzene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Chloroform	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Chloromethane	mg/kg	0.5 : 5 (Interlab)	<0.5	<0.5	0	<0.5	<5	0
	cis-1,2-dichloroethene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Dichloromethane	mg/kg	0.5	<0.5	<0.5	0	<0.5		
	Vinyl chloride	mg/kg	0.5 : 5 (Interlab)	<0.5	<0.5	0	<0.5	<5	0

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

**High RPDs are in bold (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

			Metals																				
			Arsenic	Arsenic (filtered)	Beryllium	Boron	Cadmium	Cadmium (filtered)	Chromium (III+VI)	Chromium (III+VI) (filtered)	Cobalt	Copper	Copper (filtered)	Iron	Iron (filtered)	Lead	Lead (filtered)	Manganese	Manganese (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Selenium	Zinc
			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
EQL			0.001	0.001	0.001	0.05	0.0002	0.0001	0.001	0.001	0.001	0.001	0.001	0.05	0.05	0.001	0.001	0.005	0.001	0.0001	0.0001	0.001	0.001	0.001	0.005
NEPM 2013 Table 1C GILs, Fresh Waters						0.37 #1	0.0002 #2	0.0002 #2	0.001 #1	0.001 #1		0.0014 #2	0.0014 #2			0.0034 #2	0.0034 #2	1.9 #1	1.9 #1	6E-05 #3	6E-05 #3	0.011 #2	0.011 #2	0.005 #3	0.008 #2
ANZECC 2000 FW Med-Low Reliability			0.013 #5	0.013 #5	0.00013	0.37	0.0002	0.0002			0.0014	0.0014	0.0014	0.3	0.3	0.0034	0.0034	1.7	1.7			0.011	0.011	0.005|0.011	0.008
Location Code	**Field ID**	**Sample Type**																							
BH5	BH5	Normal		<0.001				<0.0002		0.001			0.002		3.2		<0.001		3.7		<0.0001		0.023		
BH5	QC01	Field_D		<0.001				<0.0002		<0.001			0.003		3.1		<0.001		3.7		<0.0001		0.023		
BH5	QC02	Interlab_D		<0.001				<0.0001		<0.001			0.062		2.85		0.004		3.40		<0.0001		0.028		
BH6	BH6	Normal		<0.001				<0.0002		0.002			0.022		1.2		0.002		5.5		<0.0001		0.047		
GHD_BH1	GHD_BH1	Normal		0.003				<0.0002		<0.001			<0.001		44		<0.001		2.1		<0.0001		0.035		
GHD_BH1A	GHD_BH1A	Normal		<0.001				<0.0002		<0.001			0.057		58		0.002		5.8		<0.0001		0.084		
	R1	Rinsate	<0.001		<0.001	<0.05	<0.0002		<0.001		<0.001	<0.001		<0.05		<0.001		<0.005		<0.0001		<0.001		<0.001	<0.005
	R2	Rinsate	<0.001		<0.001	<0.05	<0.0002		<0.001		<0.001	<0.001		<0.05		<0.001		<0.005		<0.0001		<0.001		<0.001	<0.005
	RB01	Rinsate	<0.001				<0.0002		<0.001			<0.001		<0.05		<0.001		<0.005		<0.0001		<0.001			<0.005
	TRIP BLANK	Trip_B																							

Comments

#1 Figure may not protect key species from chronic toxicity, refer to ANZECC & ARMCANZ (2000) for further guidance.

#2 Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & ARMCANZ (2000) for site specific hardness guidance

#3 Chemical for which possible bioaccumulation and secondary poisoning effects should be considered, refer to ANZECC & ARMCANZ (2000) for further guidance.

#4 Measurement based on value for p-Xylene

#5 As (V) used as conservative value

				BTEXN								TRH - NEPM 2013							TRH - NEPM 1999						
			Zinc (filtered)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene (BTEXN)	BTEX (Sum of Total) - Lab Calc	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene
			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL			0.005	1	1	1	1	2	2	10	1	20	20	50	50	100	100	100	20	50	100	50	50	1	1
NEPM 2013 Table 1C GILs, Fresh Waters			0.008[#2]	950			350	200[#4]		16															
ANZECC 2000 FW Med-Low Reliability			0.008	950	180	80	350			16															
Location Code	**Field ID**	**Sample Type**																							
BH5	BH5	Normal	0.054	<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
BH5	QC01	Field_D	0.055	<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
BH5	QC02	Interlab_D	0.127	<1	<2	<2	<2	<2	<2		<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1.0	<1.0
BH6	BH6	Normal	0.14	<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
GHD_BH1	GHD_BH1	Normal	0.072	<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
GHD_BH1A	GHD_BH1A	Normal	0.17	<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
	R1	Rinsate		<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
	R2	Rinsate		<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
	RB01	Rinsate		<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
	TRIP BLANK	Trip_B		<1	<1	<1	<1	<2	<3	<10		<20	<20						<20						

Comments

#1 Figure may not protect key species from chronic toxicity, refer to ANZEC(

#2 Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & /

#3 Chemical for which possible bioaccumulation and secondary poisoning ef

#4 Measurement based on value for p-Xylene

#5 As (V) used as conservative value

			PAHs																					
			Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Naphthalene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	1,1-dichloroethane	1,2,3-trichlorobenzene	1,2,3-trichloropropane	1,2-dibromoethane	1,3-dichlorobenzene	Bromodichloromethane
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL			1	1	0.5	1	1	1	1	1	1	1	1	1	1	1	1	0.5	0.5	1	5	1	1	1	1
NEPM 2013 Table 1C GILs, Fresh Waters												16			16						3[#3]			260	
ANZECC 2000 FW Med-Low Reliability			0.01		0.1						1	16			16	0.6				90	3			260	
Location Code	**Field ID**	**Sample Type**																							
BH5	BH5	Normal	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
BH5	QC01	Field_D	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
BH5	QC02	Interlab_D	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<0.5	<0.5	<5	<5	<5	<5	<5	<5
BH6	BH6	Normal	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
GHD_BH1	GHD_BH1	Normal	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
GHD_BH1A	GHD_BH1A	Normal	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
	R1	Rinsate	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
	R2	Rinsate	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
	RB01	Rinsate	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
	TRIP BLANK	Trip_B																							

Comments

#1 Figure may not protect key species from chronic toxicity, refer to ANZECC

#2 Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & A

#3 Chemical for which possible bioaccumulation and secondary poisoning ef

#4 Measurement based on value for p-Xylene

#5 As (V) used as conservative value

			VOCs													Halogenated		PCBs						
			Bromoform	Chlorodibromomethane	Chloroethane	cis-1,3-dichloropropene	cis-1,4-Dichloro-2-butene	Dibromomethane	Iodomethane	Pentachloroethane	Trichloroethene	Tetrachloroethene	trans-1,3-dichloropropene	trans-1,2-dichloroethene	trans-1,4-Dichloro-2-butene	Trichlorofluoromethane	Bromomethane	Dichlorodifluoromethane	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL			1	1	50	1	5	1	1	5	1	1	1	1	5	1	1	50	1	1	1	1	1	1	1
NEPM 2013 Table 1C GILs, Fresh Waters																						0.3[#3]		0.01[#3]	
ANZECC 2000 FW Med-Low Reliability										80	330	70							0.001	1	0.3	0.3	0.03	0.01	
Location Code	**Field ID**	**Sample Type**																							
BH5	BH5	Normal	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1		<1	<1	<1	**<1**	<1	**<1**	<1
BH5	QC01	Field_D	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1		<1	<1	<1	**<1**	<1	**<1**	<1
BH5	QC02	Interlab_D	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<50	<50							
BH6	BH6	Normal	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1								
GHD_BH1	GHD_BH1	Normal	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1								
GHD_BH1A	GHD_BH1A	Normal	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1								
	R1	Rinsate	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1		<5	<1	<5	**<5**	<5	**<5**	<5
	R2	Rinsate	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1								
	RB01	Rinsate	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1		<1	<1	<1	**<1**	<1	**<1**	<1
	TRIP BLANK	Trip_B																							

Comments

#1 Figure may not protect key species from chronic toxicity, refer to ANZEC(

#2 Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & /

#3 Chemical for which possible bioaccumulation and secondary poisoning ef

#4 Measurement based on value for p-Xylene

#5 As (V) used as conservative value

			Chlorinated Hydrocarbons																					
			PCBs (Total)	Chlorinated hydrocarbons EPAVic	Other chlorinated hydrocarbons (Total)	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,4-trichlorobenzene	1,2-dibromo-3-chloropropane	1,2-dichlorobenzene	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Carbon tetrachloride	Chlorobenzene	Chloroform
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL			1	5	5	1	1	1	1	1	5	5	5	1	1	1	1	1	5	5	5	5	1	1	5
NEPM 2013 Table 1C GILs, Fresh Waters									6,500			85[#3]		160				60							
ANZECC 2000 FW Med-Low Reliability							270	400	6,500	700		85		160	1,900	900	1,100	60					240	55	370
Location Code	**Field ID**	**Sample Type**																							
BH5	BH5	Normal	<1	<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
BH5	QC01	Field_D	<1	<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
BH5	QC02	Interlab_D	<1			<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
BH6	BH6	Normal		<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
GHD_BH1	GHD_BH1	Normal		<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
GHD_BH1A	GHD_BH1A	Normal		<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
	R1	Rinsate	<1	<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
	R2	Rinsate		<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
	RB01	Rinsate	<1	<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
	TRIP BLANK	Trip_B																							

Comments

#1 Figure may not protect key species from chronic toxicity, refer to ANZECC

#2 Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & A

#3 Chemical for which possible bioaccumulation and secondary poisoning ef

#4 Measurement based on value for p-Xylene

#5 As (V) used as conservative value

	Chloromethane	cis-1,2-dichloroethene	Methylene chloride	Hexachlorobutadiene	Vinyl chloride
	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	1	1	5	1
NEPM 2013 Table 1C GILs, Fresh Waters					
ANZECC 2000 FW Med-Low Reliability			4,000	0.04	100
Location Code	**Field ID**	**Sample Type**					
BH5	BH5	Normal	<1	<1	<1		<1
BH5	QC01	Field_D	<1	<1	<1		<1
BH5	QC02	Interlab_D	<50	<5		<5	<50
BH6	BH6	Normal	<1	<1	<1		<1
GHD_BH1	GHD_BH1	Normal	<1	<1	<1		<1
GHD_BH1A	GHD_BH1A	Normal	<1	<1	<1		<1
	R1	Rinsate	<1	<1	<1		<1
	R2	Rinsate	<1	<1	<1		<1
	RB01	Rinsate	<1	<1	<1		<1
	TRIP BLANK	Trip_B					

Comments
#1 Figure may not protect key species from chronic toxicity, refer to ANZEC(
#2 Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & /
#3 Chemical for which possible bioaccumulation and secondary poisoning ef
#4 Measurement based on value for p-Xylene
#5 As (V) used as conservative value

	Metals																					
	Arsenic	Arsenic (filtered)	Beryllium	Boron	Cadmium	Cadmium (filtered)	Chromium (III+VI)	Chromium (III+VI) (filtered)	Cobalt	Copper	Copper (filtered)	Iron	Iron (filtered)	Lead	Lead (filtered)	Manganese	Manganese (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Selenium	Zinc
	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
EQL	0.001	0.001	0.001	0.05	0.0002	0.0001	0.001	0.001	0.001	0.001	0.001	0.05	0.05	0.001	0.001	0.005	0.001	0.0001	0.0001	0.001	0.001	0.001	0.005
ADWG 2011 Health (v3.5 updated 2018)	0.01	0.01	0.06	4	0.002	0.002				2	2			0.01	0.01	0.5	0.5	0.001	0.001	0.02	0.02	0.01	
ADWG 2011 Aesthetic (v3.5 updated 2018)										1	1	0.3	0.3			0.1	0.1						3[#1]
NEPM 2013 Table 1A(4) HSL A/B Res GW for Vapour Intrusion, Sand																							
2-4m																							
NEPM 2013 Table 1C GILs, Fresh Waters				*0.37[#5]*	*0.0002[#6]*	*0.0002[#6]*	*0.001[#5]*	*0.001[#5]*		*0.0014[#6]*	*0.0014[#6]*			*0.0034[#6]*	*0.0034[#6]*	*1.9[#5]*	*1.9[#5]*	*6E-05[#7]*	*6E-05[#7]*	*0.011[#6]*	*0.011[#6]*	*0.005[#7]*	*0.008[#6]*
Location Code	**Field ID**	**Sample Type**																					
BH5	BH5	Normal		<0.001				<0.0002		***0.001***			***0.002***		3.2		<0.001		***3.7***		<0.0001		***0.023***		
BH5	QC01	Field_D		<0.001				<0.0002		<0.001			***0.003***		3.1		<0.001		***3.7***		<0.0001		***0.023***		
BH5	QC02	Interlab_D		<0.001				<0.0001		<0.001			***0.062***		2.85		***0.004***		***3.40***		<0.0001		***0.028***		
BH6	BH6	Normal		<0.001				<0.0002		***0.002***			***0.022***		1.2		0.002		***5.5***		<0.0001		***0.047***		
GHD_BH1	GHD_BH1	Normal		0.003				<0.0002		<0.001			<0.001		44		<0.001		***2.1***		<0.0001		***0.035***		
GHD_BH1A	GHD_BH1A	Normal		<0.001				<0.0002		<0.001			***0.057***		58		0.002		***5.8***		<0.0001		***0.084***		
	R1	Rinsate	<0.001		<0.001	<0.05	<0.0002		<0.001		<0.001	<0.001		<0.05		<0.001		<0.005		***<0.0001***		<0.001		<0.001	<0.005
	R2	Rinsate	<0.001		<0.001	<0.05	<0.0002		<0.001		<0.001	<0.001		<0.05		<0.001		<0.005		***<0.0001***		<0.001		<0.001	<0.005
	RB01	Rinsate	<0.001				<0.0002		<0.001			<0.001		<0.05		<0.001		<0.005		***<0.0001***		<0.001			<0.005
	TRIP BLANK	Trip_B																							

Comments

#1 Natural concentrations generally <0.01 mg/L
#2 Not limiting: Derived water HSL exceeds water solubility limit
#3 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#4 To obtain F2 subtract naphthalene from the >C10 - C16 fraction.
#5 Figure may not protect key species from chronic toxicity, refer to ANZECC & ARMCANZ (2000) for further guidance.
#6 Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & ARMCANZ (2000) for site specific hardness guidance
#7 Chemical for which possible bioaccumulation and secondary poisoning effects should be considered, refer to ANZECC & ARMCANZ (2000) for further guidance.
#8 Measurement based on value for p-Xylene

Environmental Standards
National Health and Medical Research Council, August 2018, ADWG 2011 Health (v3.5 updated 2018)
National Health and Medical Research Council, August 2018, ADWG 2011 Aesthetic (v3.5 updated 2018)

			BTEXN								TRH - NEPM 2013							TRH - NEPM 1999						
			Zinc (filtered)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene (BTEXN)	BTEX (Sum of Total) - Lab Calc	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene
			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL			0.005	1	1	1	1	2	2	10	1	20	20	50	50	100	100	100	20	50	100	50	50	1	1
ADWG 2011 Health (v3.5 updated 2018)				1	800	300			600															
ADWG 2011 Aesthetic (v3.5 updated 2018)			3[#1]		25	3			20															
NEPM 2013 Table 1A(4) HSL A/B Res GW for Vapour Intrusion, Sand																								
2-4m				800	NL	NL			NL	NL		1,000[#3]		1,000[#4]											
NEPM 2013 Table 1C GILs, Fresh Waters			*0.008*[#6]	*950*			*350*	*200*[#8]		*16*															
Location Code	**Field ID**	**Sample Type**																							
BH5	BH5	Normal	*0.054*	<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
BH5	QC01	Field_D	*0.055*	<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
BH5	QC02	Interlab_D	*0.127*	<1	<2	<2	<2	<2	<2		<1	<20	<20	<100	<100	<100	<100	<100	<20	<50	<100	<50	<50	<1.0	<1.0
BH6	BH6	Normal	*0.14*	<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
GHD_BH1	GHD_BH1	Normal	*0.072*	<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
GHD_BH1A	GHD_BH1A	Normal	*0.17*	<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
	R1	Rinsate		<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
	R2	Rinsate		<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
	RB01	Rinsate		<1	<1	<1	<1	<2	<3	<10		<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	<100	<100	<1	<1
	TRIP BLANK	Trip_B		<1	<1	<1	<1	<2	<3	<10		<20	<20						<20						

Comments
#1 Natural concentrations generally <0.01 mg/L
#2 Not limiting: Derived water HSL exceeds water solubility limit
#3 To obtain F1 subtract the sum of BTEX concentrations from the C6 - (
#4 To obtain F2 subtract naphthalene from the >C10 - C16 fraction.
#5 Figure may not protect key species from chronic toxicity, refer to ANZE
#6 Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC
#7 Chemical for which possible bioaccumulation and secondary poisoning
#8 Measurement based on value for p-Xylene

Environmental Standards
National Health and Medical Research Council, August 2018, ADWG 201
National Health and Medical Research Council, August 2018, ADWG 201

	PAHs																						
	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Naphthalene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	1,1-dichloroethane	1,2,3-trichlorobenzene	1,2,3-trichloropropane	1,2-dibromoethane	1,3-dichlorobenzene	Bromodichloromethane
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	1	0.5	1	1	1	1	1	1	1	1	1	1	1	1	0.5	0.5	1	5	1	1	1	1
ADWG 2011 Health (v3.5 updated 2018)			0.01													0.01					1		
ADWG 2011 Aesthetic (v3.5 updated 2018)																						20	
NEPM 2013 Table 1A(4) HSL A/B Res GW for Vapour Intrusion, Sand																							
2-4m										NL			NL										
NEPM 2013 Table 1C GILs, Fresh Waters										*16*			*16*						*3 #7*			*260*	
Location Code	**Field ID**	**Sample Type**																					
BH5	BH5	Normal	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
BH5	QC01	Field_D	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
BH5	QC02	Interlab_D	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<0.5	<0.5	<5	*<5*	<5	<5	<5	<5
BH6	BH6	Normal	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
GHD_BH1	GHD_BH1	Normal	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
GHD_BH1A	GHD_BH1A	Normal	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
	R1	Rinsate	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
	R2	Rinsate	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
	RB01	Rinsate	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1		<1		<1	<1	<1	<1
	TRIP BLANK	Trip_B																							

Comments
#1 Natural concentrations generally <0.01 mg/L
#2 Not limiting: Derived water HSL exceeds water solubility limit
#3 To obtain F1 subtract the sum of BTEX concentrations from the C6 - (
#4 To obtain F2 subtract naphthalene from the >C10 - C16 fraction.
#5 Figure may not protect key species from chronic toxicity, refer to ANZE
#6 Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC
#7 Chemical for which possible bioaccumulation and secondary poisoning
#8 Measurement based on value for p-Xylene

Environmental Standards
National Health and Medical Research Council, August 2018, ADWG 201
National Health and Medical Research Council, August 2018, ADWG 201

			VOCs													Halogenated		PCBs						
			Bromoform	Chlorodibromomethane	Chloroethane	cis-1,3-dichloropropene	cis-1,4-Dichloro-2-butene	Dibromomethane	Iodomethane	Pentachloroethane	Trichloroethene	Tetrachloroethene	trans-1,3-dichloropropene	trans-1,2-dichloroethene	trans-1,4-Dichloro-2-butene	Trichlorofluoromethane	Bromomethane	Dichlorodifluoromethane	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL			1	1	50	1	5	1	1	5	1	1	1	1	5	1	1	50	1	1	1	1	1	1	1
ADWG 2011 Health (v3.5 updated 2018)												50					1								
ADWG 2011 Aesthetic (v3.5 updated 2018)																									
NEPM 2013 Table 1A(4) HSL A/B Res GW for Vapour Intrusion, Sand 2-4m																									
NEPM 2013 Table 1C GILs, Fresh Waters																						*0.3#7*		*0.01#7*	
Location Code	**Field ID**	**Sample Type**																							
BH5	BH5	Normal	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1		<1	<1	<1	*<1*	<1	*<1*	<1
BH5	QC01	Field_D	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1		<1	<1	<1	*<1*	<1	*<1*	<1
BH5	QC02	Interlab_D	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<50	<50							
BH6	BH6	Normal	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1								
GHD_BH1	GHD_BH1	Normal	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1								
GHD_BH1A	GHD_BH1A	Normal	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1								
	R1	Rinsate	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1		<5	<1	<5	*<5*	<5	*<5*	<5
	R2	Rinsate	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1								
	RB01	Rinsate	<1	<1		<1		<1	<1		<1	<1	<1	<1		<1	<1		<1	<1	<1	*<1*	<1	*<1*	<1
	TRIP BLANK	Trip_B																							

Comments
#1 Natural concentrations generally <0.01 mg/L
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#7 Chemical for which possible bioaccumulation and secondary poisoning
#8 Measurement based on value for p-Xylene

Environmental Standards
National Health and Medical Research Council, August 2018, ADWG 201
National Health and Medical Research Council, August 2018, ADWG 201

				Chlorinated Hydrocarbons																					
				PCBs (Total)	Chlorinated hydrocarbons EPAVic	Other chlorinated hydrocarbons (Total)	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,4-trichlorobenzene	1,2-dibromo-3-chloropropane	1,2-dichlorobenzene	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Carbon tetrachloride	Chlorobenzene	Chloroform
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	5	5	1	1	1	1	1	5	5	5	1	1	1	1	1	5	5	5	5	1	1	5
ADWG 2011 Health (v3.5 updated 2018)											30				1,500	3			40					3	300	
ADWG 2011 Aesthetic (v3.5 updated 2018)															1				0.3						10	
NEPM 2013 Table 1A(4) HSL A/B Res GW for Vapour Intrusion, Sand 2-4m																										
NEPM 2013 Table 1C GILs, Fresh Waters										*6,500*			*85#7*		*160*				*60*							
Location Code	**Field ID**	**Sample Type**																								
BH5	BH5	Normal		<1	<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
BH5	QC01	Field_D		<1	<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
BH5	QC02	Interlab_D		<1			<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
BH6	BH6	Normal			<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
GHD_BH1	GHD_BH1	Normal			<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
GHD_BH1A	GHD_BH1A	Normal			<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
	R1	Rinsate		<1	<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
	R2	Rinsate			<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
	RB01	Rinsate		<1	<5	<5	<1	<1	<1	<1	<1				<1	<1	<1	<1	<1					<1	<1	<5
	TRIP BLANK	Trip_B																								

Comments
#1 Natural concentrations generally <0.01 mg/L
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#6 Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC
#7 Chemical for which possible bioaccumulation and secondary poisoning
#8 Measurement based on value for p-Xylene

Environmental Standards
National Health and Medical Research Council, August 2018, ADWG 201
National Health and Medical Research Council, August 2018, ADWG 201

	Chloromethane	cis-1,2-dichloroethene	Methylene chloride	Hexachlorobutadiene	Vinyl chloride
	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	1	1	5	1
ADWG 2011 Health (v3.5 updated 2018)			4	0.7	0.3
ADWG 2011 Aesthetic (v3.5 updated 2018)					
NEPM 2013 Table 1A(4) HSL A/B Res GW for Vapour Intrusion, Sand					
2-4m					
NEPM 2013 Table 1C GILs, Fresh Waters					

Location Code	Field ID	Sample Type					
BH5	BH5	Normal	<1	<1	<1		<1
BH5	QC01	Field_D	<1	<1	<1		<1
BH5	QC02	Interlab_D	<50	<5		<5	<50
BH6	BH6	Normal	<1	<1	<1		<1
GHD_BH1	GHD_BH1	Normal	<1	<1	<1		<1
GHD_BH1A	GHD_BH1A	Normal	<1	<1	<1		<1
	R1	Rinsate	<1	<1	<1		<1
	R2	Rinsate	<1	<1	<1		<1
	RB01	Rinsate	<1	<1	<1		<1
	TRIP BLANK	Trip_B					

Comments
#1 Natural concentrations generally <0.01 mg/L
#2 Not limiting: Derived water HSL exceeds water solubility limit
#3 To obtain F1 subtract the sum of BTEX concentrations from the C6 - (
#4 To obtain F2 subtract naphthalene from the >C10 - C16 fraction.
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#6 Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC
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Environmental Standards
National Health and Medical Research Council, August 2018, ADWG 201
National Health and Medical Research Council, August 2018, ADWG 201

				Inorganics		Asbestos	Metals																
				Moisture (%)	Moisture Content (%)	Asbestos Reported Result	Arsenic	Beryllium	Boron	Cadmium	Chromium (III+VI)	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel		Selenium	Zinc	Benzene	Toluene	Ethylbenzene
				%	%	Asbestos Detected	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				1	1		2	1	10	0.4	2	2	5	20	5	5	0.1	2	0.05	2	5	0.1	0.1	0.1
NEPM 2013 EIL-Urban Residential- Public Open Space																							
0-2m							**100**				**190[#1]**		**60[#1]**		**1,100**			**30[#1]**			**70[#1]**			
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil																							
0-2m																						50	85	70
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																							
Location Code	**Depth**	**Field ID**	**Sample Type**																				
		TRIP BLANK	Trip_B																			<0.1	<0.1	<0.1
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal		16	1	13	<2	<10	<0.4	16	<5	32	17,000	200	98	0.2	7.4		<2	**160**	<0.1	<0.1	<0.1
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal		20		4.4	<2	<10	<0.4	11	<5	15	4,100	17	<5	<0.1	<5		<2	<5	<0.1	<0.1	<0.1
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D		19		3.3	<2	<10	<0.4	8.4	<5	15	3,500	13	<5	<0.1	<5		<2	<5	<0.1	<0.1	<0.1
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D	17.9			7	<1	<50	<1	10	<2	18	6,480	13	<5	<0.1	<2		<5	7	<0.2	<0.5	<0.5
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal		5.3																			
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal		13	1	7.1	<2	<10	<0.4	24	5.6	27	31,000	100	150	0.2	19		<2	**150**	<0.1	<0.1	<0.1
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal		20		9.9	<2	<10	<0.4	22	<5	16	40,000	25	12	<0.1	<5		<2	12	<0.1	<0.1	<0.1

Comments

#1 Develop site specific based on CEC, pH, clay content, state and traffic volume

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

#3 Errata 30 April 2014 - Naphthalene should not be subtracted from >C10-C16 (as there is no separate ESL for naphthalene)

#4 Separate management limits for BTEX & naphthalene are not available hence should not be subtracted from the relevant fractions to obtain F1 & F2

				BTEXN					TRH - NEPM 2013							TRH - NEPM 1999								
				Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene (BTEXN)	BTEX (Sum of Total) - Lab Calc	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.1	0.2	0.3	0.5	0.2	10	10	50	50	100	100	50	10	20	50	50	50	0.5	0.5	0.5	0.5
NEPM 2013 EIL-Urban Residential- Public Open Space																								
0-2m							**170**																	
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil																								
0-2m						105			180[#2]			120[#3]	300	2,800										
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil										*700[#4]*		*1,000[#4]*	*2,500*	*10,000*										
Location Code	**Depth**	**Field ID**	**Sample Type**																					
		TRIP BLANK	Trip_B	<0.1	<0.2	<0.3	<0.5		<20	<20						<20								
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	39	56	<50	95	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	43	56	52	151	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D	<0.5	<0.5	<0.5		<0.2	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal																					
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	35	<50	<50	<50	<0.5	<0.5	<0.5	<0.5

Comments

#1 Develop site specific based on CEC, pH, clay content, state and traffic volume

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

#3 Errata 30 April 2014 - Naphthalene should not be subtracted from >C10-C16 (as there is no separa

#4 Separate management limits for BTEX & naphthalene are not available hence should not be subtra

				PAHs																			
				Benzo(a) pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Naphthalene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(half LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc	1,1-dichloroethane	1,2,3-trichlorobenzene	1,2,3-trichloropropane	1,2-dibromoethane
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 EIL-Urban Residential- Public Open Space																								
0-2m											170			170										
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil																								
0-2m				0.7																				
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																								
Location Code	**Depth**	**Field ID**	**Sample Type**																					
		TRIP BLANK	Trip_B																					
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5		<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5		<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5		<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal																		<0.5		<0.5	<0.5
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5		<0.5	<0.5
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5		<0.5	<0.5

Comments

#1 Develop site specific based on CEC, pH, clay content, state and traffic volume

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

#3 Errata 30 April 2014 - Naphthalene should not be subtracted from >C10-C16 (as there is no separa

#4 Separate management limits for BTEX & naphthalene are not available hence should not be subtra

				VOCs															Halogenated				
				1,3-dichlorobenzene	Bromodichloromethane	Bromoform	Chlorodibromomethane	Chloroethane	cis-1,3-dichloropropene	cis-1,4-Dichloro-2-butene	Dibromomethane	Iodomethane	Pentachloroethane	Trichloroethene	Tetrachloroethene	trans-1,3-dichloropropene	trans-1,2-dichloroethene	trans-1,4-Dichloro-2-butene	Trichlorofluoromethane	Bromomethane	Dichlorodifluoromethane	Arochlor 1016	Arochlor 1221	Arochlor 1232
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.5	0.5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	0.5	0.1	0.5
NEPM 2013 EIL-Urban Residential- Public Open Space																								
0-2m																								
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil																								
0-2m																								
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																								
Location Code	**Depth**	**Field ID**	**Sample Type**																					
		TRIP BLANK	Trip_B																					
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5					
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5					
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5					
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5				
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5					
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5		<0.5	<0.1	<0.5	
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5		<0.5	<0.1	<0.5	

Comments

#1 Develop site specific based on CEC, pH, clay content, state and traffic volume

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

#3 Errata 30 April 2014 - Naphthalene should not be subtracted from >C10-C16 (as there is no separa

#4 Separate management limits for BTEX & naphthalene are not available hence should not be subtra

				PCBs					Chlorinated Hydrocarbons															
				Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Total)	Chlorinated hydrocarbons EPAVic	Other chlorinated hydrocarbons (Total)	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,4-trichlorobenzene	1,2-dibromo-3-chloropropane	1,2-dichlorobenzene	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 EIL-Urban Residential- Public Open Space																								
0-2m																								
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil																								
0-2m																								
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																								
Location Code	**Depth**	**Field ID**	**Sample Type**																					
		TRIP BLANK	Trip_B																					
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	

Comments

#1 Develop site specific based on CEC, pH, clay content, state and traffic volume

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

#3 Errata 30 April 2014 - Naphthalene should not be subtracted from >C10-C16 (as there is no separa

#4 Separate management limits for BTEX & naphthalene are not available hence should not be subtra

	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Carbon tetrachloride	Chlorobenzene	Chloroform	Chloromethane	cis-1,2-dichloroethene	Methylene chloride	Hexachlorobutadiene	Vinyl chloride
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 EIL-Urban Residential- Public Open Space											
0-2m											
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil											
0-2m											
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil											
Location Code	**Depth**	**Field ID**	**Sample Type**										
		TRIP BLANK	Trip_B										
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5		<0.5	<5
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Comments

#1 Develop site specific based on CEC, pH, clay content, state and traffic volume

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

#3 Errata 30 April 2014 - Naphthalene should not be subtracted from >C10-C16 (as there is no separa

#4 Separate management limits for BTEX & naphthalene are not available hence should not be subtra

				Inorganics		Asbestos	Metals														
				Moisture (%)	Moisture Content (%)	Asbestos Reported Result	Arsenic	Beryllium	Boron	Cadmium	Chromium (III+VI)	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel		Selenium	Zinc	Benzene
				%	%	Comment	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg
EQL				1	1	Asbestos Detected	2	1	10	0.4	2	2	5	20	5	5	0.1	2	0.05	2	5	0.1
CRC CARE 2011 Soil Direct Contact HSL-B Residential (High Density)																					**140**
NEPM 2013 Table 1A(1) HIL A Res							100[#1]	60	4,500	20	100[#2]	100	6,000		300[#3]	3,800	40[#4]	400		200	7,400	
NEPM 2013 Table 1A(3) HSL A/B Res Soil for Vapour Intrusion, Sand																					
0-1m																					*0.5*
Location Code	**Depth**	**Date**	**Field ID**	**Sample Type**																	
		4/12/2018	TRIP BLANK	Trip_B																	<0.1
GHD_BH1	0.2 - 0.2	5/12/2018	BH1_0.2	Normal		16	1	13	<2	<10	<0.4	16	<5	32	17,000	200	98	0.2	7.4		<2	160	<0.1
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5	Normal		20		4.4	<2	<10	<0.4	11	<5	15	4,100	17	<5	<0.1	<5		<2	<5	<0.1
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5D	Field_D		19		3.3	<2	<10	<0.4	8.4	<5	15	3,500	13	<5	<0.1	<5		<2	<5	<0.1
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5ID	Interlab_D	17.9			7	<1	<50	<1	10	<2	18	6,480	13	<5	<0.1	<2		<5	7	<0.2
GHD_BH1	21.05 - 21.05	5/12/2018	BH1_21.05	Normal		5.3																	
GHD_BH2	0.1 - 0.1	4/12/2018	BH2_0.1	Normal		13	1	7.1	<2	<10	<0.4	24	5.6	27	31,000	100	150	0.2	19		<2	150	<0.1
GHD_BH2	0.5 - 0.5	4/12/2018	BH2_0.5	Normal		20		9.9	<2	<10	<0.4	22	<5	16	40,000	25	12	<0.1	<5		<2	12	<0.1

Comments

#1 Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important and should be considered where appropriate (refer Shedule B7).

#2 In the absence of a guideline value for total chromium, chromium VI value adopted

#3 Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 50% bioavailability considered. Site-specific bioavailability should be considered where appropriate.

#4 Elemental mercury: HIL does not address elemental mercury. a site specific assessment should be considered if elemental mercury is present, or suspected to be present.

#5 Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should consider presence of carcinogenic PAHs (should meet BaP TEQ HIL) & naphthalene (should meet relevant HSL)

#6 Carcinogenic PAHs: HIL based on 8 carc. PAHs & their TEFs (rel to BaP ref Schedule 7) BaP TEQ calc by multiplying the conc of each carc. PAH in sample by its BaP TEF (ref Table 1A(1)) & summing

#7 PCBs: HIL refers to non-dioxin like PCBs only. Where PCB source is known, or suspected at a site, a site-specific assessment of exposure to all PCBs (inc dioxin like PCBs) should be undertaken

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

#9 To obtain F2 subtract naphthalene from the >C10 - C16 fraction.

#10 Not limiting: Derived soil HSL exceeds soil saturation concentration

					BTEXN							TRH - NEPM 2013							TRH - NEPM 1999				
					Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene (BTEXN)	BTEX (Sum of Total) - Lab Calc	F1 (C6-C10 minus BTEX)	C8-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.1	0.1	0.1	0.2	0.3	0.5	0.2	10	10	50	50	100	100	50	10	20	50	50	50
CRC CARE 2011 Soil Direct Contact HSL-B Residential (High Density)					**21,000**	**5,900**			**17,000**	**2,200**		**5,600**		**4,200**		**5,800**	**8,100**						
NEPM 2013 Table 1A(1) HIL A Res																							
NEPM 2013 Table 1A(3) HSL A/B Res Soil for Vapour Intrusion, Sand																							
0-1m					*160*	*55*			*40*	*3*		*45*[#8]		*110*[#9]									
Location Code	**Depth**	**Date**	**Field ID**	**Sample Type**																			
		4/12/2018	TRIP BLANK	Trip_B	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5		<20	<20						<20				
GHD_BH1	0.2 - 0.2	5/12/2018	BH1_0.2	Normal	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	39	56	<50	95
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5	Normal	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	<20	<50	<50	<50
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5D	Field_D	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	43	56	52	151
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5ID	Interlab_D	<0.5	<0.5	<0.5	<0.5	<0.5		<0.2	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GHD_BH1	21.05 - 21.05	5/12/2018	BH1_21.05	Normal																			
GHD_BH2	0.1 - 0.1	4/12/2018	BH2_0.1	Normal	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	<20	<50	<50	<50
GHD_BH2	0.5 - 0.5	4/12/2018	BH2_0.5	Normal	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	35	<50	<50	<50

Comments

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					PAHs																
					Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Naphthalene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
CRC CARE 2011 Soil Direct Contact HSL-B Residential (High Density)																**2,200**			**2,200**				
NEPM 2013 Table 1A(1) HIL A Res																						300[#5]	3[#6]
NEPM 2013 Table 1A(3) HSL A/B Res Soil for Vapour Intrusion, Sand																							
0-1m																*3*			*3*				
Location Code	**Depth**	**Date**	**Field ID**	**Sample Type**																			
		4/12/2018	TRIP BLANK	Trip_B																			
GHD_BH1	0.2 - 0.2	5/12/2018	BH1_0.2	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5D	Field_D	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5ID	Interlab_D	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5
GHD_BH1	21.05 - 21.05	5/12/2018	BH1_21.05	Normal																			
GHD_BH2	0.1 - 0.1	4/12/2018	BH2_0.1	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH2	0.5 - 0.5	4/12/2018	BH2_0.5	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Comments

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								VOCs															
					Total 8 PAHs (as BaP TEQ)(half LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc	1,1-dichloroethane	1,2,3-trichlorobenzene	1,2,3-trichloropropane	1,2-dibromoethane	1,3-dichlorobenzene	Bromodichloromethane	Bromoform	Chlorodibromomethane	Chloroethane	cis-1,3-dichloropropene	cis-1,4-Dichloro-2-butene	Dibromomethane	Iodomethane	Pentachloroethane	Trichloroethene	Tetrachloroethene	trans-1,3-dichloropropene
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
CRC CARE 2011 Soil Direct Contact HSL-B Residential (High Density)																							
NEPM 2013 Table 1A(1) HIL A Res					3[#6]	3[#6]																	
NEPM 2013 Table 1A(3) HSL A/B Res Soil for Vapour Intrusion, Sand																							
0-1m																							
Location Code	**Depth**	**Date**	**Field ID**	**Sample Type**																			
		4/12/2018	TRIP BLANK	Trip_B																			
GHD_BH1	0.2 - 0.2	5/12/2018	BH1_0.2	Normal	0.6	1.2	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5	Normal	0.6	1.2	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5D	Field_D	0.6	1.2	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5ID	Interlab_D	0.6	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	21.05 - 21.05	5/12/2018	BH1_21.05	Normal			<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5
GHD_BH2	0.1 - 0.1	4/12/2018	BH2_0.1	Normal	0.6	1.2	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5
GHD_BH2	0.5 - 0.5	4/12/2018	BH2_0.5	Normal	0.6	1.2	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5

Comments

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								Halogenated		PCBs											
						trans-1,2-dichloroethene	trans-1,4-Dichloro-2-butene	Trichlorofluoromethane	Bromomethane	Dichlorodifluoromethane	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Total)	Chlorinated hydrocarbons EPAVic	Other chlorinated hydrocarbons (Total)	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL						0.5	0.5	0.5	0.5	5	0.5	0.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
CRC CARE 2011 Soil Direct Contact HSL-B Residential (High Density)																								
NEPM 2013 Table 1A(1) HIL A Res																		1[#7]						
NEPM 2013 Table 1A(3) HSL A/B Res Soil for Vapour Intrusion, Sand																								
0-1m																								
Location Code	**Depth**	**Date**	**Field ID**	**Sample Type**																				
		4/12/2018	TRIP BLANK	Trip_B																				
GHD_BH1	0.2 - 0.2	5/12/2018	BH1_0.2	Normal	<0.5		<0.5	<0.5										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5	Normal	<0.5		<0.5	<0.5										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5D	Field_D	<0.5		<0.5	<0.5										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5ID	Interlab_D	<0.5	<0.5	<5	<5	<5											<0.5	<0.5	<0.5	<0.5
GHD_BH1	21.05 - 21.05	5/12/2018	BH1_21.05	Normal	<0.5		<0.5	<0.5										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH2	0.1 - 0.1	4/12/2018	BH2_0.1	Normal	<0.5		<0.5	<0.5		<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH2	0.5 - 0.5	4/12/2018	BH2_0.5	Normal	<0.5		<0.5	<0.5		<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Comments

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					Chlorinated Hydrocarbons															
					1,1-dichloroethene	1,1-dichloropropene	1,2,4-trichlorobenzene	1,2-dibromo-3-chloropropane	1,2-dichlorobenzene	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Carbon tetrachloride	Chlorobenzene	Chloroform	Chloromethane	cis-1,2-dichloroethene	Methylene chloride
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
CRC CARE 2011 Soil Direct Contact HSL-B Residential (High Density)																							
NEPM 2013 Table 1A(1) HIL A Res																							
NEPM 2013 Table 1A(3) HSL A/B Res Soil for Vapour Intrusion, Sand																							
0-1m																							
Location Code	**Depth**	**Date**	**Field ID**	**Sample Type**																			
		4/12/2018	TRIP BLANK	Trip_B																			
GHD_BH1	0.2 - 0.2	5/12/2018	BH1_0.2	Normal	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5	Normal	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5D	Field_D	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5ID	Interlab_D	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	
GHD_BH1	21.05 - 21.05	5/12/2018	BH1_21.05	Normal	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH2	0.1 - 0.1	4/12/2018	BH2_0.1	Normal	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH2	0.5 - 0.5	4/12/2018	BH2_0.5	Normal	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

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	Hexachlorobutadiene	Vinyl chloride
	mg/kg	mg/kg
EQL	0.5	0.5
CRC CARE 2011 Soil Direct Contact HSL-B Residential (High Density)		
NEPM 2013 Table 1A(1) HIL A Res		
NEPM 2013 Table 1A(3) HSL A/B Res Soil for Vapour Intrusion, Sand		
0-1m		

Location Code	Depth	Date	Field ID	Sample Type		
		4/12/2018	TRIP BLANK	Trip_B		
GHD_BH1	0.2 - 0.2	5/12/2018	BH1_0.2	Normal		<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5	Normal		<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5D	Field_D		<0.5
GHD_BH1	0.5 - 0.5	5/12/2018	BH1_0.5ID	Interlab_D	<0.5	<5
GHD_BH1	21.05 - 21.05	5/12/2018	BH1_21.05	Normal		<0.5
GHD_BH2	0.1 - 0.1	4/12/2018	BH2_0.1	Normal		<0.5
GHD_BH2	0.5 - 0.5	4/12/2018	BH2_0.5	Normal		<0.5

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				Inorganics		Asbestos	Metals																
				Moisture (%)	Moisture Content (%)	Asbestos Reported Result	Arsenic	Beryllium	Boron	Cadmium	Chromium (III+VI)	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel		Selenium	Zinc	Benzene	Toluene	Ethylbenzene
				%	%	Comment	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				1	1	Asbesots Detected	2	1	10	0.4	2	2	5	20	5	5	0.1	2	0.05	2	5	0.1	0.1	0.1
NSW EPA (2014) Special Waste (Asbestos)																							
NSW EPA (2014) General Solid Waste CT1 (No Leaching)							100	20		20	100				100		4	40		20		10	288	600
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)							400	80		80	400				400		16	160		80		40	1,152	2,400
Location Code	**Depth**	**Field ID**	**Sample Type**																				
		TRIP BLANK	Trip_B																		<0.1	<0.1	<0.1
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal		16	1	13	<2	<10	<0.4	16	<5	32	17,000	200	98	0.2	7.4		<2	160	<0.1	<0.1	<0.1
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal		20		4.4	<2	<10	<0.4	11	<5	15	4,100	17	<5	<0.1	<5		<2	<5	<0.1	<0.1	<0.1
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D		19		3.3	<2	<10	<0.4	8.4	<5	15	3,500	13	<5	<0.1	<5		<2	<5	<0.1	<0.1	<0.1
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D	17.9			7	<1	<50	<1	10	<2	18	6,480	13	<5	<0.1	<2		<5	7	<0.2	<0.5	<0.5
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal		5.3																			
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal		13	1	7.1	<2	<10	<0.4	24	5.6	27	31,000	100	150	0.2	19		<2	150	<0.1	<0.1	<0.1
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal		20		9.9	<2	<10	<0.4	22	<5	16	40,000	25	12	<0.1	<5		<2	12	<0.1	<0.1	<0.1

Comments
#1 No TCLP analysis required

	BTEXN					TRH - NEPM 2013							TRH - NEPM 1999								
	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene (BTEXN)	BTEX (Sum of Total) - Lab Calc	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.2	0.3	0.5	0.2	10	10	50	50	100	100	50	10	20	50	50	50	0.5	0.5	0.5	0.5
NSW EPA (2014) Special Waste (Asbestos)																					
NSW EPA (2014) General Solid Waste CT1 (No Leaching)			1,000										650[#1]				10,000[#1]				
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)			4,000										2,600[#1]				40,000[#1]				
Location Code	**Depth**	**Field ID**	**Sample Type**																		
		TRIP BLANK	Trip_B	<0.1	<0.2	<0.3	<0.5		<20	<20							<20								
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	39	56	<50	95	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	43	56	52	151	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D	<0.5	<0.5	<0.5		<0.2	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal																					
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal	<0.1	<0.2	<0.3	<0.5		<20	<20	<50	<50	<100	<100	<100	<20	35	<50	<50	<50	<0.5	<0.5	<0.5	<0.5

Comments

#1 No TCLP analysis required

				PAHs																			
				Benzo(a) pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Naphthalene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(half LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc	1,1-dichloroethane	1,2,3-trichlorobenzene	1,2,3-trichloropropane	1,2-dibromoethane
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW EPA (2014) Special Waste (Asbestos)																							
NSW EPA (2014) General Solid Waste CT1 (No Leaching)				0.8													200						
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)				3.2													800						
Location Code	**Depth**	**Field ID**	**Sample Type**																				
		TRIP BLANK	Trip_B																				
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5		<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5		<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5		<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.5	<0.5
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal																		<0.5		<0.5	<0.5
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5		<0.5	<0.5
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5		<0.5	<0.5

Comments
#1 No TCLP analysis required

				VOCs																Halogenated				
				1,3-dichlorobenzene	Bromodichloromethane	Bromoform	Chlorodibromomethane	Chloroethane	cis-1,3-dichloropropene	cis-1,4-Dichloro-2-butene	Dibromomethane	Iodomethane	Pentachloroethane	Trichloroethene	Tetrachloroethene	trans-1,3-dichloropropene	trans-1,2-dichloroethene	trans-1,4-Dichloro-2-butene	Trichlorofluoromethane	Bromomethane	Dichlorodifluoromethane	Arochlor 1016	Arochlor 1221	Arochlor 1232
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.5	0.5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	0.5	0.1	0.5
NSW EPA (2014) Special Waste (Asbestos)																								
NSW EPA (2014) General Solid Waste CT1 (No Leaching)														10	14									
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)														40	56									
Location Code	**Depth**	**Field ID**	**Sample Type**																					
		TRIP BLANK	Trip_B																					
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5					
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5					
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5					
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5					
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5					
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5		<0.5	<0.1	<0.5	
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal	<0.5	<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5		<0.5	<0.5		<0.5	<0.1	<0.5	

Comments

#1 No TCLP analysis required

	PCBs					Chlorinated Hydrocarbons															
	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Total)	Chlorinated hydrocarbons EPAVic	Other chlorinated hydrocarbons (Total)	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,4-trichlorobenzene	1,2-dibromo-3-chloropropane	1,2-dichlorobenzene	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW EPA (2014) Special Waste (Asbestos)																					
NSW EPA (2014) General Solid Waste CT1 (No Leaching)					50			200	600	26	24	14				86	10			150	
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)					50			800	2,400	104	96	56				344	40			600	
Location Code	**Depth**	**Field ID**	**Sample Type**																		
		TRIP BLANK	Trip_B																		
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	

Comments
#1 No TCLP analysis required

	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Carbon tetrachloride	Chlorobenzene	Chloroform	Chloromethane	cis-1,2-dichloroethene	Methylene chloride	Hexachlorobutadiene	Vinyl chloride
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW EPA (2014) Special Waste (Asbestos)											
NSW EPA (2014) General Solid Waste CT1 (No Leaching)				10	2,000	120			172		4
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)				40	8,000	480			688		16
Location Code	**Depth**	**Field ID**	**Sample Type**								
		TRIP BLANK	Trip_B								
GHD_BH1	0.2 - 0.2	BH1_0.2	Normal				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5	Normal				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5D	Field_D				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH1	0.5 - 0.5	BH1_0.5ID	Interlab_D	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5		<0.5	<5
GHD_BH1	21.05 - 21.05	BH1_21.05	Normal				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH2	0.1 - 0.1	BH2_0.1	Normal				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GHD_BH2	0.5 - 0.5	BH2_0.5	Normal				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Comments
#1 No TCLP analysis required

		Asbestos	Metals														
		Asbestos Reported Result	Arsenic	Beryllium	Boron	Cadmium	Chromium (III+VI)	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Nickel (TCLP)	Selenium	Zinc
		Comment	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg
EQL			2	1	10	0.4	2	2	5	20	5	5	0.1	2		2	5
NSW EPA (2014) Special Waste (Asbestos)		Asbestos detected															
NSW EPA (2014) General Solid Waste CT1 (No Leaching)			100	20		20	100				100		4	40		20	
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)			400	80		80	400				400		16	160		80	
NSW EPA (2014) General Solid Waste TCLP1															2		
NSW EPA (2014) Restricted Solid Waste TCLP2															8		
Field_ID	**Sampled_Date_Time**																
WC1	6/12/2018	No asbestos detected	10	<2	<10	<0.4	28	18	67	18,000	40	690	<0.1	43	0.14	2.9	110

	BTEXN							TRH - NEPM 2013						
	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene (BTEXN)	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)
	mg/kg	mg/kg	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.1	0.1		0.2	0.3	0.5	10	10	50	50	100	100	50
NSW EPA (2014) Special Waste (Asbestos)														
NSW EPA (2014) General Solid Waste CT1 (No Leaching)	10	288	600			1000								
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)	40	1152	2400			4000								
NSW EPA (2014) General Solid Waste TCLP1														
NSW EPA (2014) Restricted Solid Waste TCLP2														
WC1	<0.1	<0.1	<0.1		<0.2	<0.3	<0.5	<20	<20	<50	<50	<100	<100	<100

	TPH					PAHs																		
	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene-PAH	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(half LOR) - Lab Calc
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	10	20	50	50	50	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW EPA (2014) Special Waste (Asbestos)																								
NSW EPA (2014) General Solid Waste CT1 (No Leaching)	650				10000					0.8												200		
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)	2600				40000					3.2												800		
NSW EPA (2014) General Solid Waste TCLP1																								
NSW EPA (2014) Restricted Solid Waste TCLP2																								
WC1	<20	<20	<50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6

			VOCs																Halogenated Hydrocarbons	Chlorinated Hydrocarbons																					
		Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromoethane	1,3-dichlorobenzene	Bromodichloromethane	Bromoform	Chlorodibromomethane	cis-1,3-dichloropropylene	Dibromomethane	Iodomethane	Trichloroethene	Tetrachloroethene	trans-1,3-dichloropropylene	trans-1,2-dichloroethene	Trichlorofluoromethane	Bromomethane	Chlorinated hydrocarbons EPAVic	Other chlorinated hydrocarbons (Total)	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethene	1,2-dichlorobenzene	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane	Carbon tetrachloride	Chlorobenzene	Chloroform	Chloromethane	cis-1,2-dichloroethene	Dichloromethane	Hexachlorobutadiene	Vinyl chloride
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW EPA (2014) Special Waste (Asbestos)																																								
NSW EPA (2014) General Solid Waste CT1 (No Leaching)													10	14							200	600	26	24	14	86	10			150	10	2000	120			172	4		
NSW EPA (2014) Restricted Solid Waste CT2 (No Leaching)													40	56							800	2400	104	96	56	344	40			600	40	8000	480			688	16		
NSW EPA (2014) General Solid Waste TCLP1																																								
NSW EPA (2014) Restricted Solid Waste TCLP2																																								
Field_ID	**Sampled_Date_Time**																																							
WC1	6/12/2018	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Appendix F – Laboratory certificates

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☑ **Sydney Laboratory** Unit F3 Bld F, 16 Mars Rd, Lane Cove West, NSW 2066 02 9900 8400 EnviroSampleNSW@eurofins.com

☐ **Brisbane Laboratory** Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172 07 3902 4600 EnviroSampleQLD@eurofins.com

☐ **Perth Laboratory** Unit 2, 91 Leach Highway, Kewdale WA 6105 08 9251 9600 EnviroSampleWA@eurofins.com

☐ **Melbourne Laboratory** 2 Kingston Town Close, Oakleigh, VIC 3166 03 8564 5000 EnviroSampleVic@eurofins.com

Company	GHD Pty Ltd	**Project №**	2127850	**Project Manager**	Emma Harrison
Address	Level 15, 133 Castlereagh St Sydney, 2000	**Project Name**	Lindfield Village Hub - groundwater well installation	**Report Format**	ESDat
Contact Name	Emma Harrison			**Relinquished by**	emma harrison 5/12/18
Phone №	0408 401 511			**Email for Results**	emma.harrison@ghd.com
Special Direction					
Purchase Order					
Quote ID №	181121GHDN				

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

Containers

Turn Around Requirements

☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
☐ Other ( )
* Surcharges apply

№	Client Sample ID	Date	Matrix	Suite B4 : TRH, BTEXN, PAH	Suite M13A - NEPM Metals (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Halogenated Volatile Organics	Asbestos identification in soil (AS 4964)	Polychlorinated Biphenyls (PCB)	Iron (Fe)	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass	Jar	Other ( )	Sample Comments / DG Hazard Warning
1	BH1 – 0.2	5/12	soil	✓	✓	✓	✓		✓							✓		possible asbestos.
2	BH1 – 0.4			NA		NA												
3	BH1 – 0.5			✓	✓	✓			✓									
4	BH1 – 1.0																	
5	BH1 – 1.5																	
6	BH1 – 2.0																	
7	BH1 – 2.5																	
8	BH1 – 3.0																	
9	BH1 – 3.5																	
10	BH1 – 4.0																	
	Total Counts			2	2	2	1		2									

Method of Shipment	☐ Courier (#)	☑ Hand Delivered	☐ Postal	Name	Emma Harrison	Signature		Date	5/12/18	Time	::
Laboratory Use Only	Received By	Elvis P	SYD BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	5/12/18	Time	6.24PM	Temperature	4.6°C
	Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	/ /	Time	:	Report №	631666

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request.

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☑ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	GHD Pty Ltd	Project №	2127850	Project Manager	Emma Harrison
Address	Level 15, 133 Castlereagh St Sydney, 2000	Project Name	Lindfield Village Hub - groundwater well installation	Report Format	ESDat
Contact Name	Emma Harrison			Relinquished by	emma harrison 5/12/18
Phone №	0408 401 511			Email for Results	emma.harrison@ghd.com
Special Direction					
Purchase Order					
Quote ID №	181121GHDN				

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

Containers

Turn Around Requirements

☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
☐ Other ( )
* Surcharges apply

№	Client Sample ID	Date	Matrix	Suite B4 : TRH, BTEXN, PAH	Suite M13A - NEPM Metals (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Halogenated Volatile Organics	Asbestos identification in soil (AS 4964)	Polychlorinated Biphenyls (PCB)	Iron (Fe)	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass	Jar	Other ( )	Sample Comments / DG Hazard Warning
1	BH1 - 4.5	5/12	Soil													✓		
2	BH1 - 5.0																	
3	BH1 - 5.5																	
4	BH1 - 6.0																	
5	BH1 - 7.0																	
6	BH1 - 7.5																	
7	BH1 - 8.0																	
8	BH1 - 8.5																	
9	BH1 - 9.0																	
10	BH1 - 9.5																	
	Total Counts																	

Method of Shipment	☐ Courier (#)	☑ Hand Delivered	☐ Postal	Name	Emma Harrison	Signature		Date	5/12/18	Time	:
Laboratory Use Only	Received By	Elvis D	SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	5/12/18	Time	6.24pm	Temperature	4.6°C
	Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	/ /	Time	:	Report №	631666

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CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

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02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
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08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	GHD Pty Ltd	Project №	2127850	Project Manager	Emma Harrison
Address	Level 15, 133 Castlereagh St Sydney, 2000	Project Name	Lindfield Village Hub - groundwater well installation	Report Format	ESDat
Contact Name	Emma Harrison			Relinquished by	Emma Harrison
Phone №	0408 401 511				__:__ 5/12/18
Special Direction				Email for Results	emma.harrison@ghd.com
Purchase Order					
Quote ID №	181121GHDN				

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

Containers: 1L Plastic; 250mL Plastic; 125mL Plastic; 200mL Amber Glass; 40mL vial; 125mL Amber Glass; Jar; Other ( )

Turn Around Requirements
- ☐ Overnight (9am)*
- ☐ 1 Day* ☐ 2 Day*
- ☐ 3 Day* ☑ 5 Day
- ☐ Other ( )

* Surcharges apply

№	Client Sample ID	Date	Matrix	Suite B4 : TRH, BTEXN, PAH	Suite M13A - NEPM Metals (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Halogenated Volatile Organics	Asbestos identification in soil (AS 4964)	Polychlorinated Biphenyls (PCB)	Iron (Fe)	Jar	Sample Comments / DG Hazard Warning
1	BH1 – 10.0	5/12	soil							✓	
2	BH1 – 10.5										
3	BH1 – 11.0										
4	BH1 – 11.5										
5	R2		water	✓	✓	✓			✓		
6	BH1 – 0.5D		soil	✓	✓	✓			✓		
7	BH1 – 0.5T		soil	✓	✓	✓			✓		
8											
9											
10											
	Total Counts			3	3	3			3		

Method of Shipment	☐ Courier (#)	☑ Hand Delivered	☐ Postal	Name	Emma Harrison	Signature	Date 5/12/18 Time __:__
Laboratory Use Only	Received By	Elvis P	SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date 5/12/18	Time 6:40pm Temperature 4.6°C
	Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date __/__/__	Time __:__ Report № 631666

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CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☑ Sydney Laboratory
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08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	GHD Pty Ltd	Project №	2127850	Project Manager	Emma Harrison
Address	Level 15, 133 Castlereagh St Sydney, 2000	Project Name	Lindfield Village Hub - groundwater well installation	Report Format	ESDat
Contact Name	Emma Harrison				
Phone №	0408 401 511				
Special Direction					
Purchase Order					
Quote ID №	181121GHDN				

Relinquished by: Emma Harrison __:__ 5/12/18

Email for Results: emma.harrison@ghd.com

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

- Suite B4 : TRH, BTEXN, PAH
- Suite M13A - NEPM Metals (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
- Halogenated Volatile Organics
- Asbestos identification in soil (AS 4964)
- Polychlorinated Biphenyls (PCB)
- Iron (Fe)

Containers

- 1L Plastic
- 250mL Plastic
- 125mL Plastic
- 200mL Amber Glass
- 40mL vial
- 125mL Amber Glass
- Jar
- Other ( )

Turn Around Requirements

☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
☐ Other ( )
* Surcharges apply

№	Client Sample ID	Date	Matrix	Suite B4	Suite M13A	Halogenated VOC	Asbestos	PCB	Iron (Fe)	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass	Jar	Other	Sample Comments / DG Hazard Warning
1	BH1 – 20.23	5/12	core															
2	BH1 – 21.05	5/12	core															
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
	Total Counts																	

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal

Name: Emma Harrison Signature: [signature] Date: 5/12/18 Time: __:__

Laboratory Use Only

Received By	Elvis D	SYD BNE MEL PER ADL NEW DAR	Signature	[signature]	Date	5/12/18	Time 6:24pm	Temperature 4.6°C
Received By		SYD BNE MEL PER ADL NEW DAR	Signature		Date	__/__/__	Time __:__	Report № 631666

QS3009_R6 Modified by: S. Kojima Approved by: Dr. R Symons Approved on: 2 November 2016

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request.

Enviro Sample NSW

To: Nibha Vaidya; COC NSW
Subject: RE: Eurofins | mgt Sample Receipt Advice - Report 631666 : Site LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION (2127850)

From: Emma.Harrison@ghd.com [mailto:Emma.Harrison@ghd.com]
Sent: Friday, 7 December 2018 9:56 AM
To: Nibha Vaidya
Cc: Joanna Curry
Subject: FW: Eurofins | mgt Sample Receipt Advice - Report 631666 : Site LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION (2127850)

EXTERNAL EMAIL*

Hi Nibha – Please see below.

From: Emma Harrison
Sent: Friday, 7 December 2018 9:54 AM
To: 'EnviroSampleNSW@eurofins.com' <EnviroSampleNSW@eurofins.com>
Cc: Jo Curry <Joanna.Curry@ghd.com>
Subject: RE: Eurofins | mgt Sample Receipt Advice - Report 631666 : Site LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION (2127850)

Hi Nibha,

Would you please analyse BH1_21.05 for halogenated volatile organics?

I sent in a separate COC for the sample named BH1_0.5ID to be sent to ALS (a copy is attached here), but, based on the sample receipt, I believe you may have also sent sample BH1_0.5T to ALS. Can you please confirm what sample(s) you have sent to ALS? We only want one of them analysed by ALS and the other one should be put on hold. It does not matter which sample gets analysed.

Also, would you please include Joanna Curry on the COC and results emails? Her email address is above.

Many thanks,
Emma

Emma Harrison
Senior Environmental Geologist

GHD
Proudly employee owned
T: +61 2 9239 7910 | V: 217910 | M: +61 408 401 511 | E: emma.harrison@ghd.com
Level 15 133 Castlereagh Street Sydney NSW 2000 Australia | www.ghd.com

Connect

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Please consider our environment before printing this email

From: EnviroSampleNSW@eurofins.com <EnviroSampleNSW@eurofins.com>
Sent: Thursday, 6 December 2018 7:33 PM

Enviro Sample NSW

To: Nibha Vaidya; COC NSW
Subject: RE: Eurofins | mgt Sample Receipt Advice - Report 631666 : Site LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION (2127850)

From: Emma.Harrison@ghd.com [mailto:Emma.Harrison@ghd.com]
Sent: Friday, 7 December 2018 4:22 PM
To: Nibha Vaidya
Cc: Joanna Curry; Asim Khan
Subject: Re: Eurofins | mgt Sample Receipt Advice - Report 631666 : Site LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION (2127850)

EXTERNAL EMAIL*

Hi Nibha

As discussed below, please hold BH1_0.5T. We don't need this analysed.

Thanks
Emma

Emma Harrison
0408 401 511

On Dec 7, 2018, at 1:52 PM, Nibha Vaidya <NibhaVaidya@eurofins.com> wrote:

> Hi Emma,
>
> Just to follow up on this, I can confirm that we have sent sample BH1_0.5ID only to ALS. Sample BH1_0.5T is with Eurofins – logged as S18-De06863.
>
> Kind Regards,
>
> Nibha Vaidya
> Phone : +61 2 9900 8415
> Mobile : +61 499 900 805
> Email : NibhaVaidya@eurofins.com
>
> ---
>
> **From:** Nibha Vaidya
> **Sent:** Friday, 7 December 2018 12:21 PM
> **To:** 'Emma.Harrison@ghd.com'
> **Cc:** Joanna Curry; Asim Khan
> **Subject:** RE: Eurofins | mgt Sample Receipt Advice - Report 631666 : Site LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION (2127850)
>
> Hi Emma,
>
> Shall do. I will get back to you re BH1_0.5T.
>
> Kind Regards,

eurofins | mgt

Melbourne
3-5 Kingston Town Close
Oakleigh Vic 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**GHD Pty Ltd NSW**
Contact name:	Emma Harrison
Project name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID:	2127850
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Dec 5, 2018 6:24 PM
Eurofins | mgt reference:	**631666**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 4.6 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

Triplicate sample sent to ALS for analysis. Additional sample BH1_6.0(BAG+JAR) received and placed on hold.

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8415 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Emma Harrison - emma.harrison@ghd.com.

ABN– 50 005 085 521
e.mail : EnviroSales@eurofins.com
web : www.eurofins.com.au

Melbourne
2-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
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Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

Order No.:
Report #: 631666
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:24 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	BH1_0.2	Dec 05, 2018		Soil	S18-De06823	X		X	X	X	X	X
2	BH1_0.5	Dec 05, 2018		Soil	S18-De06824			X	X	X	X	X
3	R2	Dec 05, 2018		Water	S18-De06825			X	X		X	X
4	BH1_0.5D	Dec 05, 2018		Soil	S18-De06826			X	X	X	X	X
5	BH1_0.4	Dec 05, 2018		Soil	S18-De06827		X					
6	BH1_1.0	Dec 05, 2018		Soil	S18-De06828		X					
7	BH1_1.5	Dec 05, 2018		Soil	S18-De06829		X					
8	BH1_2.0	Dec 05, 2018		Soil	S18-De06830		X					
9	BH1_2.5	Dec 05, 2018		Soil	S18-De06831		X					

eurofins | mgt

ABN– 50 005 085 521
e.mail : EnviroSales@eurofins.com
web : www.eurofins.com.au

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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

Order No.:
Report #: 631666
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:24 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
10	BH1_3.0	Dec 05, 2018		Soil	S18-De06832		X					
11	BH1_3.5	Dec 05, 2018		Soil	S18-De06833		X					
12	BH1_4.0	Dec 05, 2018		Soil	S18-De06834		X					
13	BH1_4.5	Dec 05, 2018		Soil	S18-De06835		X					
14	BH1_5.0	Dec 05, 2018		Soil	S18-De06836		X					
15	BH1_5.5	Dec 05, 2018		Soil	S18-De06837		X					
16	BH1_6.0	Dec 05, 2018		Soil	S18-De06838		X					
17	BH1_7.0	Dec 05, 2018		Soil	S18-De06839		X					
18	BH1_7.5	Dec 05, 2018		Soil	S18-De06840		X					
19	BH1_8.0	Dec 05, 2018		Soil	S18-De06841		X					
20	BH1_8.5	Dec 05, 2018		Soil	S18-De06842		X					
21	BH1_9.0	Dec 05, 2018		Soil	S18-De06843		X					

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Order No.:
Report #: 631666
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:24 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
22	BH1_9.5	Dec 05, 2018		Soil	S18-De06844		X					
23	BH1_10.0	Dec 05, 2018		Soil	S18-De06845		X					
24	BH1_10.5	Dec 05, 2018		Soil	S18-De06846		X					
25	BH1_11.0	Dec 05, 2018		Soil	S18-De06847		X					
26	BH1_11.5	Dec 05, 2018		Soil	S18-De06848		X					
27	BH1_6.5	Dec 05, 2018		Soil	S18-De06849		X					
28	BH1_0.5T	Dec 05, 2018		Soil	S18-De06863		X					
29	BH1_20.23	Dec 05, 2018		Soil	S18-De06864		X					
30	BH1_21.05	Dec 05, 2018		Soil	S18-De06865				X	X		
Test Counts						1	25	4	5	4	4	4

GHD Pty Ltd NSW
Level 15, 133 Castlereagh Street
Sydney
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NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Emma Harrison**

Report **631666-S**
Project name LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID 2127850
Received Date Dec 05, 2018

Client Sample ID			**BH1_0.2**	**BH1_0.5**	**BH1_0.5D**	**BH1_21.05**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S18-De06823**	**S18-De06824**	**S18-De06826**	**S18-De06865**
Date Sampled			**Dec 05, 2018**	**Dec 05, 2018**	**Dec 05, 2018**	**Dec 05, 2018**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	-
TRH C10-C14	20	mg/kg	39	< 20	43	-
TRH C15-C28	50	mg/kg	56	< 50	56	-
TRH C29-C36	50	mg/kg	< 50	< 50	52	-
TRH C10-36 (Total)	50	mg/kg	95	< 50	151	-
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	-
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	-
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	-
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	-
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	-
4-Bromofluorobenzene (surr.)	1	%	78	84	71	-
Halogenated Volatile Organics						
1.1-Dichloroethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.1-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.1.1-Trichloroethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.1.1.2-Tetrachloroethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.1.2-Trichloroethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.1.2.2-Tetrachloroethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dibromoethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dichloroethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.2-Dichloropropane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.2.3-Trichloropropane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.3-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.3-Dichloropropane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
1.4-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Tetrachloride	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			BH1_0.2	BH1_0.5	BH1_0.5D	BH1_21.05
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-De06823	S18-De06824	S18-De06826	S18-De06865
Date Sampled			Dec 05, 2018	Dec 05, 2018	Dec 05, 2018	Dec 05, 2018
Test/Reference	LOR	Unit				
Halogenated Volatile Organics						
cis-1.2-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
cis-1.3-Dichloropropene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibromomethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Iodomethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Methylene Chloride	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
trans-1.2-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
trans-1.3-Dichloropropene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Vic EPA IWRG 621 CHC (Total)*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Vic EPA IWRG 621 Other CHC (Total)*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
4-Bromofluorobenzene (surr.)	1	%	78	84	71	84
Toluene-d8 (surr.)	1	%	93	96	80	101
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	-
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	-
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	-
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	-
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	101	104	108	-
p-Terphenyl-d14 (surr.)	1	%	105	110	114	-

Client Sample ID			BH1_0.2	BH1_0.5	BH1_0.5D	BH1_21.05
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S18-De06823**	**S18-De06824**	**S18-De06826**	**S18-De06865**
Date Sampled			**Dec 05, 2018**	**Dec 05, 2018**	**Dec 05, 2018**	**Dec 05, 2018**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	13	4.4	3.3	-
Beryllium	2	mg/kg	< 2	< 2	< 2	-
Boron	10	mg/kg	< 10	< 10	< 10	-
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	-
Chromium	5	mg/kg	16	11	8.4	-
Cobalt	5	mg/kg	< 5	< 5	< 5	-
Copper	5	mg/kg	32	15	15	-
Iron	20	mg/kg	17000	4100	3500	-
Lead	5	mg/kg	200	17	13	-
Manganese	5	mg/kg	98	< 5	< 5	-
Mercury	0.1	mg/kg	0.2	< 0.1	< 0.1	-
Nickel	5	mg/kg	7.4	< 5	< 5	-
Selenium	2	mg/kg	< 2	< 2	< 2	-
Zinc	5	mg/kg	160	< 5	< 5	-
% Moisture	1	%	16	20	19	5.3

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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
Eurofins | mgt Suite B4			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Dec 12, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Dec 11, 2018	14 Day
- Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 11, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 12, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Dec 12, 2018	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Halogenated Volatile Organics	Sydney	Dec 11, 2018	7 Day
- Method: E016 Volatile Halogenated Compounds (VHC)			
NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Sydney	Dec 11, 2018	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Sydney	Dec 11, 2018	180 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Dec 07, 2018	14 Day
- Method: LTM-GEN-7080 Moisture			

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NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Emma Harrison**

Report **631666-W**
Project name LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID 2127850
Received Date Dec 05, 2018

Client Sample ID			**R2**
Sample Matrix			**Water**
Eurofins | mgt Sample No.			**S18-De06825**
Date Sampled			**Dec 05, 2018**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-36 (Total)	0.1	mg/L	< 0.1
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	%	93
Halogenated Volatile Organics			
1.1-Dichloroethane	0.001	mg/L	< 0.001
1.1-Dichloroethene	0.001	mg/L	< 0.001
1.1.1-Trichloroethane	0.001	mg/L	< 0.001
1.1.1.2-Tetrachloroethane	0.001	mg/L	< 0.001
1.1.2-Trichloroethane	0.001	mg/L	< 0.001
1.1.2.2-Tetrachloroethane	0.001	mg/L	< 0.001
1.2-Dibromoethane	0.001	mg/L	< 0.001
1.2-Dichlorobenzene	0.001	mg/L	< 0.001
1.2-Dichloroethane	0.001	mg/L	< 0.001
1.2-Dichloropropane	0.001	mg/L	< 0.001
1.2.3-Trichloropropane	0.001	mg/L	< 0.001
1.3-Dichlorobenzene	0.001	mg/L	< 0.001
1.3-Dichloropropane	0.001	mg/L	< 0.001
1.4-Dichlorobenzene	0.001	mg/L	< 0.001
Bromodichloromethane	0.001	mg/L	< 0.001
Bromoform	0.001	mg/L	< 0.001
Bromomethane	0.001	mg/L	< 0.001
Carbon Tetrachloride	0.001	mg/L	< 0.001
Chlorobenzene	0.001	mg/L	< 0.001
Chloroform	0.005	mg/L	< 0.005
Chloromethane	0.001	mg/L	< 0.001

Client Sample ID			R2
Sample Matrix			Water
Eurofins | mgt Sample No.			S18-De06825
Date Sampled			Dec 05, 2018
Test/Reference	LOR	Unit	
Halogenated Volatile Organics			
cis-1.2-Dichloroethene	0.001	mg/L	< 0.001
cis-1.3-Dichloropropene	0.001	mg/L	< 0.001
Dibromochloromethane	0.001	mg/L	< 0.001
Dibromomethane	0.001	mg/L	< 0.001
Iodomethane	0.001	mg/L	< 0.001
Methylene Chloride	0.001	mg/L	< 0.001
Tetrachloroethene	0.001	mg/L	< 0.001
trans-1.2-Dichloroethene	0.001	mg/L	< 0.001
trans-1.3-Dichloropropene	0.001	mg/L	< 0.001
Trichloroethene	0.001	mg/L	< 0.001
Trichlorofluoromethane	0.001	mg/L	< 0.001
Vinyl chloride	0.001	mg/L	< 0.001
Vic EPA IWRG 621 CHC (Total)*	0.005	mg/L	< 0.005
Vic EPA IWRG 621 Other CHC (Total)*	0.005	mg/L	< 0.005
4-Bromofluorobenzene (surr.)	1	%	93
Toluene-d8 (surr.)	1	%	100
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
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
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	64
p-Terphenyl-d14 (surr.)	1	%	67

Client Sample ID			R2
Sample Matrix			**Water**
Eurofins | mgt Sample No.			**S18-De06825**
Date Sampled			**Dec 05, 2018**
Test/Reference	LOR	Unit	
Heavy Metals			
Arsenic	0.001	mg/L	< 0.001
Beryllium	0.001	mg/L	< 0.001
Boron	0.05	mg/L	< 0.05
Cadmium	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	< 0.001
Copper	0.001	mg/L	< 0.001
Iron	0.05	mg/L	< 0.05
Lead	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	< 0.005
Mercury	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	< 0.001
Selenium	0.001	mg/L	< 0.001
Zinc	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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
Eurofins | mgt Suite B4			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Dec 06, 2018	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Dec 06, 2018	14 Day
- Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 06, 2018	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 06, 2018	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Dec 06, 2018	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Halogenated Volatile Organics	Sydney	Dec 06, 2018	7 Day
- Method: E016 Volatile Halogenated Compounds (VHC)			
NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Sydney	Dec 11, 2018	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Sydney	Dec 11, 2018	180 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025–Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

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

Attention:	Emma Harrison
Report	631666-AID
Project Name	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID	2127850
Received Date	Dec 05, 2018
Date Reported	Dec 13, 2018

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). *NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos".This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

Project Name LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID 2127850
Date Sampled Dec 05, 2018
Report 631666-AID

Client Sample ID	Eurofins | mgt Sample No.	Date Sampled	Sample Description	Result
BH1_0.2	18-De06823	Dec 05, 2018	Approximate Sample 94g Sample consisted of: Brown fine-grained sandy soil and rocks	Chrysotile asbestos detected in fibre cement fragments. Approximate raw weight of asbestos containing material = 11g Total estimated asbestos content in the sample = 1.3g* Total estimated asbestos concentration = 1.4% w/w* Organic fibre detected. No respirable fibres detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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
Asbestos - LTM-ASB-8020	Sydney	Dec 06, 2018	Indefinite

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NATA # 1261 Site # 20794

Perth
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Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name:	GHD Pty Ltd NSW	**Order No.:**		**Received:**	Dec 5, 2018 6:24 PM
Address:	Level 15, 133 Castlereagh Street Sydney NSW 2000	**Report #:** **Phone:** **Fax:**	631666 02 9239 7100 02 9239 7199	**Due:** **Priority:** **Contact Name:**	Dec 12, 2018 5 Day Emma Harrison
Project Name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION				
Project ID:	2127850				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	BH1_0.2	Dec 05, 2018		Soil	S18-De06823	X		X	X	X	X	X
2	BH1_0.5	Dec 05, 2018		Soil	S18-De06824			X	X	X	X	X
3	R2	Dec 05, 2018		Water	S18-De06825			X	X		X	X
4	BH1_0.5D	Dec 05, 2018		Soil	S18-De06826			X	X	X	X	X
5	BH1_0.4	Dec 05, 2018		Soil	S18-De06827		X					
6	BH1_1.0	Dec 05, 2018		Soil	S18-De06828		X					
7	BH1_1.5	Dec 05, 2018		Soil	S18-De06829		X					
8	BH1_2.0	Dec 05, 2018		Soil	S18-De06830		X					
9	BH1_2.5	Dec 05, 2018		Soil	S18-De06831		X					

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Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
10	BH1_3.0	Dec 05, 2018		Soil	S18-De06832		X					
11	BH1_3.5	Dec 05, 2018		Soil	S18-De06833		X					
12	BH1_4.0	Dec 05, 2018		Soil	S18-De06834		X					
13	BH1_4.5	Dec 05, 2018		Soil	S18-De06835		X					
14	BH1_5.0	Dec 05, 2018		Soil	S18-De06836		X					
15	BH1_5.5	Dec 05, 2018		Soil	S18-De06837		X					
16	BH1_6.0	Dec 05, 2018		Soil	S18-De06838		X					
17	BH1_7.0	Dec 05, 2018		Soil	S18-De06839		X					
18	BH1_7.5	Dec 05, 2018		Soil	S18-De06840		X					
19	BH1_8.0	Dec 05, 2018		Soil	S18-De06841		X					
20	BH1_8.5	Dec 05, 2018		Soil	S18-De06842		X					
21	BH1_9.0	Dec 05, 2018		Soil	S18-De06843		X					

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Project Name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION				
Project ID:	2127850				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
22	BH1_9.5	Dec 05, 2018		Soil	S18-De06844		X					
23	BH1_10.0	Dec 05, 2018		Soil	S18-De06845		X					
24	BH1_10.5	Dec 05, 2018		Soil	S18-De06846		X					
25	BH1_11.0	Dec 05, 2018		Soil	S18-De06847		X					
26	BH1_11.5	Dec 05, 2018		Soil	S18-De06848		X					
27	BH1_6.5	Dec 05, 2018		Soil	S18-De06849		X					
28	BH1_0.5T	Dec 05, 2018		Soil	S18-De06863		X					
29	BH1_20.23	Dec 05, 2018		Soil	S18-De06864		X					
30	BH1_21.05	Dec 05, 2018		Soil	S18-De06865				X	X		
Test Counts						1	25	4	5	4	4	4

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. 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 Sample Receipt Advice.

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.

Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Sample is dried by heating prior to analysis
LOR	Limit of Reporting
COC	Chain of Custody
SRA	Sample Receipt Advice
ISO	International Standards Organisation
AS	Australian Standards
WA DOH	Reference document for the NEPM. Government of Western Australia, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009), including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil (2011)
NEPM	National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended)
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded and/or sound condition. For the purposes of the NEPM, ACM is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
AF	Asbestos Fines. Asbestos containing materials, including friable, weathered and bonded materials, able to pass a 7mm x 7mm sieve. Considered under the NEPM as equivalent to “non-bonded / friable”.
FA	Fibrous Asbestos. Asbestos containing materials in a friable and/or severely weathered condition. For the purposes of the NEPM, FA is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory’s remit to assess degree of friability.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres in the matrix.

Comments

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

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
N/A	Not applicable

Asbestos Counter/Identifier:

Authorised by:

Sayeed Abu Senior Analyst-Asbestos (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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

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Address: Level 15, 133 Castlereagh Street
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Order No.:
Report #: 631666
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:24 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	BH1_0.2	Dec 05, 2018		Soil	S18-De06823	X		X	X	X	X	X
2	BH1_0.5	Dec 05, 2018		Soil	S18-De06824			X	X	X	X	X
3	R2	Dec 05, 2018		Water	S18-De06825			X	X		X	X
4	BH1_0.5D	Dec 05, 2018		Soil	S18-De06826			X	X	X	X	X
5	BH1_0.4	Dec 05, 2018		Soil	S18-De06827		X					
6	BH1_1.0	Dec 05, 2018		Soil	S18-De06828		X					
7	BH1_1.5	Dec 05, 2018		Soil	S18-De06829		X					
8	BH1_2.0	Dec 05, 2018		Soil	S18-De06830		X					
9	BH1_2.5	Dec 05, 2018		Soil	S18-De06831		X					

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Sample Detail						Asbestos - AS4964	HOLD	Iron	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
10	BH1_3.0	Dec 05, 2018		Soil	S18-De06832		X					
11	BH1_3.5	Dec 05, 2018		Soil	S18-De06833		X					
12	BH1_4.0	Dec 05, 2018		Soil	S18-De06834		X					
13	BH1_4.5	Dec 05, 2018		Soil	S18-De06835		X					
14	BH1_5.0	Dec 05, 2018		Soil	S18-De06836		X					
15	BH1_5.5	Dec 05, 2018		Soil	S18-De06837		X					
16	BH1_6.0	Dec 05, 2018		Soil	S18-De06838		X					
17	BH1_7.0	Dec 05, 2018		Soil	S18-De06839		X					
18	BH1_7.5	Dec 05, 2018		Soil	S18-De06840		X					
19	BH1_8.0	Dec 05, 2018		Soil	S18-De06841		X					
20	BH1_8.5	Dec 05, 2018		Soil	S18-De06842		X					
21	BH1_9.0	Dec 05, 2018		Soil	S18-De06843		X					

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Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
22	BH1_9.5	Dec 05, 2018		Soil	S18-De06844		X					
23	BH1_10.0	Dec 05, 2018		Soil	S18-De06845		X					
24	BH1_10.5	Dec 05, 2018		Soil	S18-De06846		X					
25	BH1_11.0	Dec 05, 2018		Soil	S18-De06847		X					
26	BH1_11.5	Dec 05, 2018		Soil	S18-De06848		X					
27	BH1_6.5	Dec 05, 2018		Soil	S18-De06849		X					
28	BH1_0.5T	Dec 05, 2018		Soil	S18-De06863		X					
29	BH1_20.23	Dec 05, 2018		Soil	S18-De06864		X					
30	BH1_21.05	Dec 05, 2018		Soil	S18-De06865				X	X		
Test Counts						1	25	4	5	4	4	4

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil 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. 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.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
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.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. 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 - 1999 NEPM Fractions							
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	
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							
Halogenated Volatile Organics							
1.1-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.1-Dichloroethene	mg/L	< 0.001			0.001	Pass	
1.1.1-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.1.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dibromoethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.2-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.2.3-Trichloropropane	mg/L	< 0.001			0.001	Pass	
1.3-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.3-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.4-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
Bromodichloromethane	mg/L	< 0.001			0.001	Pass	
Bromoform	mg/L	< 0.001			0.001	Pass	
Bromomethane	mg/L	< 0.001			0.001	Pass	
Carbon Tetrachloride	mg/L	< 0.001			0.001	Pass	
Chlorobenzene	mg/L	< 0.001			0.001	Pass	
Chloroform	mg/L	< 0.005			0.005	Pass	
Chloromethane	mg/L	< 0.001			0.001	Pass	
cis-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
cis-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Dibromochloromethane	mg/L	< 0.001			0.001	Pass	
Dibromomethane	mg/L	< 0.001			0.001	Pass	
Iodomethane	mg/L	< 0.001			0.001	Pass	
Methylene Chloride	mg/L	< 0.001			0.001	Pass	
Tetrachloroethene	mg/L	< 0.001			0.001	Pass	
trans-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
trans-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Trichloroethene	mg/L	< 0.001			0.001	Pass	
Trichlorofluoromethane	mg/L	< 0.001			0.001	Pass	
Vinyl chloride	mg/L	< 0.001			0.001	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
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							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Beryllium	mg/L	< 0.001			0.001	Pass	
Boron	mg/L	< 0.05			0.05	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Cobalt	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Manganese	mg/L	< 0.005			0.005	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Selenium	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	73			70-130	Pass	
TRH C10-C14	%	126			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	90			70-130	Pass	
Toluene	%	89			70-130	Pass	
Ethylbenzene	%	103			70-130	Pass	
m&p-Xylenes	%	102			70-130	Pass	
o-Xylene	%	98			70-130	Pass	
Xylenes - Total	%	100			70-130	Pass	
LCS - % Recovery							
Halogenated Volatile Organics							
1.1-Dichloroethene	%	89			70-130	Pass	
1.1.1-Trichloroethane	%	93			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
1.2-Dichlorobenzene	%	93			70-130	Pass	
1.2-Dichloroethane	%	98			70-130	Pass	
Trichloroethene	%	87			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	103			70-130	Pass	
TRH C6-C10	%	76			70-130	Pass	
TRH >C10-C16	%	128			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthylene	%	74			70-130	Pass	
Anthracene	%	86			70-130	Pass	
Benz(a)anthracene	%	82			70-130	Pass	
Benzo(a)pyrene	%	79			70-130	Pass	
Benzo(b&j)fluoranthene	%	81			70-130	Pass	
Benzo(g.h.i)perylene	%	88			70-130	Pass	
Benzo(k)fluoranthene	%	80			70-130	Pass	
Chrysene	%	81			70-130	Pass	
Dibenz(a.h)anthracene	%	87			70-130	Pass	
Fluoranthene	%	79			70-130	Pass	
Fluorene	%	75			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	88			70-130	Pass	
Naphthalene	%	72			70-130	Pass	
Phenanthrene	%	81			70-130	Pass	
Pyrene	%	80			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	89			70-130	Pass	
Beryllium	%	113			70-130	Pass	
Boron	%	108			70-130	Pass	
Cadmium	%	88			70-130	Pass	
Chromium	%	106			70-130	Pass	
Cobalt	%	109			70-130	Pass	
Copper	%	111			70-130	Pass	
Iron	%	102			70-130	Pass	
Lead	%	110			70-130	Pass	
Manganese	%	94			70-130	Pass	
Mercury	%	101			70-130	Pass	
Nickel	%	110			70-130	Pass	
Selenium	%	84			70-130	Pass	
Zinc	%	97			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S18-De11219	NCP	%	88			70-130	Pass	
Beryllium	S18-De11219	NCP	%	99			70-130	Pass	
Boron	S18-De11219	NCP	%	104			70-130	Pass	
Cadmium	S18-De11219	NCP	%	85			70-130	Pass	
Chromium	S18-De11219	NCP	%	106			70-130	Pass	
Cobalt	S18-De11219	NCP	%	108			70-130	Pass	
Copper	S18-De11219	NCP	%	111			70-130	Pass	
Iron	S18-De11219	NCP	%	102			70-130	Pass	
Lead	S18-De11219	NCP	%	110			70-130	Pass	
Manganese	S18-De11219	NCP	%	94			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Mercury	S18-De11219	NCP	%	124			70-130	Pass	
Nickel	S18-De11219	NCP	%	109			70-130	Pass	
Selenium	S18-De11219	NCP	%	83			70-130	Pass	
Zinc	S18-De11219	NCP	%	96			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Beryllium	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Boron	S18-De12993	NCP	mg/L	0.06	0.05	20	30%	Pass	
Cadmium	S18-De08591	NCP	mg/L	0.0007	0.0008	5.0	30%	Pass	
Chromium	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cobalt	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S18-De12993	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iron	S18-De11224	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Lead	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Manganese	S18-De11224	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Mercury	S18-De12993	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Selenium	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	S18-De12993	NCP	mg/L	0.008	0.008	5.0	30%	Pass	

Comments

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

Sample Integrity

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

Qualifier Codes/Comments

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

Authorised By

Nibha Vaidya	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)

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

Order No.:
Report #: 631666
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:24 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	BH1_0.2	Dec 05, 2018		Soil	S18-De06823	X		X	X	X	X	X
2	BH1_0.5	Dec 05, 2018		Soil	S18-De06824			X	X	X	X	X
3	R2	Dec 05, 2018		Water	S18-De06825			X	X		X	X
4	BH1_0.5D	Dec 05, 2018		Soil	S18-De06826			X	X	X	X	X
5	BH1_0.4	Dec 05, 2018		Soil	S18-De06827		X					
6	BH1_1.0	Dec 05, 2018		Soil	S18-De06828		X					
7	BH1_1.5	Dec 05, 2018		Soil	S18-De06829		X					
8	BH1_2.0	Dec 05, 2018		Soil	S18-De06830		X					
9	BH1_2.5	Dec 05, 2018		Soil	S18-De06831		X					

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Order No.:
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Phone: 02 9239 7100
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Received: Dec 5, 2018 6:24 PM
Due: Dec 12, 2018
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Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
10	BH1_3.0	Dec 05, 2018		Soil	S18-De06832		X					
11	BH1_3.5	Dec 05, 2018		Soil	S18-De06833		X					
12	BH1_4.0	Dec 05, 2018		Soil	S18-De06834		X					
13	BH1_4.5	Dec 05, 2018		Soil	S18-De06835		X					
14	BH1_5.0	Dec 05, 2018		Soil	S18-De06836		X					
15	BH1_5.5	Dec 05, 2018		Soil	S18-De06837		X					
16	BH1_6.0	Dec 05, 2018		Soil	S18-De06838		X					
17	BH1_7.0	Dec 05, 2018		Soil	S18-De06839		X					
18	BH1_7.5	Dec 05, 2018		Soil	S18-De06840		X					
19	BH1_8.0	Dec 05, 2018		Soil	S18-De06841		X					
20	BH1_8.5	Dec 05, 2018		Soil	S18-De06842		X					
21	BH1_9.0	Dec 05, 2018		Soil	S18-De06843		X					

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Address: Level 15, 133 Castlereagh Street
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NSW 2000

Order No.:
Report #: 631666
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:24 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
22	BH1_9.5	Dec 05, 2018		Soil	S18-De06844		X					
23	BH1_10.0	Dec 05, 2018		Soil	S18-De06845		X					
24	BH1_10.5	Dec 05, 2018		Soil	S18-De06846		X					
25	BH1_11.0	Dec 05, 2018		Soil	S18-De06847		X					
26	BH1_11.5	Dec 05, 2018		Soil	S18-De06848		X					
27	BH1_6.5	Dec 05, 2018		Soil	S18-De06849		X					
28	BH1_0.5T	Dec 05, 2018		Soil	S18-De06863		X					
29	BH1_20.23	Dec 05, 2018		Soil	S18-De06864		X					
30	BH1_21.05	Dec 05, 2018		Soil	S18-De06865				X	X		
Test Counts						1	25	4	5	4	4	4

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil 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. 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.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
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.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. 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 - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Halogenated Volatile Organics							
1.1-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
1.1.1-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.1.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dibromoethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.2.3-Trichloropropane	mg/kg	< 0.5			0.5	Pass	
1.3-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.3-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.4-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
Bromodichloromethane	mg/kg	< 0.5			0.5	Pass	
Bromoform	mg/kg	< 0.5			0.5	Pass	
Bromomethane	mg/kg	< 0.5			0.5	Pass	
Carbon Tetrachloride	mg/kg	< 0.5			0.5	Pass	
Chlorobenzene	mg/kg	< 0.5			0.5	Pass	
Chloroform	mg/kg	< 0.5			0.5	Pass	
Chloromethane	mg/kg	< 0.5			0.5	Pass	
cis-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
cis-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Dibromochloromethane	mg/kg	< 0.5			0.5	Pass	
Dibromomethane	mg/kg	< 0.5			0.5	Pass	
Iodomethane	mg/kg	< 0.5			0.5	Pass	
Methylene Chloride	mg/kg	< 0.5			0.5	Pass	
Tetrachloroethene	mg/kg	< 0.5			0.5	Pass	
trans-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
trans-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Trichloroethene	mg/kg	< 0.5			0.5	Pass	
Trichlorofluoromethane	mg/kg	< 0.5			0.5	Pass	
Vinyl chloride	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Beryllium	mg/kg	< 2			2	Pass	
Boron	mg/kg	< 10			10	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Cobalt	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Iron	mg/kg	< 20			20	Pass	
Lead	mg/kg	< 5			5	Pass	
Manganese	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Selenium	mg/kg	< 2			2	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	109			70-130	Pass	
TRH C10-C14	%	92			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	97			70-130	Pass	
Toluene	%	95			70-130	Pass	
Ethylbenzene	%	111			70-130	Pass	
m&p-Xylenes	%	110			70-130	Pass	
o-Xylene	%	105			70-130	Pass	
Xylenes - Total	%	108			70-130	Pass	
LCS - % Recovery							
Halogenated Volatile Organics							
1.1-Dichloroethene	%	85			70-130	Pass	
1.1.1-Trichloroethane	%	94			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
1.2-Dichlorobenzene	%	109			70-130	Pass	
1.2-Dichloroethane	%	99			70-130	Pass	
Trichloroethene	%	90			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	114			70-130	Pass	
TRH C6-C10	%	110			70-130	Pass	
TRH >C10-C16	%	97			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	83			70-130	Pass	
Acenaphthylene	%	94			70-130	Pass	
Anthracene	%	99			70-130	Pass	
Benz(a)anthracene	%	88			70-130	Pass	
Benzo(a)pyrene	%	90			70-130	Pass	
Benzo(b&j)fluoranthene	%	96			70-130	Pass	
Benzo(g.h.i)perylene	%	103			70-130	Pass	
Benzo(k)fluoranthene	%	96			70-130	Pass	
Chrysene	%	98			70-130	Pass	
Dibenz(a.h)anthracene	%	105			70-130	Pass	
Fluoranthene	%	91			70-130	Pass	
Fluorene	%	94			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	99			70-130	Pass	
Naphthalene	%	93			70-130	Pass	
Phenanthrene	%	96			70-130	Pass	
Pyrene	%	92			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	88			70-130	Pass	
Beryllium	%	109			70-130	Pass	
Boron	%	110			70-130	Pass	
Cadmium	%	97			70-130	Pass	
Chromium	%	113			70-130	Pass	
Cobalt	%	116			70-130	Pass	
Copper	%	119			70-130	Pass	
Iron	%	108			70-130	Pass	
Lead	%	115			70-130	Pass	
Manganese	%	101			70-130	Pass	
Mercury	%	125			70-130	Pass	
Nickel	%	116			70-130	Pass	
Selenium	%	85			70-130	Pass	
Zinc	%	103			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	S18-De06987	NCP	%	83			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S18-De06750	NCP	%	109			70-130	Pass	
Toluene	S18-De06750	NCP	%	106			70-130	Pass	
Ethylbenzene	S18-De06750	NCP	%	122			70-130	Pass	
m&p-Xylenes	S18-De06750	NCP	%	118			70-130	Pass	
o-Xylene	S18-De06750	NCP	%	112			70-130	Pass	
Xylenes - Total	S18-De06750	NCP	%	116			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Halogenated Volatile Organics				Result 1					
1.1-Dichloroethene	S18-De06750	NCP	%	111			70-130	Pass	
1.1.1-Trichloroethane	S18-De06750	NCP	%	108			70-130	Pass	
1.2-Dichlorobenzene	S18-De06750	NCP	%	110			70-130	Pass	
1.2-Dichloroethane	S18-De06750	NCP	%	106			70-130	Pass	
Trichloroethene	S18-De06750	NCP	%	102			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S18-De06750	NCP	%	97			70-130	Pass	
TRH >C10-C16	S18-De06987	NCP	%	84			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S18-De12025	NCP	%	102			70-130	Pass	
Acenaphthylene	S18-De12025	NCP	%	106			70-130	Pass	
Anthracene	S18-De12025	NCP	%	112			70-130	Pass	
Benz(a)anthracene	S18-De12025	NCP	%	106			70-130	Pass	
Benzo(a)pyrene	S18-De12025	NCP	%	102			70-130	Pass	
Benzo(b&j)fluoranthene	S18-De12025	NCP	%	109			70-130	Pass	
Benzo(g.h.i)perylene	S18-De12025	NCP	%	117			70-130	Pass	
Benzo(k)fluoranthene	S18-De12025	NCP	%	114			70-130	Pass	
Chrysene	S18-De12025	NCP	%	111			70-130	Pass	
Dibenz(a.h)anthracene	S18-De12025	NCP	%	118			70-130	Pass	
Fluoranthene	S18-De12025	NCP	%	108			70-130	Pass	
Fluorene	S18-De12025	NCP	%	107			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S18-De12025	NCP	%	108			70-130	Pass	
Naphthalene	S18-De12025	NCP	%	105			70-130	Pass	
Phenanthrene	S18-De12025	NCP	%	113			70-130	Pass	
Pyrene	S18-De12025	NCP	%	108			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S18-De13679	NCP	%	84			70-130	Pass	
Beryllium	S18-De13679	NCP	%	94			70-130	Pass	
Cadmium	S18-De13679	NCP	%	80			70-130	Pass	
Chromium	S18-De13679	NCP	%	100			70-130	Pass	
Cobalt	S18-De13679	NCP	%	99			70-130	Pass	
Copper	S18-De13679	NCP	%	109			70-130	Pass	
Lead	S18-De13679	NCP	%	126			70-130	Pass	
Manganese	S18-De13679	NCP	%	101			70-130	Pass	
Mercury	S18-De13679	NCP	%	108			70-130	Pass	
Nickel	S18-De13679	NCP	%	99			70-130	Pass	
Selenium	S18-De13679	NCP	%	74			70-130	Pass	
Zinc	S18-De13679	NCP	%	121			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S18-De11198	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S18-De03420	NCP	mg/kg	39	41	4.0	30%	Pass	
TRH C15-C28	S18-De03420	NCP	mg/kg	50	54	7.0	30%	Pass	
TRH C29-C36	S18-De03420	NCP	mg/kg	< 50	< 50	<1	30%	Pass	

Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S18-De11198	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S18-De11198	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S18-De11198	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S18-De11198	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S18-De11198	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S18-De11198	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
1.1-Dichloroethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1-Dichloroethene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.1-Trichloroethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.1.2-Tetrachloroethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.2-Trichloroethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.2.2-Tetrachloroethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dibromoethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichlorobenzene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichloroethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichloropropane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2.3-Trichloropropane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.3-Dichlorobenzene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.3-Dichloropropane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.4-Dichlorobenzene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromodichloromethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromoform	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromomethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Carbon Tetrachloride	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chlorobenzene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chloroform	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chloromethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
cis-1.2-Dichloroethene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
cis-1.3-Dichloropropene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibromochloromethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibromomethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Iodomethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methylene Chloride	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Tetrachloroethene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
trans-1.2-Dichloroethene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
trans-1.3-Dichloropropene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichloroethene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichlorofluoromethane	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Vinyl chloride	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S18-De11198	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S18-De11198	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S18-De03420	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S18-De03420	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S18-De03420	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Benzo(a)pyrene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-De12945	NCP	mg/kg	3.4	3.9	14	30%	Pass	
Beryllium	S18-De12945	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Boron	S18-De12945	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Cadmium	S18-De07641	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-De12945	NCP	mg/kg	13	16	19	30%	Pass	
Copper	S18-De12945	NCP	mg/kg	19	21	11	30%	Pass	
Iron	S18-De12945	NCP	mg/kg	38000	41000	6.0	30%	Pass	
Lead	S18-De12945	NCP	mg/kg	42	50	17	30%	Pass	
Manganese	S18-De12945	NCP	mg/kg	110	120	6.0	30%	Pass	
Mercury	S18-De12945	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-De12945	NCP	mg/kg	6.6	6.1	9.0	30%	Pass	
Selenium	S18-De12945	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Zinc	S18-De12945	NCP	mg/kg	59	69	16	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S18-De06823	CP	%	16	18	11	30%	Pass	

Comments

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

Sample Integrity

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

Qualifier Codes/Comments

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

Authorised By

Nibha Vaidya	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)
Nibha Vaidya	Senior Analyst-Asbestos (NSW)

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

ABN 50 005 085 521

☑ Sydney Laboratory
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02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
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☐ Perth Laboratory
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☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	GHD Pty Ltd	Project №	2127850	Project Manager	Emma Harrison
Address	Level 15, 133 Castlereagh St Sydney, 2000	Project Name	Lindfield Village Hub - groundwater well installation	Report Format	ESDat
Contact Name	Emma Harrison				
Phone №	0408 401 511				
Special Direction					
Purchase Order					
Quote ID №	181121GHDN				

Relinquished by: Emma Harrison ___:___ 5/12/18

Email for Results: emma.harrison@ghd.com

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

№	Client Sample ID	Date	Matrix	Suite B4 : TRH, BTEXN, PAH	Suite M13A - NEPM Metals (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Halogenated Volatile Organics	Asbestos identification in soil (AS 4964)	Polychlorinated Biphenyls (PCB)	Iron (Fe)	Containers: 1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass	Jar	Other ( )	Sample Comments / DG Hazard Warning
1	BH2_0.1	4/12	Soil	✓	✓	✓	✓	✓	✓							✓		possible asbestos
2	BH2_0.4																	
3	BH2_0.5			✓	✓	✓		✓	✓									
4	BH2_1.0																	
5	BH2_1.5																	
6	BH2_2.0																	
7	BH2_2.5																	
8	BH2_3.0																	
9	BH2_3.5																	
10	BH2_4.0																	
	Total Counts			2	2	2	1	2	2							10		

Turn Around Requirements

- ☐ Overnight (9am)*
- ☐ 1 Day* ☐ 2 Day*
- ☐ 3 Day* ☑ 5 Day
- ☐ Other ( )

* Surcharges apply

Method of Shipment	☐ Courier (#)	☑ Hand Delivered	☐ Postal	Name	Emma Harrison	Signature		Date	5/12/18	Time ___:___
Laboratory Use Only	Received By	Lucia D	SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	05/12/18	Time	6:27 PM	Temperature 2.27°C
	Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	___/___/___	Time	___:___	Report № 631640

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request.

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

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☐ Brisbane Laboratory
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☐ Perth Laboratory
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08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	GHD Pty Ltd	Project №	2127850	Project Manager	Emma Harrison
Address	Level 15, 133 Castlereagh St Sydney, 2000	Project Name	Lindfield Village Hub - groundwater well installation	Report Format	ESDat
Contact Name	Emma Harrison				
Phone №	0408 401 511				
Special Direction					
Purchase Order					
Quote ID №	181121GHDN				

Relinquished by: Emma Harrison __:__ 5/12/18

Email for Results: emma.harrison@ghd.com

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

№	Client Sample ID	Date	Matrix	Suite B4 : TRH, BTEXN, PAH	Suite M13A - NEPM Metals (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Halogenated Volatile Organics	Asbestos identification in soil (AS 4964)	Polychlorinated Biphenyls (PCB)	Iron (Fe)	Containers: 1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mLvial	125mL Amber Glass	Jar	Other ( )	Sample Comments / DG Hazard Warning
1	BH2 - 4.5	4/12	Soil															
2	BH2 - 5.0																	
3	BH2 - 5.5																	
4	BH2 - 6.0																	
5	BH2 - 6.5																	
6	BH2 - 7.0																	
7	BH2 - 7.5																	
8	BH2 - 8.0																	
9	BH2 - 8.5																	
10	BH2 - 9.0																	
	Total Counts															10		

Turn Around Requirements

- ☐ Overnight (9am)*
- ☐ 1 Day* ☐ 2 Day*
- ☐ 3 Day* ☑ 5 Day
- ☐ Other ( )

*Surcharges apply

Method of Shipment	☐ Courier (#)	☑ Hand Delivered	☐ Postal	Name	Emma Harrison	Signature		Date	5/12/18	Time	__:__
Laboratory Use Only	Received By	Leisa D.	SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	05/12/18	Time	6:27 pm	Temperature	2.27°C
	Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	__/__/__	Time	__:__	Report №	631640

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CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

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☐ Perth Laboratory
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☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	GHD Pty Ltd	Project №	2127850
Address	Level 15, 133 Castlereagh St Sydney, 2000	Project Name	Lindfield Village Hub - groundwater well installation
Contact Name	Emma Harrison	Project Manager	Emma Harrison
Phone №	0408 401 511	Report Format	ESDat
Special Direction		Relinquished by	Emmatarrison 5/12/18
Purchase Order		Email for Results	emma.harrison@ghd.com
Quote ID №	181121GHDN		

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

№	Client Sample ID	Date	Matrix	Suite B4 : TRH, BTEXN, PAH	Suite M13A - NEPM Metals (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Halogenated Volatile Organics	Asbestos identification in soil (AS 4964)	Polychlorinated Biphenyls (PCB)	Iron (Fe)	Containers: 1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass	Jar	Other ( )	Sample Comments / DG Hazard Warning
1	BH2 - 9.5	4/12	soil													✓		
2	BH2 - 10.0																	
3	BH2 - 10.5																	
4	BH2 - 11.0																	
5	~~BH2 - 12.0~~																	
6	~~BH2 - 13~~																	
7	R1	4/12	water	✓	✓	✓		✓	✓							✓		
8	Trip spike	4/12												✓				
9	Trip blank	4/12												✓				
10																		
	Total Counts													2				

Turn Around Requirements

- ☐ Overnight (9am)*
- ☐ 1 Day* ☐ 2 Day*
- ☐ 3 Day* ☑ 5 Day
- ☐ Other ( )

* Surcharges apply

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name	Emmatarrison	Signature		Date	5/12/18	Time	::
Laboratory Use Only	Received By	Lucia D.	SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	05/12/18	Time	6:27 PM	Temperature	2.27°C
	Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	/ /	Time	:	Report №	631640

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request

Enviro Sample NSW

To: Nibha Vaidya; COC NSW
Subject: RE: Eurofins | mgt Sample Receipt Advice - Report 631640 : Site LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION (2127850)

From: Emma Harrison
Sent: Friday, 7 December 2018 9:42 AM
To: 'EnviroSampleNSW@eurofins.com' <EnviroSampleNSW@eurofins.com>
Cc: Jo Curry <Joanna.Curry@ghd.com>
Subject: RE: Eurofins | mgt Sample Receipt Advice - Report 631640 : Site LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION (2127850)

Hi Nibha,

I've just tried calling a couple of times but with no luck.

For the trip spike in this sample batch, would you please analyse for BTEXN?

For the trip blank in this sample batch, would you please analyse for BTEXN and TRH?

Also, would you please add Joanna Curry to the COC emails and results?

Many thanks,
Emma

From: EnviroSampleNSW@eurofins.com <EnviroSampleNSW@eurofins.com>
Sent: Thursday, 6 December 2018 6:53 PM
To: Emma Harrison <Emma.Harrison@ghd.com>
Subject: Eurofins | mgt Sample Receipt Advice - Report 631640 : Site LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION (2127850)

Dear Valued Client,
Extra Jar received for BH2_12.0, BH2_13.5, BH2_15.0 and asbestos bag for BH2_12.0 placed on hold.
Please find attached a Sample Receipt Advice (SRA), a Summary Sheet and a scanned copy of your Chain-of-Custody (COC). It is important that you check this documentation to ensure that the details are correct such as the Client Job Number, Turn Around Time, any comments in the Notes section and sample numbers as well as the requested analysis. If there are any irregularities then please contact your Eurofins | mgt Analytical Services Manager as soon as possible to make certain that they get changed.

Regards

Luca Dominici
Sample Receipt

Eurofins | mgt
Unit F3, Parkview Building
16 Mars Road
LANE COVE WEST NSW 2066
AUSTRALIA
Phone: +61 29900 8492
Email: EnviroSampleNSW@eurofins.com
Website:environment.eurofins.com.au

eurofins | mgt

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Oakleigh Vic 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
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16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**GHD Pty Ltd NSW**
Contact name:	Emma Harrison
Project name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID:	2127850
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Dec 5, 2018 6:27 PM
Eurofins | mgt reference:	**631640**

Sample information

- ☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 2.3 degrees Celsius.
- ☑ All samples have been received as described on the above COC.
- ☑ COC has been completed correctly.
- ☑ Attempt to chill was evident.
- ☑ Appropriately preserved sample containers have been used.
- ☑ All samples were received in good condition.
- ☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ☑ Appropriate sample containers have been used.
- ☑ Sample containers for volatile analysis received with zero headspace.
- ☒ Split sample sent to requested external lab.
- ☒ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Extra Jar received for BH2_12.0, BH2_13.5, BH2_15.0 and asbestos bag for BH2_12.0 placed on hold.

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8415 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Emma Harrison - emma.harrison@ghd.com.

eurofins | mgt

ABN– 50 005 085 521
e.mail : EnviroSales@eurofins.com
web : www.eurofins.com.au

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NATA # 1261
Site # 1254 & 14271

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NATA # 1261 Site # 18217

Brisbane
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Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

Order No.:
Report #: 631640
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:27 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polychlorinated Biphenyls	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	BTEXN and Volatile TRH	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	BH2_0.1	Dec 04, 2018		Soil	S18-De06749	X		X	X		X	X	X		X
2	BH2_0.5	Dec 04, 2018		Soil	S18-De06750			X	X		X	X	X		X
3	R1	Dec 04, 2018		Water	S18-De06751			X	X		X		X		X
4	BH2_0.4	Dec 04, 2018		Soil	S18-De06752		X								
5	BH2_1.0	Dec 04, 2018		Soil	S18-De06753		X								
6	BH2_1.5	Dec 04, 2018		Soil	S18-De06754		X								
7	BH2_2.0	Dec 04, 2018		Soil	S18-De06755		X								
8	BH2_2.5	Dec 04, 2018		Soil	S18-De06756		X								
9	BH2_3.0	Dec 04, 2018		Soil	S18-De06757		X								

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ABN– 50 005 085 521
e.mail : EnviroSales@eurofins.com
web : www.eurofins.com.au

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NATA # 1261
Site # 1254 & 14271

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Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

Order No.:
Report #: 631640
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:27 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polychlorinated Biphenyls	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	BTEXN and Volatile TRH	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
10	BH2_3.5	Dec 04, 2018		Soil	S18-De06758		X								
11	BH2_4.0	Dec 04, 2018		Soil	S18-De06759		X								
12	BH2_4.5	Dec 04, 2018		Soil	S18-De06760		X								
13	BH2_5.0	Dec 04, 2018		Soil	S18-De06761		X								
14	BH2_5.5	Dec 04, 2018		Soil	S18-De06762		X								
15	BH2_6.0	Dec 04, 2018		Soil	S18-De06763		X								
16	BH2_6.5	Dec 04, 2018		Soil	S18-De06764		X								
17	BH2_7.0	Dec 04, 2018		Soil	S18-De06765		X								
18	BH2_7.5	Dec 04, 2018		Soil	S18-De06766		X								
19	BH2_8.0	Dec 04, 2018		Soil	S18-De06767		X								
20	BH2_8.5	Dec 04, 2018		Soil	S18-De06768		X								
21	BH2_9.0	Dec 04, 2018		Soil	S18-De06769		X								

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NATA # 1261
Site # 23736

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

Order No.:
Report #: 631640
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:27 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polychlorinated Biphenyls	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	BTEXN and Volatile TRH	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
22	BH2_9.5	Dec 04, 2018		Soil	S18-De06770		X								
23	BH2_10.0	Dec 04, 2018		Soil	S18-De06771		X								
24	BH2_10.5	Dec 04, 2018		Soil	S18-De06772		X								
25	BH2_11.0	Dec 04, 2018		Soil	S18-De06773		X								
26	TRIP SPIKE	Dec 04, 2018		Soil	S18-De06774					X					
27	TRIP BLANK	Dec 04, 2018		Soil	S18-De06775									X	
28	BH2_12.0	Dec 04, 2018		Soil	S18-De06812		X								
29	BH2_13.5	Dec 04, 2018		Soil	S18-De06813		X								
30	BH2_15	Dec 04, 2018		Soil	S18-De06814		X								
Test Counts						1	25	3	3	1	3	2	3	1	3

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025–Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

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

Attention:	Emma Harrison
Report	631640-AID
Project Name	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID	2127850
Received Date	Dec 05, 2018
Date Reported	Dec 13, 2018

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). *NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos".This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

Project Name LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID 2127850
Date Sampled Dec 04, 2018
Report 631640-AID

Client Sample ID	Eurofins | mgt Sample No.	Date Sampled	Sample Description	Result
BH2_0.1	18-De06749	Dec 04, 2018	Approximate Sample 349g Sample consisted of: Brown coarse-grained soil and rocks	Chrysotile and amosite asbestos detected in fibre cement fragments and chrysotile asbestos detected in the form of loose fibre bundles. Approximate raw weight of asbestos containing material = 41g* Total estimated asbestos content in the sample = 5.3g* Total estimated asbestos concentration = 1.5% w/w* Organic fibre detected. No respirable fibres detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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
Asbestos - LTM-ASB-8020	Sydney	Dec 06, 2018	Indefinite

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Site # 23736

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

Order No.:
Report #: 631640
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:27 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polychlorinated Biphenyls	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	BTEXN and Volatile TRH	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	BH2_0.1	Dec 04, 2018		Soil	S18-De06749	X		X	X		X	X	X		X
2	BH2_0.5	Dec 04, 2018		Soil	S18-De06750			X	X		X	X	X		X
3	R1	Dec 04, 2018		Water	S18-De06751			X	X		X		X		X
4	BH2_0.4	Dec 04, 2018		Soil	S18-De06752		X								
5	BH2_1.0	Dec 04, 2018		Soil	S18-De06753		X								
6	BH2_1.5	Dec 04, 2018		Soil	S18-De06754		X								
7	BH2_2.0	Dec 04, 2018		Soil	S18-De06755		X								
8	BH2_2.5	Dec 04, 2018		Soil	S18-De06756		X								
9	BH2_3.0	Dec 04, 2018		Soil	S18-De06757		X								

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NATA # 1261
Site # 23736

Company Name:	GHD Pty Ltd NSW	**Order No.:**		**Received:**	Dec 5, 2018 6:27 PM
Address:	Level 15, 133 Castlereagh Street Sydney NSW 2000	**Report #:** **Phone:** **Fax:**	631640 02 9239 7100 02 9239 7199	**Due:** **Priority:** **Contact Name:**	Dec 12, 2018 5 Day Emma Harrison
Project Name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION				
Project ID:	2127850				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polychlorinated Biphenyls	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	BTEXN and Volatile TRH	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
10	BH2_3.5	Dec 04, 2018		Soil	S18-De06758		X								
11	BH2_4.0	Dec 04, 2018		Soil	S18-De06759		X								
12	BH2_4.5	Dec 04, 2018		Soil	S18-De06760		X								
13	BH2_5.0	Dec 04, 2018		Soil	S18-De06761		X								
14	BH2_5.5	Dec 04, 2018		Soil	S18-De06762		X								
15	BH2_6.0	Dec 04, 2018		Soil	S18-De06763		X								
16	BH2_6.5	Dec 04, 2018		Soil	S18-De06764		X								
17	BH2_7.0	Dec 04, 2018		Soil	S18-De06765		X								
18	BH2_7.5	Dec 04, 2018		Soil	S18-De06766		X								
19	BH2_8.0	Dec 04, 2018		Soil	S18-De06767		X								
20	BH2_8.5	Dec 04, 2018		Soil	S18-De06768		X								
21	BH2_9.0	Dec 04, 2018		Soil	S18-De06769		X								

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Company Name:	GHD Pty Ltd NSW	**Order No.:**		**Received:**	Dec 5, 2018 6:27 PM
Address:	Level 15, 133 Castlereagh Street Sydney NSW 2000	**Report #:** **Phone:** **Fax:**	631640 02 9239 7100 02 9239 7199	**Due:** **Priority:** **Contact Name:**	Dec 12, 2018 5 Day Emma Harrison
Project Name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION				
Project ID:	2127850				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polychlorinated Biphenyls	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	BTEXN and Volatile TRH	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
22	BH2_9.5	Dec 04, 2018		Soil	S18-De06770		X								
23	BH2_10.0	Dec 04, 2018		Soil	S18-De06771		X								
24	BH2_10.5	Dec 04, 2018		Soil	S18-De06772		X								
25	BH2_11.0	Dec 04, 2018		Soil	S18-De06773		X								
26	TRIP SPIKE	Dec 04, 2018		Soil	S18-De06774					X					
27	TRIP BLANK	Dec 04, 2018		Soil	S18-De06775									X	
28	BH2_12.0	Dec 04, 2018		Soil	S18-De06812		X								
29	BH2_13.5	Dec 04, 2018		Soil	S18-De06813		X								
30	BH2_15	Dec 04, 2018		Soil	S18-De06814		X								
Test Counts						1	25	3	3	1	3	2	3	1	3

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. 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 Sample Receipt Advice.

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.

Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Sample is dried by heating prior to analysis
LOR	Limit of Reporting
COC	Chain of Custody
SRA	Sample Receipt Advice
ISO	International Standards Organisation
AS	Australian Standards
WA DOH	Reference document for the NEPM. Government of Western Australia, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009), including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil (2011)
NEPM	National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended)
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded and/or sound condition. For the purposes of the NEPM, ACM is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
AF	Asbestos Fines. Asbestos containing materials, including friable, weathered and bonded materials, able to pass a 7mm x 7mm sieve. Considered under the NEPM as equivalent to “non-bonded / friable”.
FA	Fibrous Asbestos. Asbestos containing materials in a friable and/or severely weathered condition. For the purposes of the NEPM, FA is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory’s remit to assess degree of friability.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres in the matrix.

Comments

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

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
N/A	Not applicable

Asbestos Counter/Identifier:

Authorised by:

Sayeed Abu Senior Analyst-Asbestos (NSW)

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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GHD Pty Ltd NSW
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NSW 2000

NATA Accredited
Accreditation Number 1261
Site Number 18217

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The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Emma Harrison**

Report **631640-S**
Project name LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID 2127850
Received Date Dec 05, 2018

Client Sample ID			**BH2_0.1**	**BH2_0.5**	**[R20]TRIP SPIKE**	**TRIP BLANK**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S18-De06749**	**S18-De06750**	**S18-De06774**	**S18-De06775**
Date Sampled			**Dec 04, 2018**	**Dec 04, 2018**	**Dec 04, 2018**	**Dec 04, 2018**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	99	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	-	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	-	-
TRH >C16-C34	100	mg/kg	< 100	< 100	-	-
TRH >C34-C40	100	mg/kg	< 100	< 100	-	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	-	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	-	< 20
TRH C10-C14	20	mg/kg	< 20	35	-	-
TRH C15-C28	50	mg/kg	< 50	< 50	-	-
TRH C29-C36	50	mg/kg	< 50	< 50	-	-
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	-	-
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	99	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	110	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	110	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	100	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	100	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	100	< 0.3
4-Bromofluorobenzene (surr.)	1	%	87	77	86	87
Halogenated Volatile Organics						
1.1-Dichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	-
1.1-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	-
1.1.1-Trichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	-
1.1.1.2-Tetrachloroethane	0.5	mg/kg	< 0.5	< 0.5	-	-
1.1.2-Trichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	-
1.1.2.2-Tetrachloroethane	0.5	mg/kg	< 0.5	< 0.5	-	-
1.2-Dibromoethane	0.5	mg/kg	< 0.5	< 0.5	-	-
1.2-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	-
1.2-Dichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	-
1.2-Dichloropropane	0.5	mg/kg	< 0.5	< 0.5	-	-
1.2.3-Trichloropropane	0.5	mg/kg	< 0.5	< 0.5	-	-
1.3-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	-

Client Sample ID			BH2_0.1	BH2_0.5	[R20]TRIP SPIKE	TRIP BLANK
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-De06749	S18-De06750	S18-De06774	S18-De06775
Date Sampled			Dec 04, 2018	Dec 04, 2018	Dec 04, 2018	Dec 04, 2018
Test/Reference	LOR	Unit				
Halogenated Volatile Organics						
1.3-Dichloropropane	0.5	mg/kg	< 0.5	< 0.5	-	-
1.4-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	-
Bromodichloromethane	0.5	mg/kg	< 0.5	< 0.5	-	-
Bromoform	0.5	mg/kg	< 0.5	< 0.5	-	-
Bromomethane	0.5	mg/kg	< 0.5	< 0.5	-	-
Carbon Tetrachloride	0.5	mg/kg	< 0.5	< 0.5	-	-
Chlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	-
Chloroform	0.5	mg/kg	< 0.5	< 0.5	-	-
Chloromethane	0.5	mg/kg	< 0.5	< 0.5	-	-
cis-1.2-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	-
cis-1.3-Dichloropropene	0.5	mg/kg	< 0.5	< 0.5	-	-
Dibromochloromethane	0.5	mg/kg	< 0.5	< 0.5	-	-
Dibromomethane	0.5	mg/kg	< 0.5	< 0.5	-	-
Iodomethane	0.5	mg/kg	< 0.5	< 0.5	-	-
Methylene Chloride	0.5	mg/kg	< 0.5	< 0.5	-	-
Tetrachloroethene	0.5	mg/kg	< 0.5	< 0.5	-	-
trans-1.2-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	-
trans-1.3-Dichloropropene	0.5	mg/kg	< 0.5	< 0.5	-	-
Trichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	-
Trichlorofluoromethane	0.5	mg/kg	< 0.5	< 0.5	-	-
Vinyl chloride	0.5	mg/kg	< 0.5	< 0.5	-	-
Vic EPA IWRG 621 CHC (Total)*	0.5	mg/kg	< 0.5	< 0.5	-	-
Vic EPA IWRG 621 Other CHC (Total)*	0.5	mg/kg	< 0.5	< 0.5	-	-
4-Bromofluorobenzene (surr.)	1	%	87	77	-	-
Toluene-d8 (surr.)	1	%	103	92	-	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	-	-
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	-	-
Anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Chrysene	0.5	mg/kg	< 0.5	< 0.5	-	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Fluorene	0.5	mg/kg	< 0.5	< 0.5	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	-	-
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	-	-
2-Fluorobiphenyl (surr.)	1	%	102	102	-	-
p-Terphenyl-d14 (surr.)	1	%	104	106	-	-

Client Sample ID			BH2_0.1	BH2_0.5	[R20]TRIP SPIKE	TRIP BLANK
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S18-De06749**	**S18-De06750**	**S18-De06774**	**S18-De06775**
Date Sampled			**Dec 04, 2018**	**Dec 04, 2018**	**Dec 04, 2018**	**Dec 04, 2018**
Test/Reference	LOR	Unit				
Polychlorinated Biphenyls						
Aroclor-1016	0.5	mg/kg	< 0.5	< 0.5	-	-
Aroclor-1221	0.1	mg/kg	< 0.1	< 0.1	-	-
Aroclor-1232	0.5	mg/kg	< 0.5	< 0.5	-	-
Aroclor-1242	0.5	mg/kg	< 0.5	< 0.5	-	-
Aroclor-1248	0.5	mg/kg	< 0.5	< 0.5	-	-
Aroclor-1254	0.5	mg/kg	< 0.5	< 0.5	-	-
Aroclor-1260	0.5	mg/kg	< 0.5	< 0.5	-	-
Total PCB*	0.5	mg/kg	< 0.5	< 0.5	-	-
Dibutylchlorendate (surr.)	1	%	138	136	-	-
Tetrachloro-m-xylene (surr.)	1	%	119	122	-	-
Heavy Metals						
Arsenic	2	mg/kg	7.1	9.9	-	-
Beryllium	2	mg/kg	< 2	< 2	-	-
Boron	10	mg/kg	< 10	< 10	-	-
Cadmium	0.4	mg/kg	< 0.4	< 0.4	-	-
Chromium	5	mg/kg	24	22	-	-
Cobalt	5	mg/kg	5.6	< 5	-	-
Copper	5	mg/kg	27	16	-	-
Iron	20	mg/kg	31000	40000	-	-
Lead	5	mg/kg	100	25	-	-
Manganese	5	mg/kg	150	12	-	-
Mercury	0.1	mg/kg	0.2	< 0.1	-	-
Nickel	5	mg/kg	19	< 5	-	-
Selenium	2	mg/kg	< 2	< 2	-	-
Zinc	5	mg/kg	150	12	-	-
% Moisture	1	%	13	20	-	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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 - 2013 NEPM Fractions	Sydney	Dec 11, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Sydney	Dec 11, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Dec 12, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Dec 11, 2018	14 Day
- Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices			
Eurofins | mgt Suite B4			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 12, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Dec 12, 2018	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Halogenated Volatile Organics	Sydney	Dec 11, 2018	7 Day
- Method: E016 Volatile Halogenated Compounds (VHC)			
Polychlorinated Biphenyls	Sydney	Dec 12, 2018	28 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Sydney	Dec 11, 2018	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Sydney	Dec 11, 2018	180 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Dec 06, 2018	14 Day
- Method: LTM-GEN-7080 Moisture			

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NATA # 1261
Site # 23736

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

Order No.:
Report #: 631640
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:27 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polychlorinated Biphenyls	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	BTEXN and Volatile TRH	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	BH2_0.1	Dec 04, 2018		Soil	S18-De06749	X		X	X		X	X	X		X
2	BH2_0.5	Dec 04, 2018		Soil	S18-De06750			X	X		X	X	X		X
3	R1	Dec 04, 2018		Water	S18-De06751			X	X		X		X		X
4	BH2_0.4	Dec 04, 2018		Soil	S18-De06752		X								
5	BH2_1.0	Dec 04, 2018		Soil	S18-De06753		X								
6	BH2_1.5	Dec 04, 2018		Soil	S18-De06754		X								
7	BH2_2.0	Dec 04, 2018		Soil	S18-De06755		X								
8	BH2_2.5	Dec 04, 2018		Soil	S18-De06756		X								
9	BH2_3.0	Dec 04, 2018		Soil	S18-De06757		X								

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Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
10	BH2_3.5	Dec 04, 2018		Soil	S18-De06758		X								
11	BH2_4.0	Dec 04, 2018		Soil	S18-De06759		X								
12	BH2_4.5	Dec 04, 2018		Soil	S18-De06760		X								
13	BH2_5.0	Dec 04, 2018		Soil	S18-De06761		X								
14	BH2_5.5	Dec 04, 2018		Soil	S18-De06762		X								
15	BH2_6.0	Dec 04, 2018		Soil	S18-De06763		X								
16	BH2_6.5	Dec 04, 2018		Soil	S18-De06764		X								
17	BH2_7.0	Dec 04, 2018		Soil	S18-De06765		X								
18	BH2_7.5	Dec 04, 2018		Soil	S18-De06766		X								
19	BH2_8.0	Dec 04, 2018		Soil	S18-De06767		X								
20	BH2_8.5	Dec 04, 2018		Soil	S18-De06768		X								
21	BH2_9.0	Dec 04, 2018		Soil	S18-De06769		X								

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Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polychlorinated Biphenyls	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	BTEXN and Volatile TRH	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
22	BH2_9.5	Dec 04, 2018		Soil	S18-De06770		X								
23	BH2_10.0	Dec 04, 2018		Soil	S18-De06771		X								
24	BH2_10.5	Dec 04, 2018		Soil	S18-De06772		X								
25	BH2_11.0	Dec 04, 2018		Soil	S18-De06773		X								
26	TRIP SPIKE	Dec 04, 2018		Soil	S18-De06774					X					
27	TRIP BLANK	Dec 04, 2018		Soil	S18-De06775									X	
28	BH2_12.0	Dec 04, 2018		Soil	S18-De06812		X								
29	BH2_13.5	Dec 04, 2018		Soil	S18-De06813		X								
30	BH2_15	Dec 04, 2018		Soil	S18-De06814		X								
Test Counts						1	25	3	3	1	3	2	3	1	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil 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. 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.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
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.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. 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 - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Halogenated Volatile Organics							
1.1-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
1.1.1-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.1.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dibromoethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.2.3-Trichloropropane	mg/kg	< 0.5			0.5	Pass	
1.3-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.3-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.4-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
Bromodichloromethane	mg/kg	< 0.5			0.5	Pass	
Bromoform	mg/kg	< 0.5			0.5	Pass	
Bromomethane	mg/kg	< 0.5			0.5	Pass	
Carbon Tetrachloride	mg/kg	< 0.5			0.5	Pass	
Chlorobenzene	mg/kg	< 0.5			0.5	Pass	
Chloroform	mg/kg	< 0.5			0.5	Pass	
Chloromethane	mg/kg	< 0.5			0.5	Pass	
cis-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
cis-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Dibromochloromethane	mg/kg	< 0.5			0.5	Pass	
Dibromomethane	mg/kg	< 0.5			0.5	Pass	
Iodomethane	mg/kg	< 0.5			0.5	Pass	
Methylene Chloride	mg/kg	< 0.5			0.5	Pass	
Tetrachloroethene	mg/kg	< 0.5			0.5	Pass	
trans-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
trans-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Trichloroethene	mg/kg	< 0.5			0.5	Pass	
Trichlorofluoromethane	mg/kg	< 0.5			0.5	Pass	
Vinyl chloride	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.5			0.5	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.5			0.5	Pass	
Aroclor-1242	mg/kg	< 0.5			0.5	Pass	
Aroclor-1248	mg/kg	< 0.5			0.5	Pass	
Aroclor-1254	mg/kg	< 0.5			0.5	Pass	
Aroclor-1260	mg/kg	< 0.5			0.5	Pass	
Total PCB*	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Beryllium	mg/kg	< 2			2	Pass	
Boron	mg/kg	< 10			10	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Cobalt	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Iron	mg/kg	< 20			20	Pass	
Lead	mg/kg	< 5			5	Pass	
Manganese	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Selenium	mg/kg	< 2			2	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	122			70-130	Pass	
TRH C6-C10	%	104			70-130	Pass	
TRH >C10-C16	%	90			70-130	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	108			70-130	Pass	
TRH C10-C14	%	88			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	124			70-130	Pass	
Toluene	%	113			70-130	Pass	
Ethylbenzene	%	112			70-130	Pass	
m&p-Xylenes	%	114			70-130	Pass	
o-Xylene	%	114			70-130	Pass	
Xylenes - Total	%	114			70-130	Pass	
LCS - % Recovery							
Halogenated Volatile Organics							
1.1-Dichloroethene	%	85			70-130	Pass	
1.1.1-Trichloroethane	%	94			70-130	Pass	
1.2-Dichlorobenzene	%	109			70-130	Pass	
1.2-Dichloroethane	%	99			70-130	Pass	
Trichloroethene	%	90			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	99			70-130	Pass	
Acenaphthylene	%	96			70-130	Pass	
Anthracene	%	103			70-130	Pass	
Benz(a)anthracene	%	100			70-130	Pass	
Benzo(a)pyrene	%	93			70-130	Pass	
Benzo(b&j)fluoranthene	%	91			70-130	Pass	
Benzo(g.h.i)perylene	%	98			70-130	Pass	
Benzo(k)fluoranthene	%	99			70-130	Pass	
Chrysene	%	92			70-130	Pass	
Dibenz(a.h)anthracene	%	96			70-130	Pass	
Fluoranthene	%	91			70-130	Pass	
Fluorene	%	104			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	96			70-130	Pass	
Naphthalene	%	94			70-130	Pass	
Phenanthrene	%	101			70-130	Pass	
Pyrene	%	92			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	100			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	88			70-130	Pass	
Beryllium	%	109			70-130	Pass	
Boron	%	110			70-130	Pass	
Cadmium	%	97			70-130	Pass	
Chromium	%	113			70-130	Pass	
Cobalt	%	116			70-130	Pass	
Copper	%	119			70-130	Pass	
Iron	%	108			70-130	Pass	
Lead	%	115			70-130	Pass	
Manganese	%	101			70-130	Pass	
Mercury	%	125			70-130	Pass	
Nickel	%	116			70-130	Pass	
Selenium	%	85			70-130	Pass	
Zinc	%	103			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S18-De06903	NCP	%	88			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	S18-De06903	NCP	%	84			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S18-De03657	NCP	%	99			70-130	Pass	
Acenaphthylene	S18-De03657	NCP	%	86			70-130	Pass	
Anthracene	S18-De03657	NCP	%	90			70-130	Pass	
Benz(a)anthracene	S18-De11458	NCP	%	100			70-130	Pass	
Benzo(a)pyrene	S18-De03657	NCP	%	122			70-130	Pass	
Benzo(b&j)fluoranthene	S18-De03657	NCP	%	77			70-130	Pass	
Benzo(g.h.i)perylene	S18-De11458	NCP	%	91			70-130	Pass	
Benzo(k)fluoranthene	S18-De11458	NCP	%	89			70-130	Pass	
Chrysene	S18-De11458	NCP	%	91			70-130	Pass	
Dibenz(a.h)anthracene	S18-De03657	NCP	%	85			70-130	Pass	
Fluoranthene	S18-De11458	NCP	%	91			70-130	Pass	
Fluorene	S18-De03657	NCP	%	102			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S18-De03657	NCP	%	73			70-130	Pass	
Naphthalene	S18-De03657	NCP	%	91			70-130	Pass	
Phenanthrene	S18-De03657	NCP	%	78			70-130	Pass	
Pyrene	S18-De11458	NCP	%	88			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S18-De13679	NCP	%	84			70-130	Pass	
Beryllium	S18-De13679	NCP	%	94			70-130	Pass	
Cadmium	S18-De13679	NCP	%	80			70-130	Pass	
Chromium	S18-De13679	NCP	%	100			70-130	Pass	
Cobalt	S18-De13679	NCP	%	99			70-130	Pass	
Copper	S18-De13679	NCP	%	109			70-130	Pass	
Lead	S18-De13679	NCP	%	126			70-130	Pass	
Manganese	S18-De13679	NCP	%	101			70-130	Pass	
Mercury	S18-De13679	NCP	%	108			70-130	Pass	
Nickel	S18-De13679	NCP	%	99			70-130	Pass	
Selenium	S18-De13679	NCP	%	74			70-130	Pass	
Zinc	S18-De13679	NCP	%	121			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S18-De06750	CP	%	97			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S18-De06750	CP	%	109			70-130	Pass	
Toluene	S18-De06750	CP	%	106			70-130	Pass	
Ethylbenzene	S18-De06750	CP	%	122			70-130	Pass	
m&p-Xylenes	S18-De06750	CP	%	118			70-130	Pass	
o-Xylene	S18-De06750	CP	%	112			70-130	Pass	
Xylenes - Total	S18-De06750	CP	%	116			70-130	Pass	
Spike - % Recovery									
Halogenated Volatile Organics				Result 1					
1.1-Dichloroethene	S18-De06750	CP	%	111			70-130	Pass	
1.1.1-Trichloroethane	S18-De06750	CP	%	108			70-130	Pass	
1.2-Dichlorobenzene	S18-De06750	CP	%	110			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
1.2-Dichloroethane	S18-De06750	CP	%	106			70-130	Pass	
Trichloroethene	S18-De06750	CP	%	102			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1260	S18-De13849	NCP	%	103			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH C6-C10	S18-De04540	NCP	%	78			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S18-De04540	NCP	%	81			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S18-De12013	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S18-De15091	NCP	mg/kg	< 50	66	36	30%	Fail	Q15
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S18-De12013	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S18-De15091	NCP	mg/kg	29	38	26	30%	Pass	
TRH C15-C28	S18-De15091	NCP	mg/kg	100	150	38	30%	Fail	Q15
TRH C29-C36	S18-De15091	NCP	mg/kg	50	69	32	30%	Fail	Q15
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S18-De12013	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S18-De12013	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S18-De12013	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S18-De12013	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S18-De12013	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S18-De12013	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
1.1-Dichloroethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1-Dichloroethene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.1-Trichloroethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.1.2-Tetrachloroethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.2-Trichloroethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.2.2-Tetrachloroethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dibromoethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichlorobenzene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichloroethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichloropropane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2.3-Trichloropropane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.3-Dichlorobenzene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.3-Dichloropropane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.4-Dichlorobenzene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromodichloromethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromoform	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromomethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Carbon Tetrachloride	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chlorobenzene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chloroform	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chloromethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
cis-1.2-Dichloroethene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
cis-1.3-Dichloropropene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibromochloromethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibromomethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Iodomethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methylene Chloride	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Tetrachloroethene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
trans-1.2-Dichloroethene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
trans-1.3-Dichloropropene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichloroethene	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichlorofluoromethane	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Vinyl chloride	S18-De12013	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S18-De03654	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1221	S18-De14373	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1232	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1242	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1248	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1254	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aroclor-1260	S18-De14373	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-De12945	NCP	mg/kg	3.4	3.9	14	30%	Pass	
Beryllium	S18-De12945	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Boron	S18-De12945	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Cadmium	S18-De07641	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-De12945	NCP	mg/kg	13	16	19	30%	Pass	
Copper	S18-De12945	NCP	mg/kg	19	21	11	30%	Pass	
Iron	S18-De12945	NCP	mg/kg	38000	41000	6.0	30%	Pass	
Lead	S18-De12945	NCP	mg/kg	42	50	17	30%	Pass	
Manganese	S18-De12945	NCP	mg/kg	110	120	6.0	30%	Pass	
Mercury	S18-De12945	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-De12945	NCP	mg/kg	6.6	6.1	9.0	30%	Pass	
Selenium	S18-De12945	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Zinc	S18-De12945	NCP	mg/kg	59	69	16	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S18-De06750	CP	%	20	20	1.0	30%	Pass	

Comments

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.
R20	This sample is a Trip Spike and therefore all results are reported as a percentage

Authorised By

Nibha Vaidya	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)
Nibha Vaidya	Senior Analyst-Asbestos (NSW)

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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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
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Emma Harrison**

Report **631640-W**
Project name LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID 2127850
Received Date Dec 05, 2018

Client Sample ID			**R1**
Sample Matrix			**Water**
Eurofins | mgt Sample No.			**S18-De06751**
Date Sampled			**Dec 04, 2018**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-36 (Total)	0.1	mg/L	< 0.1
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	%	96
Halogenated Volatile Organics			
1.1-Dichloroethane	0.001	mg/L	< 0.001
1.1-Dichloroethene	0.001	mg/L	< 0.001
1.1.1-Trichloroethane	0.001	mg/L	< 0.001
1.1.1.2-Tetrachloroethane	0.001	mg/L	< 0.001
1.1.2-Trichloroethane	0.001	mg/L	< 0.001
1.1.2.2-Tetrachloroethane	0.001	mg/L	< 0.001
1.2-Dibromoethane	0.001	mg/L	< 0.001
1.2-Dichlorobenzene	0.001	mg/L	< 0.001
1.2-Dichloroethane	0.001	mg/L	< 0.001
1.2-Dichloropropane	0.001	mg/L	< 0.001
1.2.3-Trichloropropane	0.001	mg/L	< 0.001
1.3-Dichlorobenzene	0.001	mg/L	< 0.001
1.3-Dichloropropane	0.001	mg/L	< 0.001
1.4-Dichlorobenzene	0.001	mg/L	< 0.001
Bromodichloromethane	0.001	mg/L	< 0.001
Bromoform	0.001	mg/L	< 0.001
Bromomethane	0.001	mg/L	< 0.001
Carbon Tetrachloride	0.001	mg/L	< 0.001
Chlorobenzene	0.001	mg/L	< 0.001
Chloroform	0.005	mg/L	< 0.005
Chloromethane	0.001	mg/L	< 0.001

Client Sample ID			R1
Sample Matrix			Water
Eurofins | mgt Sample No.			S18-De06751
Date Sampled			Dec 04, 2018
Test/Reference	LOR	Unit	
Halogenated Volatile Organics			
cis-1.2-Dichloroethene	0.001	mg/L	< 0.001
cis-1.3-Dichloropropene	0.001	mg/L	< 0.001
Dibromochloromethane	0.001	mg/L	< 0.001
Dibromomethane	0.001	mg/L	< 0.001
Iodomethane	0.001	mg/L	< 0.001
Methylene Chloride	0.001	mg/L	< 0.001
Tetrachloroethene	0.001	mg/L	< 0.001
trans-1.2-Dichloroethene	0.001	mg/L	< 0.001
trans-1.3-Dichloropropene	0.001	mg/L	< 0.001
Trichloroethene	0.001	mg/L	< 0.001
Trichlorofluoromethane	0.001	mg/L	< 0.001
Vinyl chloride	0.001	mg/L	< 0.001
Vic EPA IWRG 621 CHC (Total)*	0.005	mg/L	< 0.005
Vic EPA IWRG 621 Other CHC (Total)*	0.005	mg/L	< 0.005
4-Bromofluorobenzene (surr.)	1	%	96
Toluene-d8 (surr.)	1	%	101
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
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
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	78
p-Terphenyl-d14 (surr.)	1	%	88

Client Sample ID			R1
Sample Matrix			**Water**
Eurofins | mgt Sample No.			**S18-De06751**
Date Sampled			**Dec 04, 2018**
Test/Reference	LOR	Unit	
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.001	mg/L	< 0.001
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.001	mg/L	< 0.001
Dibutylchlorendate (surr.)	1	%	79
Tetrachloro-m-xylene (surr.)	1	%	65
Heavy Metals			
Arsenic	0.001	mg/L	< 0.001
Beryllium	0.001	mg/L	< 0.001
Boron	0.05	mg/L	< 0.05
Cadmium	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	< 0.001
Copper	0.001	mg/L	< 0.001
Iron	0.05	mg/L	< 0.05
Lead	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	< 0.005
Mercury	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	< 0.001
Selenium	0.001	mg/L	< 0.001
Zinc	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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	Dec 11, 2018	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Dec 06, 2018	14 Day
- Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 06, 2018	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Eurofins | mgt Suite B4			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 11, 2018	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Dec 11, 2018	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Halogenated Volatile Organics	Sydney	Dec 06, 2018	7 Day
- Method: E016 Volatile Halogenated Compounds (VHC)			
Polychlorinated Biphenyls	Sydney	Dec 11, 2018	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Sydney	Dec 11, 2018	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Sydney	Dec 11, 2018	180 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

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Site # 23736

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

Order No.:
Report #: 631640
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 5, 2018 6:27 PM
Due: Dec 12, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polychlorinated Biphenyls	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	BTEXN and Volatile TRH	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	BH2_0.1	Dec 04, 2018		Soil	S18-De06749	X		X	X		X	X	X		X
2	BH2_0.5	Dec 04, 2018		Soil	S18-De06750			X	X		X	X	X		X
3	R1	Dec 04, 2018		Water	S18-De06751			X	X		X		X		X
4	BH2_0.4	Dec 04, 2018		Soil	S18-De06752		X								
5	BH2_1.0	Dec 04, 2018		Soil	S18-De06753		X								
6	BH2_1.5	Dec 04, 2018		Soil	S18-De06754		X								
7	BH2_2.0	Dec 04, 2018		Soil	S18-De06755		X								
8	BH2_2.5	Dec 04, 2018		Soil	S18-De06756		X								
9	BH2_3.0	Dec 04, 2018		Soil	S18-De06757		X								

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Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

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Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
10	BH2_3.5	Dec 04, 2018		Soil	S18-De06758		X								
11	BH2_4.0	Dec 04, 2018		Soil	S18-De06759		X								
12	BH2_4.5	Dec 04, 2018		Soil	S18-De06760		X								
13	BH2_5.0	Dec 04, 2018		Soil	S18-De06761		X								
14	BH2_5.5	Dec 04, 2018		Soil	S18-De06762		X								
15	BH2_6.0	Dec 04, 2018		Soil	S18-De06763		X								
16	BH2_6.5	Dec 04, 2018		Soil	S18-De06764		X								
17	BH2_7.0	Dec 04, 2018		Soil	S18-De06765		X								
18	BH2_7.5	Dec 04, 2018		Soil	S18-De06766		X								
19	BH2_8.0	Dec 04, 2018		Soil	S18-De06767		X								
20	BH2_8.5	Dec 04, 2018		Soil	S18-De06768		X								
21	BH2_9.0	Dec 04, 2018		Soil	S18-De06769		X								

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Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polychlorinated Biphenyls	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Eurofins | mgt Suite B4	BTEXN and Volatile TRH	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
22	BH2_9.5	Dec 04, 2018		Soil	S18-De06770		X								
23	BH2_10.0	Dec 04, 2018		Soil	S18-De06771		X								
24	BH2_10.5	Dec 04, 2018		Soil	S18-De06772		X								
25	BH2_11.0	Dec 04, 2018		Soil	S18-De06773		X								
26	TRIP SPIKE	Dec 04, 2018		Soil	S18-De06774					X					
27	TRIP BLANK	Dec 04, 2018		Soil	S18-De06775									X	
28	BH2_12.0	Dec 04, 2018		Soil	S18-De06812		X								
29	BH2_13.5	Dec 04, 2018		Soil	S18-De06813		X								
30	BH2_15	Dec 04, 2018		Soil	S18-De06814		X								
Test Counts						1	25	3	3	1	3	2	3	1	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil 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. 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.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
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.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. 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 - 1999 NEPM Fractions							
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	
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							
Halogenated Volatile Organics							
1.1-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.1-Dichloroethene	mg/L	< 0.001			0.001	Pass	
1.1.1-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.1.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dibromoethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.2-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.2.3-Trichloropropane	mg/L	< 0.001			0.001	Pass	
1.3-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.3-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.4-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
Bromodichloromethane	mg/L	< 0.001			0.001	Pass	
Bromoform	mg/L	< 0.001			0.001	Pass	
Bromomethane	mg/L	< 0.001			0.001	Pass	
Carbon Tetrachloride	mg/L	< 0.001			0.001	Pass	
Chlorobenzene	mg/L	< 0.001			0.001	Pass	
Chloroform	mg/L	< 0.005			0.005	Pass	
Chloromethane	mg/L	< 0.001			0.001	Pass	
cis-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
cis-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Dibromochloromethane	mg/L	< 0.001			0.001	Pass	
Dibromomethane	mg/L	< 0.001			0.001	Pass	
Iodomethane	mg/L	< 0.001			0.001	Pass	
Methylene Chloride	mg/L	< 0.001			0.001	Pass	
Tetrachloroethene	mg/L	< 0.001			0.001	Pass	
trans-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
trans-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Trichloroethene	mg/L	< 0.001			0.001	Pass	
Trichlorofluoromethane	mg/L	< 0.001			0.001	Pass	
Vinyl chloride	mg/L	< 0.001			0.001	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
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							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.001			0.001	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.001			0.001	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Beryllium	mg/L	< 0.001			0.001	Pass	
Boron	mg/L	< 0.05			0.05	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Cobalt	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Manganese	mg/L	< 0.005			0.005	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Selenium	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	73			70-130	Pass	
TRH C10-C14	%	126			70-130	Pass	
LCS - % Recovery							
BTEX							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzene	%	90			70-130	Pass	
Toluene	%	89			70-130	Pass	
Ethylbenzene	%	103			70-130	Pass	
m&p-Xylenes	%	102			70-130	Pass	
o-Xylene	%	98			70-130	Pass	
Xylenes - Total	%	100			70-130	Pass	
LCS - % Recovery							
Halogenated Volatile Organics							
1.1-Dichloroethene	%	89			70-130	Pass	
1.1.1-Trichloroethane	%	93			70-130	Pass	
1.2-Dichlorobenzene	%	93			70-130	Pass	
1.2-Dichloroethane	%	98			70-130	Pass	
Trichloroethene	%	87			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	103			70-130	Pass	
TRH C6-C10	%	76			70-130	Pass	
TRH >C10-C16	%	128			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthylene	%	74			70-130	Pass	
Anthracene	%	86			70-130	Pass	
Benz(a)anthracene	%	82			70-130	Pass	
Benzo(a)pyrene	%	79			70-130	Pass	
Benzo(b&j)fluoranthene	%	81			70-130	Pass	
Benzo(g.h.i)perylene	%	88			70-130	Pass	
Benzo(k)fluoranthene	%	80			70-130	Pass	
Chrysene	%	81			70-130	Pass	
Dibenz(a.h)anthracene	%	87			70-130	Pass	
Fluoranthene	%	79			70-130	Pass	
Fluorene	%	75			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	88			70-130	Pass	
Naphthalene	%	72			70-130	Pass	
Phenanthrene	%	81			70-130	Pass	
Pyrene	%	80			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	78			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	89			70-130	Pass	
Beryllium	%	113			70-130	Pass	
Boron	%	108			70-130	Pass	
Cadmium	%	88			70-130	Pass	
Chromium	%	106			70-130	Pass	
Cobalt	%	109			70-130	Pass	
Copper	%	111			70-130	Pass	
Iron	%	102			70-130	Pass	
Lead	%	110			70-130	Pass	
Manganese	%	94			70-130	Pass	
Mercury	%	101			70-130	Pass	
Nickel	%	110			70-130	Pass	
Selenium	%	84			70-130	Pass	
Zinc	%	97			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S18-De11219	NCP	%	88			70-130	Pass	
Beryllium	S18-De11219	NCP	%	99			70-130	Pass	
Boron	S18-De11219	NCP	%	104			70-130	Pass	
Cadmium	S18-De11219	NCP	%	85			70-130	Pass	
Chromium	S18-De11219	NCP	%	106			70-130	Pass	
Cobalt	S18-De11219	NCP	%	108			70-130	Pass	
Copper	S18-De11219	NCP	%	111			70-130	Pass	
Iron	S18-De11219	NCP	%	102			70-130	Pass	
Lead	S18-De11219	NCP	%	110			70-130	Pass	
Manganese	S18-De11219	NCP	%	94			70-130	Pass	
Mercury	S18-De11219	NCP	%	124			70-130	Pass	
Nickel	S18-De11219	NCP	%	109			70-130	Pass	
Selenium	S18-De11219	NCP	%	83			70-130	Pass	
Zinc	S18-De11219	NCP	%	96			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Beryllium	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Boron	S18-De12993	NCP	mg/L	0.06	0.05	20	30%	Pass	
Cadmium	S18-De08591	NCP	mg/L	0.0007	0.0008	5.0	30%	Pass	
Chromium	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cobalt	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S18-De12993	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iron	S18-De11224	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Lead	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Manganese	S18-De11224	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Mercury	S18-De12993	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Selenium	S18-De11224	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	S18-De12993	NCP	mg/L	0.008	0.008	5.0	30%	Pass	

Comments

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

Sample Integrity

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

Qualifier Codes/Comments

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

Authorised By

Nibha Vaidya	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

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

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

eurofins | mgt

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☐ **Melbourne**
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Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mgtlabmark.com.au

CHAIN OF CUSTODY RECORD

Page 1 of 1

CLIENT DETAILS

Company Name : GHD Pty Ltd, Sydney
Office Address : Level 15, 133 Castlereagh Street, Sydney NSW 2000
Special Directions & Comments :
Eurofins | mgt DI water batch number:

Contact Name : Terry Nham
Project Manager : Emma Harrison
Email for results : terry.nham@ghd.com emma.harrison@ghd.com

Purchase Order :
PROJECT Number : 21-27850
PROJECT Name : Lindfield

COC Number :
Eurofins | mgt quote ID : GHD Rates 2018
Data output format: ESDAT

	Sample ID	Date	Matrix	TRH, BTEX, PAH, 8 Metals (B7)	Manganese	Iron	VHC	PCB	TRH C6-C10 / BTEX
1	GHD-BH1	14/12/18	Water	X	X	X	X		
2	GHD-BH1A			X	X	X	X		
3	BH5			X	X	X	X	X	
4	BH6			X	X	X	X		
5	QC01			X	X	X	X	X	
6	QC02			Please send to ALS with attached COC					
7	RB01			X	X	X	X	X	
8	Trip Blank							X	
9	Trip Spike	↓	↓					X	
10									
11									
12									
13									
14									
15									
16									

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

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

Containers:

	500P	250P	60P	1LA	40mL vial	200mL A	Jar	Bag
1	1		2		2	1		
2	1		2		2	1		
3	1		2		2	1		
4	1		2		2	1		
5	1		2		2	1		
6	1		2		2	1		
7	1		2		2	1		
8					2			
9					2			
10								
11								
12								
13								
14								
15								
16								

Sample comments:

Relinquished By: Terry Nham - GHD
Date & Time : 14/12/18
Signature:

Laboratory Staff
Received By: ESMBA
Date & Time : 14/12 1:28PM
Signature:

Turn around time
1 DAY ☐ 2 DAY ☐ 3 DAY ☐
5 DAY ☒ 10 DAY ☐ Other:

Method Of Shipment
☐ Courier
☒ Hand Delivered
☐ Postal
Courier Consignment # :

Temperature on arrival:

Report number: 633721

Jaipa Patni
14/12/18 1:28 PM

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townesville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd

OFFICE: Sydney

PROJECT: 21-27850

ORDER NUMBER:

PROJECT MANAGER: Emma Harrison — CONTACT PH: 02 9239 7910 / 0408 401 511

SAMPLER: Terry Nham — SAMPLER MOBILE: 0403 251 883

COC emailed to ALS? (YES / NO) — EDD FORMAT (or default):

Email Reports to: emma.harrison@ghd.com terry.nham@ghd.com

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

TURNAROUND REQUIREMENT ☒ Standard TAT (List due date):

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

ALS QUOTE NO.: EN/005/18

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7 8

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Terry Nham (GHD)	[illegible]		Jaipa Patel
DATE/TIME: 14/12/18	DATE/TIME: 14/12	DATE/TIME:	DATE/TIME: 14/12/18 1:28pm

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

633721

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION							
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	TRH / BTEX / PAH / 8 Metals (W-26)	Manganese	Iron	VHC	PCB	
	QC02	14/12/18	Water		6	X	X	X	X	X	
				TOTAL							

SAMPLED

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 - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight 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 Soils; B = Unpreserved Bag.

eurofins | mgt

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Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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NATA # 1261 Site # 18217

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Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**GHD Pty Ltd NSW**
Contact name:	Emma Harrison
Project name:	LINDFIELD
Project ID:	21-27850
COC number:	Not provided
Turn around time:	10 Day
Date/Time received:	Dec 14, 2018 1:28 PM
Eurofins | mgt reference:	**633721**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 1.9 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).

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8415 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Emma Harrison - emma.harrison@ghd.com.

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web : www.eurofins.com.au

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NATA # 1261 Site # 18217

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NATA # 1261 Site # 20794

Perth
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Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

Project Name: LINDFIELD
Project ID: 21-27850

Order No.:
Report #: 633721
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 14, 2018 1:28 PM
Due: Jan 2, 2019
Priority: 10 Day
Contact Name: Emma Harrison

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Iron	Iron (filtered)	Manganese	Manganese (filtered)	Polychlorinated Biphenyls	Halogenated Volatile Organics	Eurofins | mgt Suite B7	Eurofins | mgt Suite B7 (filtered metals)	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217														
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	GHD_BH1	Dec 14, 2018		Water	M18-De25082		X		X		X		X	
2	GHD_BH1A	Dec 14, 2018		Water	M18-De25083		X		X		X		X	
3	BH5	Dec 14, 2018		Water	M18-De25084		X		X	X	X		X	
4	BH6	Dec 14, 2018		Water	M18-De25085		X		X		X		X	
5	QC01	Dec 14, 2018		Water	M18-De25086		X		X	X	X		X	
6	RB01	Dec 14, 2018		Water	M18-De25087	X		X		X	X	X		
7	TRIP BLANK	Dec 14, 2018		Water	M18-De25088									X
8	TRIP SPIKE	Dec 14, 2018		Water	M18-De25089									X
Test Counts						1	5	1	5	3	6	1	5	2

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

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Emma Harrison**

Report **633721-W**
Project name LINDFIELD
Project ID 21-27850
Received Date Dec 14, 2018

Client Sample ID			**GHD_BH1**	**GHD_BH1A**	**BH5**	**BH6**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**M18-De25082**	**M18-De25083**	**M18-De25084**	**M18-De25085**
Date Sampled			**Dec 14, 2018**	**Dec 14, 2018**	**Dec 14, 2018**	**Dec 14, 2018**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
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
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
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 C10-36 (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	%	105	71	95	80
Halogenated Volatile Organics						
1.1-Dichloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.1-Dichloroethene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.1.1-Trichloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.1.1.2-Tetrachloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.1.2-Trichloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.1.2.2-Tetrachloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.2-Dibromoethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.2-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.2-Dichloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.2-Dichloropropane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.2.3-Trichloropropane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.3-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			GHD_BH1	GHD_BH1A	BH5	BH6
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**M18-De25082**	**M18-De25083**	**M18-De25084**	**M18-De25085**
Date Sampled			**Dec 14, 2018**	**Dec 14, 2018**	**Dec 14, 2018**	**Dec 14, 2018**
Test/Reference	LOR	Unit				
Halogenated Volatile Organics						
1.3-Dichloropropane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
1.4-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Bromodichloromethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Bromoform	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Bromomethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Carbon Tetrachloride	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chlorobenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chloroform	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Chloromethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
cis-1.2-Dichloroethene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
cis-1.3-Dichloropropene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibromochloromethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibromomethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Iodomethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Methylene Chloride	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Tetrachloroethene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
trans-1.2-Dichloroethene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
trans-1.3-Dichloropropene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Trichloroethene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Trichlorofluoromethane	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Vinyl chloride	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Vic EPA IWRG 621 CHC (Total)*	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Vic EPA IWRG 621 Other CHC (Total)*	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
4-Bromofluorobenzene (surr.)	1	%	105	71	95	80
Toluene-d8 (surr.)	1	%	101	72	95	81
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	54	60	76	50
p-Terphenyl-d14 (surr.)	1	%	78	52	83	92

Client Sample ID			GHD_BH1	GHD_BH1A	BH5	BH6
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			M18-De25082	M18-De25083	M18-De25084	M18-De25085
Date Sampled			Dec 14, 2018	Dec 14, 2018	Dec 14, 2018	Dec 14, 2018
Test/Reference	LOR	Unit				
Polychlorinated Biphenyls						
Aroclor-1016	0.001	mg/L	-	-	< 0.001	-
Aroclor-1221	0.001	mg/L	-	-	< 0.001	-
Aroclor-1232	0.001	mg/L	-	-	< 0.001	-
Aroclor-1242	0.001	mg/L	-	-	< 0.001	-
Aroclor-1248	0.001	mg/L	-	-	< 0.001	-
Aroclor-1254	0.001	mg/L	-	-	< 0.001	-
Aroclor-1260	0.001	mg/L	-	-	< 0.001	-
Total PCB*	0.001	mg/L	-	-	< 0.001	-
Dibutylchlorendate (surr.)	1	%	-	-	137	-
Tetrachloro-m-xylene (surr.)	1	%	-	-	104	-
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	0.003	< 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	0.002
Copper (filtered)	0.001	mg/L	< 0.001	0.057	0.002	0.022
Iron (filtered)	0.05	mg/L	44	58	3.2	1.2
Lead (filtered)	0.001	mg/L	< 0.001	0.002	< 0.001	0.002
Manganese (filtered)	0.005	mg/L	2.1	5.8	3.7	5.5
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.035	0.084	0.023	0.047
Zinc (filtered)	0.005	mg/L	0.072	0.17	0.054	0.14

Client Sample ID			QC01	RB01	TRIP BLANK	[R20]TRIP SPIKE
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			M18-De25086	M18-De25087	M18-De25088	M18-De25089
Date Sampled			Dec 14, 2018	Dec 14, 2018	Dec 14, 2018	Dec 14, 2018
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	100
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	79
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	-	-
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	-	-
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	-	-
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	-	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	77
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	-	-
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	-	-
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	-	-
TRH C10-36 (Total)	0.1	mg/L	< 0.1	< 0.1	-	-
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	88
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	96
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	110
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	100
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	110

Client Sample ID			QC01	RB01	TRIP BLANK	[R20]TRIP SPIKE
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			M18-De25086	M18-De25087	M18-De25088	M18-De25089
Date Sampled			Dec 14, 2018	Dec 14, 2018	Dec 14, 2018	Dec 14, 2018
Test/Reference	LOR	Unit				
BTEX						
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	110
4-Bromofluorobenzene (surr.)	1	%	92	72	112	122
Halogenated Volatile Organics						
1.1-Dichloroethane	0.001	mg/L	< 0.001	< 0.001	-	-
1.1-Dichloroethene	0.001	mg/L	< 0.001	< 0.001	-	-
1.1.1-Trichloroethane	0.001	mg/L	< 0.001	< 0.001	-	-
1.1.1.2-Tetrachloroethane	0.001	mg/L	< 0.001	< 0.001	-	-
1.1.2-Trichloroethane	0.001	mg/L	< 0.001	< 0.001	-	-
1.1.2.2-Tetrachloroethane	0.001	mg/L	< 0.001	< 0.001	-	-
1.2-Dibromoethane	0.001	mg/L	< 0.001	< 0.001	-	-
1.2-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	-	-
1.2-Dichloroethane	0.001	mg/L	< 0.001	< 0.001	-	-
1.2-Dichloropropane	0.001	mg/L	< 0.001	< 0.001	-	-
1.2.3-Trichloropropane	0.001	mg/L	< 0.001	< 0.001	-	-
1.3-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	-	-
1.3-Dichloropropane	0.001	mg/L	< 0.001	< 0.001	-	-
1.4-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	-	-
Bromodichloromethane	0.001	mg/L	< 0.001	< 0.001	-	-
Bromoform	0.001	mg/L	< 0.001	< 0.001	-	-
Bromomethane	0.001	mg/L	< 0.001	< 0.001	-	-
Carbon Tetrachloride	0.001	mg/L	< 0.001	< 0.001	-	-
Chlorobenzene	0.001	mg/L	< 0.001	< 0.001	-	-
Chloroform	0.005	mg/L	< 0.005	< 0.005	-	-
Chloromethane	0.001	mg/L	< 0.001	< 0.001	-	-
cis-1.2-Dichloroethene	0.001	mg/L	< 0.001	< 0.001	-	-
cis-1.3-Dichloropropene	0.001	mg/L	< 0.001	< 0.001	-	-
Dibromochloromethane	0.001	mg/L	< 0.001	< 0.001	-	-
Dibromomethane	0.001	mg/L	< 0.001	< 0.001	-	-
Iodomethane	0.001	mg/L	< 0.001	< 0.001	-	-
Methylene Chloride	0.001	mg/L	< 0.001	< 0.001	-	-
Tetrachloroethene	0.001	mg/L	< 0.001	< 0.001	-	-
trans-1.2-Dichloroethene	0.001	mg/L	< 0.001	< 0.001	-	-
trans-1.3-Dichloropropene	0.001	mg/L	< 0.001	< 0.001	-	-
Trichloroethene	0.001	mg/L	< 0.001	< 0.001	-	-
Trichlorofluoromethane	0.001	mg/L	< 0.001	< 0.001	-	-
Vinyl chloride	0.001	mg/L	< 0.001	< 0.001	-	-
Vic EPA IWRG 621 CHC (Total)*	0.005	mg/L	< 0.005	< 0.005	-	-
Vic EPA IWRG 621 Other CHC (Total)*	0.005	mg/L	< 0.005	< 0.005	-	-
4-Bromofluorobenzene (surr.)	1	%	92	72	-	-
Toluene-d8 (surr.)	1	%	94	70	-	-
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	-	-
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	-	-
Anthracene	0.001	mg/L	< 0.001	< 0.001	-	-
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	-	-

Client Sample ID			QC01	RB01	TRIP BLANK	[R20]TRIP SPIKE
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			M18-De25086	M18-De25087	M18-De25088	M18-De25089
Date Sampled			Dec 14, 2018	Dec 14, 2018	Dec 14, 2018	Dec 14, 2018
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Chrysene	0.001	mg/L	< 0.001	< 0.001	-	-
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	-	-
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	-	-
Fluorene	0.001	mg/L	< 0.001	< 0.001	-	-
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	-	-
Naphthalene	0.001	mg/L	< 0.001	< 0.001	-	-
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	-	-
Pyrene	0.001	mg/L	< 0.001	< 0.001	-	-
Total PAH*	0.001	mg/L	< 0.001	< 0.001	-	-
2-Fluorobiphenyl (surr.)	1	%	104	122	-	-
p-Terphenyl-d14 (surr.)	1	%	112	137	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1221	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1232	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1242	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1248	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1254	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1260	0.001	mg/L	< 0.001	< 0.001	-	-
Total PCB*	0.001	mg/L	< 0.001	< 0.001	-	-
Dibutylchlorendate (surr.)	1	%	96	121	-	-
Tetrachloro-m-xylene (surr.)	1	%	105	124	-	-
Heavy Metals						
Arsenic	0.001	mg/L	-	< 0.001	-	-
Arsenic (filtered)	0.001	mg/L	< 0.001	-	-	-
Cadmium	0.0002	mg/L	-	< 0.0002	-	-
Cadmium (filtered)	0.0002	mg/L	< 0.0002	-	-	-
Chromium	0.001	mg/L	-	< 0.001	-	-
Chromium (filtered)	0.001	mg/L	< 0.001	-	-	-
Copper	0.001	mg/L	-	< 0.001	-	-
Copper (filtered)	0.001	mg/L	0.003	-	-	-
Iron	0.05	mg/L	-	< 0.05	-	-
Iron (filtered)	0.05	mg/L	3.1	-	-	-
Lead	0.001	mg/L	-	< 0.001	-	-
Lead (filtered)	0.001	mg/L	< 0.001	-	-	-
Manganese	0.005	mg/L	-	< 0.005	-	-
Manganese (filtered)	0.005	mg/L	3.7	-	-	-
Mercury	0.0001	mg/L	-	< 0.0001	-	-
Mercury (filtered)	0.0001	mg/L	< 0.0001	-	-	-
Nickel	0.001	mg/L	-	< 0.001	-	-
Nickel (filtered)	0.001	mg/L	0.023	-	-	-
Zinc	0.005	mg/L	-	< 0.005	-	-
Zinc (filtered)	0.005	mg/L	0.055	-	-	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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 - 2013 NEPM Fractions	Melbourne	Dec 20, 2018	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Melbourne	Dec 20, 2018	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Dec 20, 2018	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Dec 20, 2018	14 Day
- Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices			
Eurofins | mgt Suite B7 (filtered metals)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 20, 2018	7 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Dec 20, 2018	7 Day
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Metals M8 filtered	Melbourne	Dec 20, 2018	28 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Halogenated Volatile Organics	Melbourne	Dec 20, 2018	7 Day
- Method: USEPA 8260 MGT 350A Halogenated Volatile Organics			
Polychlorinated Biphenyls	Melbourne	Dec 20, 2018	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Heavy Metals	Melbourne	Dec 20, 2018	180 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Dec 20, 2018	180 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins | mgt Suite B7			
Metals M8	Melbourne	Dec 20, 2018	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

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Project Name: LINDFIELD
Project ID: 21-27850

Order No.:
Report #: 633721
Phone: 02 9239 7100
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Received: Dec 14, 2018 1:28 PM
Due: Jan 2, 2019
Priority: 10 Day
Contact Name: Emma Harrison

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Iron	Iron (filtered)	Manganese	Manganese (filtered)	Polychlorinated Biphenyls	Halogenated Volatile Organics	Eurofins | mgt Suite B7	Eurofins | mgt Suite B7 (filtered metals)	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217														
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	GHD_BH1	Dec 14, 2018		Water	M18-De25082		X		X		X		X	
2	GHD_BH1A	Dec 14, 2018		Water	M18-De25083		X		X		X		X	
3	BH5	Dec 14, 2018		Water	M18-De25084		X		X	X	X		X	
4	BH6	Dec 14, 2018		Water	M18-De25085		X		X		X		X	
5	QC01	Dec 14, 2018		Water	M18-De25086		X		X	X	X		X	
6	RB01	Dec 14, 2018		Water	M18-De25087	X		X		X	X	X		
7	TRIP BLANK	Dec 14, 2018		Water	M18-De25088									X
8	TRIP SPIKE	Dec 14, 2018		Water	M18-De25089									X
Test Counts						1	5	1	5	3	6	1	5	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil 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. 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.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
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.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
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							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
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	
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							
Halogenated Volatile Organics							
1.1-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.1-Dichloroethene	mg/L	< 0.001			0.001	Pass	
1.1.1-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.1.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dibromoethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.2-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.2.3-Trichloropropane	mg/L	< 0.001			0.001	Pass	
1.3-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.3-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.4-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
Bromodichloromethane	mg/L	< 0.001			0.001	Pass	
Bromoform	mg/L	< 0.001			0.001	Pass	
Bromomethane	mg/L	< 0.001			0.001	Pass	
Carbon Tetrachloride	mg/L	< 0.001			0.001	Pass	
Chlorobenzene	mg/L	< 0.001			0.001	Pass	
Chloroform	mg/L	< 0.005			0.005	Pass	
Chloromethane	mg/L	< 0.001			0.001	Pass	
cis-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
cis-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Dibromochloromethane	mg/L	< 0.001			0.001	Pass	
Dibromomethane	mg/L	< 0.001			0.001	Pass	
Iodomethane	mg/L	< 0.001			0.001	Pass	
Methylene Chloride	mg/L	< 0.001			0.001	Pass	
Tetrachloroethene	mg/L	< 0.001			0.001	Pass	
trans-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
trans-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Trichloroethene	mg/L	< 0.001			0.001	Pass	
Trichlorofluoromethane	mg/L	< 0.001			0.001	Pass	
Vinyl chloride	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.001			0.001	Pass	
Aroclor-1221	mg/L	< 0.001			0.001	Pass	
Aroclor-1232	mg/L	< 0.001			0.001	Pass	
Aroclor-1242	mg/L	< 0.001			0.001	Pass	
Aroclor-1248	mg/L	< 0.001			0.001	Pass	
Aroclor-1254	mg/L	< 0.001			0.001	Pass	
Aroclor-1260	mg/L	< 0.001			0.001	Pass	
Total PCB*	mg/L	< 0.001			0.001	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	
Iron	mg/L	< 0.05			0.05	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Manganese	mg/L	< 0.005			0.005	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	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	111			70-130	Pass	
TRH C6-C10	%	118			70-130	Pass	
TRH >C10-C16	%	113			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	112			70-130	Pass	
TRH C10-C14	%	108			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	108			70-130	Pass	
Toluene	%	119			70-130	Pass	
Ethylbenzene	%	103			70-130	Pass	
m&p-Xylenes	%	106			70-130	Pass	
Xylenes - Total	%	106			70-130	Pass	
LCS - % Recovery							
Halogenated Volatile Organics							
1.1-Dichloroethene	%	76			70-130	Pass	
1.1.1-Trichloroethane	%	108			70-130	Pass	
1.2-Dichlorobenzene	%	109			70-130	Pass	
1.2-Dichloroethane	%	115			70-130	Pass	
Trichloroethene	%	108			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	123			70-130	Pass	
Acenaphthylene	%	120			70-130	Pass	
Anthracene	%	127			70-130	Pass	
Benz(a)anthracene	%	91			70-130	Pass	
Benzo(a)pyrene	%	83			70-130	Pass	
Benzo(b&j)fluoranthene	%	74			70-130	Pass	
Benzo(g.h.i)perylene	%	84			70-130	Pass	
Benzo(k)fluoranthene	%	81			70-130	Pass	
Chrysene	%	114			70-130	Pass	
Dibenz(a.h)anthracene	%	80			70-130	Pass	
Fluoranthene	%	111			70-130	Pass	
Fluorene	%	125			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	71			70-130	Pass	
Naphthalene	%	114			70-130	Pass	
Phenanthrene	%	129			70-130	Pass	
Pyrene	%	114			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	88			80-120	Pass	
Arsenic (filtered)	%	96			80-120	Pass	
Cadmium	%	87			80-120	Pass	
Cadmium (filtered)	%	87			80-120	Pass	
Chromium	%	87			80-120	Pass	
Chromium (filtered)	%	92			80-120	Pass	
Copper	%	95			80-120	Pass	
Copper (filtered)	%	98			80-120	Pass	
Iron	%	94			80-120	Pass	
Iron (filtered)	%	105			80-120	Pass	
Lead	%	87			80-120	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead (filtered)	%	90			80-120	Pass	
Manganese	%	96			80-120	Pass	
Manganese (filtered)	%	103			80-120	Pass	
Mercury	%	87			75-125	Pass	
Mercury (filtered)	%	90			70-130	Pass	
Nickel	%	88			80-120	Pass	
Nickel (filtered)	%	97			80-120	Pass	
Zinc	%	90			80-120	Pass	
Zinc (filtered)	%	98			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	M18-De27784	NCP	%	113			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	M18-De27784	NCP	%	112			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M18-De25082	CP	%	71			70-130	Pass	
Acenaphthylene	M18-De25082	CP	%	71			70-130	Pass	
Anthracene	M18-De25082	CP	%	73			70-130	Pass	
Benz(a)anthracene	M18-De25082	CP	%	75			70-130	Pass	
Benzo(a)pyrene	M18-De25082	CP	%	75			70-130	Pass	
Benzo(b&j)fluoranthene	M18-De25082	CP	%	72			70-130	Pass	
Benzo(g.h.i)perylene	M18-De25082	CP	%	72			70-130	Pass	
Benzo(k)fluoranthene	M18-De25082	CP	%	85			70-130	Pass	
Chrysene	M18-De25082	CP	%	84			70-130	Pass	
Dibenz(a.h)anthracene	M18-De25082	CP	%	73			70-130	Pass	
Fluoranthene	M18-De25082	CP	%	99			70-130	Pass	
Fluorene	M18-De25082	CP	%	74			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M18-De25082	CP	%	70			70-130	Pass	
Naphthalene	M18-De25082	CP	%	70			70-130	Pass	
Phenanthrene	M18-De25082	CP	%	86			70-130	Pass	
Pyrene	M18-De25082	CP	%	101			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	M18-De22228	NCP	%	90			70-130	Pass	
Cadmium (filtered)	M18-De22228	NCP	%	94			70-130	Pass	
Chromium (filtered)	M18-De22228	NCP	%	93			70-130	Pass	
Copper (filtered)	M18-De22228	NCP	%	92			70-130	Pass	
Iron (filtered)	M18-De22228	NCP	%	92			70-130	Pass	
Lead (filtered)	M18-De22228	NCP	%	93			70-130	Pass	
Manganese (filtered)	M18-De22228	NCP	%	92			70-130	Pass	
Mercury (filtered)	M18-De22228	NCP	%	92			70-130	Pass	
Nickel (filtered)	M18-De22228	NCP	%	91			70-130	Pass	
Zinc (filtered)	M18-De22228	NCP	%	93			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M18-De22228	NCP	%	105			75-125	Pass	
Cadmium	M18-De22228	NCP	%	107			75-125	Pass	
Chromium	M18-De22228	NCP	%	108			75-125	Pass	
Copper	M18-De27250	NCP	%	106			75-125	Pass	
Iron	M18-De22228	NCP	%	108			75-125	Pass	
Lead	M18-De22228	NCP	%	107			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Manganese	M18-De22228	NCP	%	106			75-125	Pass	
Mercury	M18-De22228	NCP	%	105			70-130	Pass	
Nickel	M18-De22228	NCP	%	106			75-125	Pass	
Zinc	M18-De22228	NCP	%	106			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M18-De26515	NCP	%	98			70-130	Pass	
TRH C6-C10	M18-De26515	NCP	%	125			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M18-De26515	NCP	%	126			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M18-De26515	NCP	%	99			70-130	Pass	
Toluene	M18-De26515	NCP	%	100			70-130	Pass	
Ethylbenzene	M18-De26515	NCP	%	109			70-130	Pass	
m&p-Xylenes	M18-De26515	NCP	%	112			70-130	Pass	
o-Xylene	M18-De26515	NCP	%	109			70-130	Pass	
Xylenes - Total	M18-De26515	NCP	%	111			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	M18-De23687	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M18-De23687	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M18-De23687	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	M18-De23687	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M18-De23687	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M18-De23687	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	B18-De19804	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	M18-De22228	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	M18-De22228	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	M18-De22228	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	M18-De23728	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Iron (filtered)	M18-De22228	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Lead (filtered)	M18-De22228	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Manganese (filtered)	M18-De22228	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Mercury (filtered)	M18-De22228	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	M18-De22228	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc (filtered)	M18-De22228	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M18-De22228	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	M18-De22228	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	M18-De22228	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	M18-De22228	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iron	M18-De22228	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Lead	M18-De22228	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Manganese	M18-De22228	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Mercury	M18-De22228	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	M18-De22228	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	M18-De22228	NCP	mg/L	0.006	0.008	16	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M18-De26515	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	M18-De26515	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M18-De26515	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M18-De26515	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M18-De26515	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M18-De26515	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M18-De26515	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M18-De26515	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	M18-De26515	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	

Comments

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
R20	This sample is a Trip Spike and therefore all results are reported as a percentage

Authorised By

Nibha Vaidya	Analytical Services Manager
Chris Bennett	Senior Analyst-Metal (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)

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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Enviro Sample NSW

To: Nibha Vaidya; COC NSW
Subject: RE: Updated Analysis - FW: 2127850 - Lindfield Groundwater Hub samples

From: Emma.Harrison@ghd.com [mailto:Emma.Harrison@ghd.com]
Sent: Friday, 7 December 2018 10:05 AM
To: Nibha Vaidya
Cc: Joanna Curry
Subject: RE: 2127850 - Lindfield Groundwater Hub samples

EXTERNAL EMAIL*

Hi Nibha,

Please also include asbestos identification in the WC1 sample analysis.

Thanks,
Emma

From: Emma Harrison
Sent: Friday, 7 December 2018 10:02 AM
To: 'Nibha Vaidya' <NibhaVaidya@eurofins.com>
Cc: Jo Curry <Joanna.Curry@ghd.com>
Subject: 2127850 - Lindfield Groundwater Hub samples

#632814

Hi Nibha,

We dropped off some samples to your lab last night (I have attached the 3 COC forms for your reference).

Would you please analyse WC1 for the following:

TRH, BTEXN, PAH, NEPM Metals, halogenated volatile organics, and iron

Please keep the other samples on hold.

Also, would you please add Joanna Curry to the COC emails and results?

Many thanks
Emma

Emma Harrison
Senior Environmental Geologist

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Proudly employee owned
T: +61 2 9239 7910 | V: 217910 | M: +61 408 401 511 | E: emma.harrison@ghd.com
Level 15 133 Castlereagh Street Sydney NSW 2000 Australia | www.ghd.com

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CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

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☐ Brisbane Laboratory — Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172 — 07 3902 4600 — EnviroSampleQLD@eurofins.com

☐ Perth Laboratory — Unit 2, 91 Leach Highway, Kewdale WA 6105 — 08 9251 9600 — EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory — 2 Kingston Town Close, Oakleigh, VIC 3166 — 03 8564 5000 — EnviroSampleVic@eurofins.com

Company	GHD Pty Ltd	Project №	2127850
Address	Level 15, 133 Castlereagh St Sydney, 2000	Project Name	Lindfield Village Hub - groundwater well installation
Contact Name	Emma Harrison	Project Manager	Emma Harrison
Phone №	0408 401 511	Report Format	ESDat
Special Direction		Relinquished by	Emma Harrison
Purchase Order			___:___ 6/12/18
Quote ID №	181121GHDN	Email for Results	emma.harrison@ghd.com

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

№	Client Sample ID	Date	Matrix	Suite B4 : TRH, BTEXN, PAH	Suite M13A - NEPM Metals (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Halogenated Volatile Organics	Asbestos identification in soil (AS 4964)	Polychlorinated Biphenyls (PCB)	Iron (Fe)	Containers: 1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass	Jar	Other ( )	Sample Comments / DG Hazard Warning
1	BH1A_0.2																	
2	BH1A_0.4																	
3	BH1A_0.5																	
4	BH1A_1.5																	
5	BH1A_2.0																	
6	BH1A_2.5																	
7	BH1A_3.0																	
8	BH1A_3.5																	
9	BH1A_4.0																	
10	BH1A_4.5																	
	Total Counts																	

Turn Around Requirements

- ☐ Overnight (9am)*
- ☐ 1 Day* ☐ 2 Day*
- ☐ 3 Day* ☑ 5 Day
- ☐ Other ( ) * Surcharges apply

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal

	Name	Signature	Date	Time	
Received By	R.T.M.R.A		6/12	1.59PM	Temperature
Received By			___/___/___	___:___	Report № 632314

Laboratory Use Only — SYD | BNE | MEL | PER | ADL | NEW | DAR

QS3009_R5 Modified by: S. Kojima Approved by: Dr. R Symons Approved on: 2 November 2016

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | Inc. Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | Inc. Standard Terms and Conditions is available on request.

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☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	GHD Pty Ltd	Project №	2127850
Address	Level 15, 133 Castlereagh St Sydney, 2000	Project Name	Lindfield Village Hub - groundwater well installation
Contact Name	Emma Harrison	Project Manager	Emma Harrison
Phone №	0408 401 511	Report Format	ESDat
Special Direction		Relinquished by	Emma Harrison 6/12/18
Purchase Order		Email for Results	emma.harrison@ghd.com
Quote ID №	181121GHDN		

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

№	Client Sample ID	Date	Matrix	Suite B4 : TRH, BTEXN, PAH	Suite M13A - NEPM Metals (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Halogenated Volatile Organics	Asbestos identification in soil (AS 4964)	Polychlorinated Biphenyls (PCB)	Iron (Fe)
1	BH1A_5.0								
2	BH1A_5.5								
3	BH1A_6.0								
4	BH1A_6.5								
5	BH1A_7.0								
6	BH1A_7.5								
7	BH1A_8.0								
8	BH1A_8.5								
9	BH1A_9.0								
10	BH1A_9.5								
	Total Counts								

Containers: 1L Plastic | 250mL Plastic | 125mL Plastic | 200mL Amber Glass | 40mL vial | 125mL Amber Glass | Jar | Other ( )

Turn Around Requirements
- ☐ Overnight (9am)*
- ☐ 1 Day* ☐ 2 Day*
- ☐ 3 Day* ☑ 5 Day
- ☐ Other ( )

* Surcharges apply

Sample Comments / DG Hazard Warning

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal — Name — Signature — Date — Time

Laboratory Use Only

Received By	RTIMBA	SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date 6/12	Time 1:59PM	Temperature
Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date __/__/__	Time __:__	Report № 632314

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☐ Melbourne Laboratory — 2 Kingston Town Close, Oakleigh, VIC 3166 — 03 8564 5000 — EnviroSampleVic@eurofins.com

Company	GHD Pty Ltd	Project №	2127850	Project Manager	Emma Harrison
Address	Level 15, 133 Castlereagh St Sydney, 2000	Project Name	Lindfield Village Hub - groundwater well installation	Report Format	ESDat
Contact Name	Emma Harrison				
Phone №	0408 401 511				
Special Direction					
Purchase Order					
Quote ID №	181121GHDN				

Relinquished by: Emma Harrison — __:__ — 6/12/18

Email for Results: emma.harrison@ghd.com

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

№	Client Sample ID	Date	Matrix	Suite B4 : TRH, BTEXN, PAH	Suite M13A - NEPM Metals (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Halogenated Volatile Organics	Asbestos identification in soil (AS 4964)	Polychlorinated Biphenyls (PCB)	Iron (Fe)	Containers: 1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass Jar	Other ( )	Sample Comments / DG Hazard Warning
1	BH1A – 10.0																
2	BH1A – 10.5																
3	BH1A – 11.0																
4	WC1																
5																	
6																	
7																	
8																	
9																	
10																	
	Total Counts																

Turn Around Requirements

☐ Overnight (9am)*

☐ 1 Day* ☐ 2 Day*

☐ 3 Day* ☑ 5 Day

☐ Other ( ) * Surcharges apply

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal — Name — Signature — Date __/__/__ — Time __:__

Laboratory Use Only

Received By	R Timor	SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	6/12	Time	1.59pm
Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Signature		Date	__/__/__	Time	__:__

Temperature: — Report №: 03234

QS3009_R6 Modified by: S. Koirna Approved by: Dr. R Symons Approved on: 2 November 2016

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NATA # 1261 Site # 23736

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**GHD Pty Ltd NSW**
Contact name:	Emma Harrison
Project name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID:	2127850
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Dec 7, 2018 10:02 AM
Eurofins | mgt reference:	**632314**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : .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.

☒ Split sample sent to requested external lab.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Notes

Extra sample not on C.O.C received as BH1A_1.0 (jar & bag), placed on hold.

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8415 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Emma Harrison - emma.harrison@ghd.com.

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NATA # 1261 Site # 20794

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Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

Order No.:
Report #: 632314
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 7, 2018 10:02 AM
Due: Dec 14, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polycyclic Aromatic Hydrocarbons	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Total Recoverable Hydrocarbons	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271														
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	WC1	Dec 06, 2018		Soil	S18-De12968	X		X	X	X	X	X	X	X
2	BH1A_0.2	Dec 06, 2018		Soil	S18-De12969		X							
3	BH1A_0.4	Dec 06, 2018		Soil	S18-De12970		X							
4	BH1A_0.5	Dec 06, 2018		Soil	S18-De12971		X							
5	BH1A_1.5	Dec 06, 2018		Soil	S18-De12972		X							
6	BH1A_2.0	Dec 06, 2018		Soil	S18-De12973		X							
7	BH1A_2.5	Dec 06, 2018		Soil	S18-De12974		X							
8	BH1A_3.0	Dec 06, 2018		Soil	S18-De12975		X							
9	BH1A_3.5	Dec 06, 2018		Soil	S18-De12976		X							

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NATA # 1261 Site # 20794

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Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

Order No.:
Report #: 632314
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 7, 2018 10:02 AM
Due: Dec 14, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polycyclic Aromatic Hydrocarbons	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Total Recoverable Hydrocarbons	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271														
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
10	BH1A_4.0	Dec 06, 2018		Soil	S18-De12977		X							
11	BH1A_4.5	Dec 06, 2018		Soil	S18-De12978		X							
12	BH1A_5.0	Dec 06, 2018		Soil	S18-De12979		X							
13	BH1A_5.5	Dec 06, 2018		Soil	S18-De12980		X							
14	BH1A_6.0	Dec 06, 2018		Soil	S18-De12981		X							
15	BH1A_6.5	Dec 06, 2018		Soil	S18-De12982		X							
16	BH1A_7.0	Dec 06, 2018		Soil	S18-De12983		X							
17	BH1A_7.5	Dec 06, 2018		Soil	S18-De12984		X							
18	BH1A_8.0	Dec 06, 2018		Soil	S18-De12985		X							
19	BH1A_8.5	Dec 06, 2018		Soil	S18-De12986		X							
20	BH1A_9.0	Dec 06, 2018		Soil	S18-De12987		X							
21	BH1A_9.5	Dec 06, 2018		Soil	S18-De12988		X							

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NATA # 1261 Site # 20794

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Company Name:	GHD Pty Ltd NSW	**Order No.:**		**Received:**	Dec 7, 2018 10:02 AM
Address:	Level 15, 133 Castlereagh Street Sydney NSW 2000	**Report #:** **Phone:** **Fax:**	632314 02 9239 7100 02 9239 7199	**Due:** **Priority:** **Contact Name:**	Dec 14, 2018 5 Day Emma Harrison
Project Name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION				
Project ID:	2127850				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polycyclic Aromatic Hydrocarbons	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Total Recoverable Hydrocarbons	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271														
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
22	BH1A_10.0	Dec 06, 2018		Soil	S18-De12989		X							
23	BH1A_10.5	Dec 06, 2018		Soil	S18-De12990		X							
24	BH1A_11.0	Dec 06, 2018		Soil	S18-De12991		X							
25	BH1A_1.0	Dec 06, 2018		Soil	S18-De12992		X							
Test Counts						1	24	1	1	1	1	1	1	1

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

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Emma Harrison**

Report **632314-S**
Project name LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID 2127850
Received Date Dec 07, 2018

Client Sample ID			**WC1**
Sample Matrix			**Soil**
Eurofins | mgt Sample No.			**S18-De12968**
Date Sampled			**Dec 06, 2018**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	20	mg/kg	< 20
TRH C10-C14	20	mg/kg	< 20
TRH C15-C28	50	mg/kg	< 50
TRH C29-C36	50	mg/kg	< 50
TRH C10-36 (Total)	50	mg/kg	< 50
BTEX			
Benzene	0.1	mg/kg	< 0.1
Toluene	0.1	mg/kg	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2
o-Xylene	0.1	mg/kg	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3
4-Bromofluorobenzene (surr.)	1	%	110
Halogenated Volatile Organics			
1.1-Dichloroethane	0.5	mg/kg	< 0.5
1.1-Dichloroethene	0.5	mg/kg	< 0.5
1.1.1-Trichloroethane	0.5	mg/kg	< 0.5
1.1.1.2-Tetrachloroethane	0.5	mg/kg	< 0.5
1.1.2-Trichloroethane	0.5	mg/kg	< 0.5
1.1.2.2-Tetrachloroethane	0.5	mg/kg	< 0.5
1.2-Dibromoethane	0.5	mg/kg	< 0.5
1.2-Dichlorobenzene	0.5	mg/kg	< 0.5
1.2-Dichloroethane	0.5	mg/kg	< 0.5
1.2-Dichloropropane	0.5	mg/kg	< 0.5
1.2.3-Trichloropropane	0.5	mg/kg	< 0.5
1.3-Dichlorobenzene	0.5	mg/kg	< 0.5
1.3-Dichloropropane	0.5	mg/kg	< 0.5
1.4-Dichlorobenzene	0.5	mg/kg	< 0.5
Bromodichloromethane	0.5	mg/kg	< 0.5
Bromoform	0.5	mg/kg	< 0.5
Bromomethane	0.5	mg/kg	< 0.5
Carbon Tetrachloride	0.5	mg/kg	< 0.5
Chlorobenzene	0.5	mg/kg	< 0.5
Chloroform	0.5	mg/kg	< 0.5
Chloromethane	0.5	mg/kg	< 0.5

Client Sample ID			WC1
Sample Matrix			Soil
Eurofins | mgt Sample No.			S18-De12968
Date Sampled			Dec 06, 2018
Test/Reference	LOR	Unit	
Halogenated Volatile Organics			
cis-1.2-Dichloroethene	0.5	mg/kg	< 0.5
cis-1.3-Dichloropropene	0.5	mg/kg	< 0.5
Dibromochloromethane	0.5	mg/kg	< 0.5
Dibromomethane	0.5	mg/kg	< 0.5
Iodomethane	0.5	mg/kg	< 0.5
Methylene Chloride	0.5	mg/kg	< 0.5
Tetrachloroethene	0.5	mg/kg	< 0.5
trans-1.2-Dichloroethene	0.5	mg/kg	< 0.5
trans-1.3-Dichloropropene	0.5	mg/kg	< 0.5
Trichloroethene	0.5	mg/kg	< 0.5
Trichlorofluoromethane	0.5	mg/kg	< 0.5
Vinyl chloride	0.5	mg/kg	< 0.5
Vic EPA IWRG 621 CHC (Total)*	0.5	mg/kg	< 0.5
Vic EPA IWRG 621 Other CHC (Total)*	0.5	mg/kg	< 0.5
4-Bromofluorobenzene (surr.)	1	%	110
Toluene-d8 (surr.)	1	%	106
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.5	mg/kg	< 0.5
TRH C6-C10	20	mg/kg	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20
TRH >C10-C16	50	mg/kg	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50
TRH >C16-C34	100	mg/kg	< 100
TRH >C34-C40	100	mg/kg	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5
Fluorene	0.5	mg/kg	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5
Naphthalene	0.5	mg/kg	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH*	0.5	mg/kg	< 0.5
2-Fluorobiphenyl (surr.)	1	%	91
p-Terphenyl-d14 (surr.)	1	%	94

Client Sample ID			WC1
Sample Matrix			**Soil**
Eurofins | mgt Sample No.			**S18-De12968**
Date Sampled			**Dec 06, 2018**
Test/Reference	LOR	Unit	
Heavy Metals			
Arsenic	2	mg/kg	10
Beryllium	2	mg/kg	< 2
Boron	10	mg/kg	< 10
Cadmium	0.4	mg/kg	< 0.4
Chromium	5	mg/kg	28
Cobalt	5	mg/kg	18
Copper	5	mg/kg	67
Iron	20	mg/kg	18000
Lead	5	mg/kg	40
Manganese	5	mg/kg	690
Mercury	0.1	mg/kg	< 0.1
Nickel	5	mg/kg	43
Selenium	2	mg/kg	2.9
Zinc	5	mg/kg	110
% Moisture	1	%	16

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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	Dec 12, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 12, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 12, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Dec 12, 2018	14 Day
- Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices			
Halogenated Volatile Organics	Sydney	Dec 12, 2018	7 Day
- Method: E016 Volatile Halogenated Compounds (VHC)			
Polycyclic Aromatic Hydrocarbons	Sydney	Dec 12, 2018	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Sydney	Dec 12, 2018	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Sydney	Dec 12, 2018	180 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Dec 11, 2018	14 Day
- Method: LTM-GEN-7080 Moisture			

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NATA # 1261
Site # 23736

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

Order No.:
Report #: 632314
Phone: 02 9239 7100
Fax: 02 9239 7199

Received: Dec 7, 2018 10:02 AM
Due: Dec 14, 2018
Priority: 5 Day
Contact Name: Emma Harrison

Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polycyclic Aromatic Hydrocarbons	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Total Recoverable Hydrocarbons	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271														
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	WC1	Dec 06, 2018		Soil	S18-De12968	X		X	X	X	X	X	X	X
2	BH1A_0.2	Dec 06, 2018		Soil	S18-De12969		X							
3	BH1A_0.4	Dec 06, 2018		Soil	S18-De12970		X							
4	BH1A_0.5	Dec 06, 2018		Soil	S18-De12971		X							
5	BH1A_1.5	Dec 06, 2018		Soil	S18-De12972		X							
6	BH1A_2.0	Dec 06, 2018		Soil	S18-De12973		X							
7	BH1A_2.5	Dec 06, 2018		Soil	S18-De12974		X							
8	BH1A_3.0	Dec 06, 2018		Soil	S18-De12975		X							
9	BH1A_3.5	Dec 06, 2018		Soil	S18-De12976		X							

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Received: Dec 7, 2018 10:02 AM
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Project Name: LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polycyclic Aromatic Hydrocarbons	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Total Recoverable Hydrocarbons	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271														
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
10	BH1A_4.0	Dec 06, 2018		Soil	S18-De12977		X							
11	BH1A_4.5	Dec 06, 2018		Soil	S18-De12978		X							
12	BH1A_5.0	Dec 06, 2018		Soil	S18-De12979		X							
13	BH1A_5.5	Dec 06, 2018		Soil	S18-De12980		X							
14	BH1A_6.0	Dec 06, 2018		Soil	S18-De12981		X							
15	BH1A_6.5	Dec 06, 2018		Soil	S18-De12982		X							
16	BH1A_7.0	Dec 06, 2018		Soil	S18-De12983		X							
17	BH1A_7.5	Dec 06, 2018		Soil	S18-De12984		X							
18	BH1A_8.0	Dec 06, 2018		Soil	S18-De12985		X							
19	BH1A_8.5	Dec 06, 2018		Soil	S18-De12986		X							
20	BH1A_9.0	Dec 06, 2018		Soil	S18-De12987		X							
21	BH1A_9.5	Dec 06, 2018		Soil	S18-De12988		X							

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Company Name:	GHD Pty Ltd NSW	**Order No.:**		**Received:**	Dec 7, 2018 10:02 AM
Address:	Level 15, 133 Castlereagh Street Sydney NSW 2000	**Report #:** **Phone:** **Fax:**	632314 02 9239 7100 02 9239 7199	**Due:** **Priority:** **Contact Name:**	Dec 14, 2018 5 Day Emma Harrison
Project Name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION				
Project ID:	2127850				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polycyclic Aromatic Hydrocarbons	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Total Recoverable Hydrocarbons	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271														
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
22	BH1A_10.0	Dec 06, 2018		Soil	S18-De12989		X							
23	BH1A_10.5	Dec 06, 2018		Soil	S18-De12990		X							
24	BH1A_11.0	Dec 06, 2018		Soil	S18-De12991		X							
25	BH1A_1.0	Dec 06, 2018		Soil	S18-De12992		X							
Test Counts						1	24	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil 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. 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.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
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.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. 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 - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Halogenated Volatile Organics							
1.1-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
1.1.1-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.1.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dibromoethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.2.3-Trichloropropane	mg/kg	< 0.5			0.5	Pass	
1.3-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.3-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.4-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
Bromodichloromethane	mg/kg	< 0.5			0.5	Pass	
Bromoform	mg/kg	< 0.5			0.5	Pass	
Bromomethane	mg/kg	< 0.5			0.5	Pass	
Carbon Tetrachloride	mg/kg	< 0.5			0.5	Pass	
Chlorobenzene	mg/kg	< 0.5			0.5	Pass	
Chloroform	mg/kg	< 0.5			0.5	Pass	
Chloromethane	mg/kg	< 0.5			0.5	Pass	
cis-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
cis-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Dibromochloromethane	mg/kg	< 0.5			0.5	Pass	
Dibromomethane	mg/kg	< 0.5			0.5	Pass	
Iodomethane	mg/kg	< 0.5			0.5	Pass	
Methylene Chloride	mg/kg	< 0.5			0.5	Pass	
Tetrachloroethene	mg/kg	< 0.5			0.5	Pass	
trans-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
trans-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Trichloroethene	mg/kg	< 0.5			0.5	Pass	
Trichlorofluoromethane	mg/kg	< 0.5			0.5	Pass	
Vinyl chloride	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Beryllium	mg/kg	< 2			2	Pass	
Boron	mg/kg	< 10			10	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Cobalt	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Iron	mg/kg	< 20			20	Pass	
Lead	mg/kg	< 5			5	Pass	
Manganese	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Selenium	mg/kg	< 2			2	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	116			70-130	Pass	
TRH C10-C14	%	85			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	99			70-130	Pass	
Toluene	%	96			70-130	Pass	
Ethylbenzene	%	112			70-130	Pass	
m&p-Xylenes	%	113			70-130	Pass	
o-Xylene	%	106			70-130	Pass	
Xylenes - Total	%	111			70-130	Pass	
LCS - % Recovery							
Halogenated Volatile Organics							
1.1-Dichloroethene	%	105			70-130	Pass	
1.1.1-Trichloroethane	%	99			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
1.2-Dichlorobenzene	%	106			70-130	Pass	
1.2-Dichloroethane	%	98			70-130	Pass	
Trichloroethene	%	99			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	123			70-130	Pass	
TRH C6-C10	%	118			70-130	Pass	
TRH >C10-C16	%	88			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	100			70-130	Pass	
Acenaphthylene	%	100			70-130	Pass	
Anthracene	%	106			70-130	Pass	
Benz(a)anthracene	%	105			70-130	Pass	
Benzo(a)pyrene	%	97			70-130	Pass	
Benzo(b&j)fluoranthene	%	90			70-130	Pass	
Benzo(g.h.i)perylene	%	105			70-130	Pass	
Benzo(k)fluoranthene	%	100			70-130	Pass	
Chrysene	%	99			70-130	Pass	
Dibenz(a.h)anthracene	%	107			70-130	Pass	
Fluoranthene	%	96			70-130	Pass	
Fluorene	%	104			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	104			70-130	Pass	
Naphthalene	%	94			70-130	Pass	
Phenanthrene	%	103			70-130	Pass	
Pyrene	%	97			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	109			70-130	Pass	
Beryllium	%	103			70-130	Pass	
Boron	%	104			70-130	Pass	
Cadmium	%	113			70-130	Pass	
Chromium	%	110			70-130	Pass	
Cobalt	%	109			70-130	Pass	
Copper	%	108			70-130	Pass	
Iron	%	109			70-130	Pass	
Lead	%	109			70-130	Pass	
Manganese	%	109			70-130	Pass	
Mercury	%	106			70-130	Pass	
Nickel	%	108			70-130	Pass	
Selenium	%	127			70-130	Pass	
Zinc	%	110			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S18-De13638	NCP	%	95			70-130	Pass	
TRH C10-C14	S18-De20574	NCP	%	94			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S18-De13638	NCP	%	101			70-130	Pass	
Toluene	S18-De13638	NCP	%	90			70-130	Pass	
Ethylbenzene	S18-De13638	NCP	%	89			70-130	Pass	
m&p-Xylenes	S18-De13638	NCP	%	88			70-130	Pass	
o-Xylene	S18-De13638	NCP	%	89			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Xylenes - Total	S18-De13638	NCP	%	89			70-130	Pass	
Spike - % Recovery									
Halogenated Volatile Organics				Result 1					
1.1-Dichloroethene	S18-De16776	NCP	%	76			70-130	Pass	
1.1.1-Trichloroethane	S18-De16776	NCP	%	83			70-130	Pass	
1.2-Dichlorobenzene	S18-De16776	NCP	%	83			70-130	Pass	
1.2-Dichloroethane	S18-De16776	NCP	%	83			70-130	Pass	
Trichloroethene	S18-De16776	NCP	%	80			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S18-De13638	NCP	%	96			70-130	Pass	
TRH C6-C10	S18-De13638	NCP	%	96			70-130	Pass	
TRH >C10-C16	S18-De20574	NCP	%	96			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S18-De11707	NCP	%	104			70-130	Pass	
Acenaphthylene	S18-De11707	NCP	%	111			70-130	Pass	
Anthracene	S18-De11707	NCP	%	122			70-130	Pass	
Benz(a)anthracene	S18-De11707	NCP	%	119			70-130	Pass	
Benzo(a)pyrene	S18-De11707	NCP	%	105			70-130	Pass	
Benzo(b&j)fluoranthene	S18-De11707	NCP	%	124			70-130	Pass	
Benzo(g.h.i)perylene	S18-De11707	NCP	%	106			70-130	Pass	
Benzo(k)fluoranthene	S18-De11707	NCP	%	90			70-130	Pass	
Chrysene	S18-De11707	NCP	%	108			70-130	Pass	
Dibenz(a.h)anthracene	S18-De11707	NCP	%	109			70-130	Pass	
Fluoranthene	S18-De11707	NCP	%	113			70-130	Pass	
Fluorene	S18-De11707	NCP	%	111			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S18-De11707	NCP	%	107			70-130	Pass	
Naphthalene	S18-De11707	NCP	%	98			70-130	Pass	
Phenanthrene	S18-De11707	NCP	%	108			70-130	Pass	
Pyrene	S18-De11707	NCP	%	107			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S18-De13805	NCP	%	87			70-130	Pass	
Beryllium	S18-De16692	NCP	%	108			70-130	Pass	
Boron	S18-De16692	NCP	%	110			70-130	Pass	
Cadmium	S18-De13805	NCP	%	107			70-130	Pass	
Chromium	S18-De13805	NCP	%	100			70-130	Pass	
Cobalt	S18-De16692	NCP	%	115			70-130	Pass	
Copper	S18-De13805	NCP	%	109			70-130	Pass	
Lead	S18-De13805	NCP	%	104			70-130	Pass	
Mercury	S18-De13805	NCP	%	114			70-130	Pass	
Nickel	S18-De13805	NCP	%	109			70-130	Pass	
Selenium	S18-De16692	NCP	%	123			70-130	Pass	
Zinc	S18-De13805	NCP	%	111			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S18-De08209	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S18-De20573	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S18-De20573	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S18-De20573	NCP	mg/kg	< 50	< 50	<1	30%	Pass	

Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S18-De08209	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S18-De08209	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S18-De08209	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S18-De08209	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S18-De08209	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S18-De08209	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
1.1-Dichloroethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1-Dichloroethene	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.1-Trichloroethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.1.2-Tetrachloroethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.2-Trichloroethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.2.2-Tetrachloroethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dibromoethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichlorobenzene	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichloroethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichloropropane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2.3-Trichloropropane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.3-Dichlorobenzene	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.3-Dichloropropane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.4-Dichlorobenzene	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromodichloromethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromoform	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromomethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Carbon Tetrachloride	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chlorobenzene	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chloroform	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chloromethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
cis-1.2-Dichloroethene	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
cis-1.3-Dichloropropene	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibromochloromethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibromomethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Iodomethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methylene Chloride	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Tetrachloroethene	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
trans-1.2-Dichloroethene	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
trans-1.3-Dichloropropene	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichloroethene	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichlorofluoromethane	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Vinyl chloride	S18-De16771	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S18-De08209	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S18-De08209	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S18-De20573	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S18-De20573	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S18-De20573	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Benzo(a)pyrene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S18-De11141	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-De13804	NCP	mg/kg	4.3	5.2	20	30%	Pass	
Beryllium	S18-De16691	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Boron	S18-De16691	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Cadmium	S18-De13649	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-De13804	NCP	mg/kg	14	14	3.0	30%	Pass	
Cobalt	S18-De16691	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Copper	S18-De13804	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Lead	S18-De13804	NCP	mg/kg	33	34	2.0	30%	Pass	
Manganese	S18-De16691	NCP	mg/kg	140	150	10	30%	Pass	
Mercury	S18-De16691	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-De13804	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Selenium	S18-De16691	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Zinc	S18-De13804	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S18-De13825	NCP	%	7.8	8.2	5.0	30%	Pass	

Comments

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

Sample Integrity

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

Qualifier Codes/Comments

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

Authorised By

Nibha Vaidya	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)
Nibha Vaidya	Senior Analyst-Asbestos (NSW)

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

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025–Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

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

Attention:	Emma Harrison
Report	632314-AID
Project Name	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID	2127850
Received Date	Dec 07, 2018
Date Reported	Dec 17, 2018

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). *NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos".This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

Project Name LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID 2127850
Date Sampled Dec 06, 2018
Report 632314-AID

Client Sample ID	Eurofins | mgt Sample No.	Date Sampled	Sample Description	Result
WC1	18-De12968	Dec 06, 2018	Approximate Sample 78g Sample consisted of: Grey fine-grained sandy soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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
Asbestos - LTM-ASB-8020	Sydney	Dec 11, 2018	Indefinite

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NATA # 1261
Site # 1254 & 14271

Sydney
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NATA # 1261 Site # 18217

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NATA # 1261 Site # 20794

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Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name:	GHD Pty Ltd NSW	**Order No.:**		**Received:**	Dec 7, 2018 10:02 AM
Address:	Level 15, 133 Castlereagh Street Sydney NSW 2000	**Report #:** **Phone:** **Fax:**	632314 02 9239 7100 02 9239 7199	**Due:** **Priority:** **Contact Name:**	Dec 14, 2018 5 Day Emma Harrison
Project Name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION				
Project ID:	2127850				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polycyclic Aromatic Hydrocarbons	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Total Recoverable Hydrocarbons	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271														
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	WC1	Dec 06, 2018		Soil	S18-De12968	X		X	X	X	X	X	X	X
2	BH1A_0.2	Dec 06, 2018		Soil	S18-De12969		X							
3	BH1A_0.4	Dec 06, 2018		Soil	S18-De12970		X							
4	BH1A_0.5	Dec 06, 2018		Soil	S18-De12971		X							
5	BH1A_1.5	Dec 06, 2018		Soil	S18-De12972		X							
6	BH1A_2.0	Dec 06, 2018		Soil	S18-De12973		X							
7	BH1A_2.5	Dec 06, 2018		Soil	S18-De12974		X							
8	BH1A_3.0	Dec 06, 2018		Soil	S18-De12975		X							
9	BH1A_3.5	Dec 06, 2018		Soil	S18-De12976		X							

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Project Name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION				
Project ID:	2127850				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polycyclic Aromatic Hydrocarbons	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Total Recoverable Hydrocarbons	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271														
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
10	BH1A_4.0	Dec 06, 2018		Soil	S18-De12977		X							
11	BH1A_4.5	Dec 06, 2018		Soil	S18-De12978		X							
12	BH1A_5.0	Dec 06, 2018		Soil	S18-De12979		X							
13	BH1A_5.5	Dec 06, 2018		Soil	S18-De12980		X							
14	BH1A_6.0	Dec 06, 2018		Soil	S18-De12981		X							
15	BH1A_6.5	Dec 06, 2018		Soil	S18-De12982		X							
16	BH1A_7.0	Dec 06, 2018		Soil	S18-De12983		X							
17	BH1A_7.5	Dec 06, 2018		Soil	S18-De12984		X							
18	BH1A_8.0	Dec 06, 2018		Soil	S18-De12985		X							
19	BH1A_8.5	Dec 06, 2018		Soil	S18-De12986		X							
20	BH1A_9.0	Dec 06, 2018		Soil	S18-De12987		X							
21	BH1A_9.5	Dec 06, 2018		Soil	S18-De12988		X							

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Address:	Level 15, 133 Castlereagh Street Sydney NSW 2000	**Report #:** **Phone:** **Fax:**	632314 02 9239 7100 02 9239 7199	**Due:** **Priority:** **Contact Name:**	Dec 14, 2018 5 Day Emma Harrison
Project Name:	LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION				
Project ID:	2127850				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Asbestos - AS4964	HOLD	Iron	Polycyclic Aromatic Hydrocarbons	BTEX and Naphthalene	Halogenated Volatile Organics	Moisture Set	Total Recoverable Hydrocarbons	NEPM 2013 Metals without Cr6+ (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)
Melbourne Laboratory - NATA Site # 1254 & 14271														
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
22	BH1A_10.0	Dec 06, 2018		Soil	S18-De12989		X							
23	BH1A_10.5	Dec 06, 2018		Soil	S18-De12990		X							
24	BH1A_11.0	Dec 06, 2018		Soil	S18-De12991		X							
25	BH1A_1.0	Dec 06, 2018		Soil	S18-De12992		X							
Test Counts						1	24	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. 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 Sample Receipt Advice.

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.

Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Sample is dried by heating prior to analysis
LOR	Limit of Reporting
COC	Chain of Custody
SRA	Sample Receipt Advice
ISO	International Standards Organisation
AS	Australian Standards
WA DOH	Reference document for the NEPM. Government of Western Australia, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009), including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil (2011)
NEPM	National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended)
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded and/or sound condition. For the purposes of the NEPM, ACM is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
AF	Asbestos Fines. Asbestos containing materials, including friable, weathered and bonded materials, able to pass a 7mm x 7mm sieve. Considered under the NEPM as equivalent to “non-bonded / friable”.
FA	Fibrous Asbestos. Asbestos containing materials in a friable and/or severely weathered condition. For the purposes of the NEPM, FA is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory’s remit to assess degree of friability.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres in the matrix.

Comments

The sample received was not collected in an approved asbestos bag and was therefore sub-sampled from the 250mL glass jar. Valid sub-sampling procedures were applied so as to ensure that the sub-sample to be analysed accurately represented the sample received.

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

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
N/A	Not applicable

Asbestos Counter/Identifier:

Sayeed Abu	Senior Analyst-Asbestos (NSW)

Authorised by:

Laxman Dias	Senior Analyst-Asbestos (NSW)

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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Enviro Sample NSW

To: Nibha Vaidya; COC NSW
Subject: RE: TCLP request for Lindfield project 2127850

From: Nibha Vaidya
Sent: Tuesday, 18 December 2018 2:53 PM
To: Enviro Sample NSW; COC NSW
Subject: FW: TCLP request for Lindfield project 2127850

Additional TCLP Ni please

Kind Regards,

Nibha Vaidya
Phone : +61 2 9900 8415
Mobile : +61 499 900 805
Email : NibhaVaidya@eurofins.com

From: Emma.Harrison@ghd.com [mailto:Emma.Harrison@ghd.com]
Sent: Tuesday, 18 December 2018 2:06 PM
To: Nibha Vaidya
Subject: RE: TCLP request for Lindfield project 2127850

EXTERNAL EMAIL*

Hi Nibha,

I'm not sure if you do the TCLPs for individual metals, but if so, we are interested in the nickel levels for this sample.

Many thanks
Emma

From: Emma Harrison
Sent: Tuesday, 18 December 2018 2:01 PM
To: 'Nibha Vaidya' <NibhaVaidya@eurofins.com>
Subject: TCLP request for Lindfield project 2127850

Hi Nibha,

Would you please arrange TCLP for metals on sample WC1 for the Lindfield Village Hub – Groundwater well installation project number 2127850?

The original analyses were part of Eurofins report 632314-S. Are we able to get the results before the 7th of January?

Please let me know if you need any further information.

Many thanks,
Emma

Emma Harrison
Senior Environmental Geologist

GHD
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NATA # 1261 Site # 23736

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**GHD Pty Ltd NSW**
Contact name:	Emma Harrison
Project name:	ADDITIONAL - LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID:	2127850
COC number:	Not provided
Turn around time:	7 Day
Date/Time received:	Dec 18, 2018 2:06 PM
Eurofins | mgt reference:	**634033**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ 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.

☒ Split sample sent to requested external lab.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8415 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Emma Harrison - emma.harrison@ghd.com.

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Site # 23736

Company Name:	GHD Pty Ltd NSW	**Order No.:**		**Received:**	Dec 18, 2018 2:06 PM
Address:	Level 15, 133 Castlereagh Street Sydney NSW 2000	**Report #:**	634033	**Due:**	Dec 31, 2018
		Phone:	02 9239 7100	**Priority:**	7 Day
		Fax:	02 9239 7199	**Contact Name:**	Emma Harrison

Project Name: ADDITIONAL - LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID: 2127850

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Nickel	USA Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	WC1	Dec 06, 2018		US Leachate	S18-De27113	X	X
Test Counts						1	1

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

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Emma Harrison**

Report **634033-L**
Project name ADDITIONAL - LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION
Project ID 2127850
Received Date Dec 18, 2018

Client Sample ID			**WC1**
Sample Matrix			**US Leachate**
Eurofins | mgt Sample No.			**S18-De27113**
Date Sampled			**Dec 06, 2018**
Test/Reference	LOR	Unit	
Heavy Metals			
Nickel	0.05	mg/L	0.14
USA Leaching Procedure			
Leachate Fluid[C01]		comment	1.0
pH (initial)	0.1	pH Units	7.2
pH (off)	0.1	pH Units	5.1
pH (USA HCl addition)	0.1	pH Units	1.8

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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
Heavy Metals	Sydney	Dec 28, 2018	180 Day
- Method:			
USA Leaching Procedure	Sydney	Dec 21, 2018	14 Day
- Method:			

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Company Name:	GHD Pty Ltd NSW	**Order No.:**		**Received:**	Dec 18, 2018 2:06 PM
Address:	Level 15, 133 Castlereagh Street Sydney NSW 2000	**Report #:** **Phone:** **Fax:**	634033 02 9239 7100 02 9239 7199	**Due:** **Priority:** **Contact Name:**	Dec 31, 2018 7 Day Emma Harrison
Project Name:	ADDITIONAL - LINDFIELD VILLAGE HUB - GROUNDWATER WELL INSTALLATION				
Project ID:	2127850				

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Nickel	USA Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	WC1	Dec 06, 2018		US Leachate	S18-De27113	X	X
Test Counts						1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil 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. 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.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
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.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Nickel			mg/L	< 0.05			0.05	Pass	
LCS - % Recovery									
Heavy Metals									
Nickel			%	98			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Nickel	S18-De25490	NCP	%	94			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Nickel	S18-De27113	CP	mg/L	0.14	0.14	5.0	30%	Pass	

Comments

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

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
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised By

Nibha Vaidya	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

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

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

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☑ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	GHD Pty Ltd	Project №	2127850
Address	Level 15, 133 Castlereagh St Sydney, 2000	Project Name	Lindfield Village Hub - groundwater well installation
Contact Name	Emma Harrison	Project Manager	Emma Harrison
Phone №	0408 401 511	Report Format	ESDat
Special Direction	For ALS interlab duplicate	Relinquished by	Emma Harrison 5/12/18
Purchase Order		Email for Results	emma.harrison@ghd.com
Quote ID №	181121GHDN		

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered".)

Containers

Turn Around Requirements

☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
☐ Other ( )
* Surcharges apply

№	Client Sample ID	Date	Matrix	Suite B4 : TRH, BTEXN, PAH	Suite M13A - NEPM Metals (As, Be, B, Cd, Co, Cr, Cu, Hg, Pb, Ni, Mn, Se, Zn)	Halogenated Volatile Organics	Asbestos identification in soil (AS 4964)	Polychlorinated Biphenyls (PCB)	Iron (Fe)	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass Jar	Other ( )	Sample Comments / DG Hazard Warning
1	BH1_0.5ID	5/12	soil	✓	✓	✓			✓							✓	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Please send to ALS for interlab duplicate.

68°

ANDREW 7/12/18 3:00pm

Total Counts

Environmental Division
Sydney
Work Order Reference
ES1836831

Telephone : +61-2-8784 8555

Method of Shipment: ☐ Courier (#) ☑ Hand Delivered ☐ Postal Name: Emma Harrison Signature: Date: 5/12/18

Laboratory Use Only

Received By	Elvis P	(SYD) | BNE | MEL | PER | ADL | NEW | DAR	Signature	Date 5/12/18	Time	
Received By	Sep-ALS Crows Nest	(SYD) | BNE | MEL | PER | ADL | NEW | DAR	Signature	Date 7/12/18	Time 6:44PM	Temperature 4.6 C
				Date 7/12/18	Time 11:25am	Report №

OS3009_R5 Modified by: S. Kajima Approved by: Dr. R Symons Approved on: 2 November 2016

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1836831**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: EMMA HARRISON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: emma.harrison@ghd.com	E-mail	: ALSEnviro.Sydney@ALSGlobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 2127850	Page	: 1 of 2
Order number	:	Quote number	: ES2018GHDSER0025 (EN/005/18)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	:		
Sampler	:		

Dates

Date Samples Received	: 07-Dec-2018 11:25	Issue Date	: 08-Dec-2018
Client Requested Due Date	: 14-Dec-2018	Scheduled Reporting Date	: **14-Dec-2018**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 7.1'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 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) from receipt of samples.

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: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - EG005T (solids) Total Metals by ICP-AES	SOIL - EP074DEFG (solids) VOC - Fumigants, Hal Aliphatics, Hal Aromatics,	SOIL - S-02 8 Metals (incl. Digestion)	SOIL - S-07 TRH/BTEXN/PAH (SIM)
ES1836831-001	05-Dec-2018 00:00	BH1_0.5ID	✓	✓	✓	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE (Brisbane)		
- A4 - AU Tax Invoice (INV)	Email	ap-fss@ghd.com
ACCOUNTS PAYABLE (Hobart)		
- A4 - AU Tax Invoice (INV)	Email	ap-fss@ghd.com
EMMA HARRISON		
- *AU Certificate of Analysis - NATA (COA)	Email	emma.harrison@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	emma.harrison@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	emma.harrison@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	emma.harrison@ghd.com
- Chain of Custody (CoC) (COC)	Email	emma.harrison@ghd.com
- EDI Format - ENMRG (ENMRG)	Email	emma.harrison@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	emma.harrison@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	emma.harrison@ghd.com
GHD LAB REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	ghdlabreports@ghd.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ghdlabreports@ghd.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ghdlabreports@ghd.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ghdlabreports@ghd.com
- EDI Format - ESDAT (ESDAT)	Email	ghdlabreports@ghd.com
- Electronic SRN for ESdat (ESRN_ESDAT)	Email	ghdlabreports@ghd.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1836831**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: EMMA HARRISON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 2127850	Date Samples Received	: 07-Dec-2018 11:25
Order number	:	Date Analysis Commenced	: 10-Dec-2018
C-O-C number	: ----	Issue Date	: 14-Dec-2018 17:55
Sampler	: ----		
Site	:		
Quote number	: EN/005/18		
No. of samples received	: 1		
No. of samples analysed	: 1		

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. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH1_0.5ID	----	----	----	----
			Client sampling date / time	05-Dec-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1836831-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**17.9**	----	----	----	----
EG005T: Total Metals by ICP-AES								
Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
Cobalt	7440-48-4	2	mg/kg	<2	----	----	----	----
Iron	7439-89-6	50	mg/kg	**6480**	----	----	----	----
Manganese	7439-96-5	5	mg/kg	<5	----	----	----	----
Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	**7**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**10**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**18**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**13**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	<2	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**7**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP074D: Fumigants								
2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	----	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	----	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	----	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	----	----	----	----
Chloromethane	74-87-3	5	mg/kg	<5	----	----	----	----
Vinyl chloride	75-01-4	5	mg/kg	<5	----	----	----	----
Bromomethane	74-83-9	5	mg/kg	<5	----	----	----	----
Chloroethane	75-00-3	5	mg/kg	<5	----	----	----	----
Trichlorofluoromethane	75-69-4	5	mg/kg	<5	----	----	----	----
1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	----	----	----	----
Iodomethane	74-88-4	0.5	mg/kg	<0.5	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	----	----	----	----
1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH1_0.5ID	----	----	----	----
				Client sampling date / time	05-Dec-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1836831-001	--------	--------	--------	--------
					Result	----	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued									
cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg		<0.5	----	----	----	----
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg		<0.5	----	----	----	----
1.1-Dichloropropylene	563-58-6	0.5	mg/kg		<0.5	----	----	----	----
Carbon Tetrachloride	56-23-5	0.5	mg/kg		<0.5	----	----	----	----
1.2-Dichloroethane	107-06-2	0.5	mg/kg		<0.5	----	----	----	----
Trichloroethene	79-01-6	0.5	mg/kg		<0.5	----	----	----	----
Dibromomethane	74-95-3	0.5	mg/kg		<0.5	----	----	----	----
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg		<0.5	----	----	----	----
1.3-Dichloropropane	142-28-9	0.5	mg/kg		<0.5	----	----	----	----
Tetrachloroethene	127-18-4	0.5	mg/kg		<0.5	----	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg		<0.5	----	----	----	----
trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg		<0.5	----	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg		<0.5	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg		<0.5	----	----	----	----
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg		<0.5	----	----	----	----
Pentachloroethane	76-01-7	0.5	mg/kg		<0.5	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg		<0.5	----	----	----	----
Hexachlorobutadiene	87-68-3	0.5	mg/kg		<0.5	----	----	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	0.5	mg/kg		<0.5	----	----	----	----
Bromobenzene	108-86-1	0.5	mg/kg		<0.5	----	----	----	----
2-Chlorotoluene	95-49-8	0.5	mg/kg		<0.5	----	----	----	----
4-Chlorotoluene	106-43-4	0.5	mg/kg		<0.5	----	----	----	----
1.3-Dichlorobenzene	541-73-1	0.5	mg/kg		<0.5	----	----	----	----
1.4-Dichlorobenzene	106-46-7	0.5	mg/kg		<0.5	----	----	----	----
1.2-Dichlorobenzene	95-50-1	0.5	mg/kg		<0.5	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg		<0.5	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg		<0.5	----	----	----	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	0.5	mg/kg		<0.5	----	----	----	----
Bromodichloromethane	75-27-4	0.5	mg/kg		<0.5	----	----	----	----
Dibromochloromethane	124-48-1	0.5	mg/kg		<0.5	----	----	----	----
Bromoform	75-25-2	0.5	mg/kg		<0.5	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH1_0.5ID	----	----	----	----
				Client sampling date / time	05-Dec-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1836831-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		**0.6**	----	----	----	----
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH1_0.5ID	----	----	----	----
				Client sampling date / time	05-Dec-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1836831-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.5	%		**86.9**	----	----	----	----
Toluene-D8	2037-26-5	0.5	%		**95.6**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.5	%		**95.0**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**73.9**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**78.4**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**55.3**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**85.3**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**84.0**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**82.0**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**89.1**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**88.3**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**90.5**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	64	130
Toluene-D8	2037-26-5	66	136
4-Bromofluorobenzene	460-00-4	60	122
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1836831**	Page	: 1 of 12
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: EMMA HARRISON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 2127850	Date Samples Received	: 07-Dec-2018
Order number	:	Date Analysis Commenced	: 10-Dec-2018
C-O-C number	: ----	Issue Date	: 14-Dec-2018
Sampler	: ----		
Site	:		
Quote number	: EN/005/18		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA
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. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 2085887)									
ES1836822-001	Anonymous	EA055: Moisture Content	----	0.1	%	17.4	15.5	11.6	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 2093452)									
ES1836831-001	BH1_0.5ID	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	10	10	0.00	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	7	7	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	18	18	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	13	12	0.00	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	7	6	0.00	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	6480	6930	6.64	0% - 20%
ES1837191-033	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	7	8	0.00	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	2	3	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	6	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	18	20	5.79	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	43	43	0.00	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	18	10	57.3	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005T: Total Metals by ICP-AES (QC Lot: 2093452) - continued									
ES1837191-033	Anonymous	EG005T: Zinc	7440-66-6	5	mg/kg	15	16	0.00	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	20700	22900	9.87	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2093453)									
ES1836831-001	BH1_0.5ID	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1837191-033	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP074D: Fumigants (QC Lot: 2083771)									
ES1836598-001	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1836598-011	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 2083771)									
ES1836598-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Iodomethane	74-88-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 2083771) - continued									
ES1836598-001	Anonymous	EP074: Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Chloromethane	74-87-3	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Bromomethane	74-83-9	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Chloroethane	75-00-3	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Trichlorofluoromethane	75-69-4	5	mg/kg	<5	<5	0.00	No Limit
ES1836598-011	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Iodomethane	74-88-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Chloromethane	74-87-3	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Bromomethane	74-83-9	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Chloroethane	75-00-3	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Trichlorofluoromethane	75-69-4	5	mg/kg	<5	<5	0.00	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 2083771)									
ES1836598-001	Anonymous	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074F: Halogenated Aromatic Compounds (QC Lot: 2083771) - continued									
ES1836598-001	Anonymous	EP074: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1836598-011	Anonymous	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074G: Trihalomethanes (QC Lot: 2083771)									
ES1836598-001	Anonymous	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1836598-011	Anonymous	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2083680)									
ES1836882-022	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2083680) - continued									
ES1836882-022	Anonymous	EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1836882-034	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2083681)									
ES1836882-022	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1836882-034	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2083772)									
ES1836598-011	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2083681)									
ES1836882-022	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1836882-034	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2083772)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2083772) - continued									
ES1836598-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 2083772)									
ES1836598-011	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (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 Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 2093452)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	106	86	126
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	106	90	113
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	91.2	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	88.5	76	128
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	16 mg/kg	106	88	120
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	98.2	86	120
EG005T: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	74.2	70	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	101	80	114
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	99.7	85	117
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	106	87	123
EG005T: Selenium	7782-49-2	5	mg/kg	<5	5.37 mg/kg	88.5	75	131
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	112	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2093453)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	70.4	70	105
EP074D: Fumigants (QCLot: 2083771)								
EP074: 2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	1 mg/kg	95.3	60	126
EP074: 1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	1 mg/kg	97.0	68	124
EP074: cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	1 mg/kg	96.4	51	119
EP074: trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	1 mg/kg	95.7	52	114
EP074: 1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	1 mg/kg	95.9	63	115
EP074E: Halogenated Aliphatic Compounds (QCLot: 2083771)								
EP074: Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	10 mg/kg	61.2	30	148
EP074: Chloromethane	74-87-3	5	mg/kg	<5	10 mg/kg	77.5	41	141
EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	10 mg/kg	110	43	147
EP074: Bromomethane	74-83-9	5	mg/kg	<5	10 mg/kg	76.1	47	141
EP074: Chloroethane	75-00-3	5	mg/kg	<5	10 mg/kg	87.1	49	143
EP074: Trichlorofluoromethane	75-69-4	5	mg/kg	<5	10 mg/kg	87.6	49	135
EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	1 mg/kg	89.8	54	126
EP074: Iodomethane	74-88-4	0.5	mg/kg	<0.5	1 mg/kg	61.6	43	129
EP074: trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	1 mg/kg	92.6	64	120
EP074: 1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	1 mg/kg	95.7	67	125
EP074: cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	1 mg/kg	96.8	69	121
EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	1 mg/kg	96.6	65	117

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 2083771) - continued								
EP074: 1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	1 mg/kg	96.4	65	123
EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	1 mg/kg	96.2	59	125
EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	1 mg/kg	93.8	65	125
EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	1 mg/kg	97.6	70	118
EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	1 mg/kg	94.5	68	118
EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	1 mg/kg	96.1	64	126
EP074: 1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	1 mg/kg	99.8	68	122
EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	1 mg/kg	96.7	67	143
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	1 mg/kg	94.2	62	122
EP074: trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	1 mg/kg	91.1	54	128
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	1 mg/kg	95.1	55	129
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	1 mg/kg	98.2	65	121
EP074: 1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	1 mg/kg	100	61	125
EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	1 mg/kg	90.1	20	134
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	1 mg/kg	92.0	53	129
EP074: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	1 mg/kg	96.2	50	128
EP074F: Halogenated Aromatic Compounds (QCLot: 2083771)								
EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	1 mg/kg	97.9	68	116
EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	1 mg/kg	98.2	70	114
EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	1 mg/kg	96.0	68	122
EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	1 mg/kg	96.5	67	123
EP074: 1.3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	1 mg/kg	97.3	70	116
EP074: 1.4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1 mg/kg	94.9	67	117
EP074: 1.2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1 mg/kg	96.6	70	114
EP074: 1.2.4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1 mg/kg	95.0	48	122
EP074: 1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	1 mg/kg	94.6	52	122
EP074G: Trihalomethanes (QCLot: 2083771)								
EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	1 mg/kg	95.0	66	124
EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	1 mg/kg	94.8	61	121
EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	1 mg/kg	96.7	63	121
EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	1 mg/kg	87.4	60	126
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2083680)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	114	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	120	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	104	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	119	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	116	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	98.8	77	127

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2083680) - continued								
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	120	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	117	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	109	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	111	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	104	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	114	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	122	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	116	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	113	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	118	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2083681)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	118	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	110	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	110	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2083772)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	85.7	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2083681)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	102	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	93.2	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	108	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2083772)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	86.3	68	128
EP080: BTEXN (QCLot: 2083772)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	92.1	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	86.1	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	84.4	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	81.4	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	87.1	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	82.9	63	119

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 2093452)							
ES1836831-001	BH1_0.5ID	EG005T: Arsenic	7440-38-2	50 mg/kg	99.7	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	94.8	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	89.1	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	95.3	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	97.0	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	98.5	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	114	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2093453)							
ES1836831-001	BH1_0.5ID	EG035T: Mercury	7439-97-6	5 mg/kg	80.2	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 2083771)							
ES1836598-011	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	2.5 mg/kg	114	70	130
		EP074: Trichloroethene	79-01-6	2.5 mg/kg	107	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 2083771)							
ES1836598-011	Anonymous	EP074: Chlorobenzene	108-90-7	2.5 mg/kg	107	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2083680)							
ES1836882-022	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	95.9	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	114	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2083681)							
ES1836882-022	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	112	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	131	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	79.3	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2083772)							
ES1836598-011	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	88.5	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2083681)							
ES1836882-022	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	127	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	105	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	99.0	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2083772)							
ES1836598-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	90.9	70	130
EP080: BTEXN (QCLot: 2083772)							
ES1836598-011	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	87.8	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	86.9	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	89.0	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	85.3	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	90.6	70	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080: BTEXN (QCLot: 2083772) - continued							
ES1836598-011	Anonymous	EP080: Naphthalene	91-20-3	2.5 mg/kg	90.2	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1836831**	Page	: 1 of 5
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: EMMA HARRISON	Telephone	: +61-2-8784 8555
Project	: 2127850	Date Samples Received	: 07-Dec-2018
Site	:	Issue Date	: 14-Dec-2018
Sampler	: ----	No. of samples received	: 1
Order number	:	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Moisture Content	1	15	6.67	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / *Container* / Client Sample ID(s)	*Sample Date*	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
BH1_0.5ID	**05-Dec-2018**	**----**	----	----	**10-Dec-2018**	19-Dec-2018	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
BH1_0.5ID	**05-Dec-2018**	**13-Dec-2018**	03-Jun-2019	✓	**13-Dec-2018**	03-Jun-2019	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
BH1_0.5ID	**05-Dec-2018**	**13-Dec-2018**	02-Jan-2019	✓	**13-Dec-2018**	02-Jan-2019	✓
EP074D: Fumigants							
Soil Glass Jar - Unpreserved (EP074)							
BH1_0.5ID	**05-Dec-2018**	**10-Dec-2018**	12-Dec-2018	✓	**10-Dec-2018**	12-Dec-2018	✓
EP074E: Halogenated Aliphatic Compounds							
Soil Glass Jar - Unpreserved (EP074)							
BH1_0.5ID	**05-Dec-2018**	**10-Dec-2018**	12-Dec-2018	✓	**10-Dec-2018**	12-Dec-2018	✓
EP074F: Halogenated Aromatic Compounds							
Soil Glass Jar - Unpreserved (EP074)							
BH1_0.5ID	**05-Dec-2018**	**10-Dec-2018**	12-Dec-2018	✓	**10-Dec-2018**	12-Dec-2018	✓
EP074G: Trihalomethanes							
Soil Glass Jar - Unpreserved (EP074)							
BH1_0.5ID	**05-Dec-2018**	**10-Dec-2018**	12-Dec-2018	✓	**10-Dec-2018**	12-Dec-2018	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BH1_0.5ID	**05-Dec-2018**	**12-Dec-2018**	19-Dec-2018	✓	**13-Dec-2018**	21-Jan-2019	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
BH1_0.5ID	**05-Dec-2018**	**10-Dec-2018**	19-Dec-2018	✓	**10-Dec-2018**	19-Dec-2018	✓
Soil Glass Jar - Unpreserved (EP071)							
BH1_0.5ID	**05-Dec-2018**	**12-Dec-2018**	19-Dec-2018	✓	**13-Dec-2018**	21-Jan-2019	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
BH1_0.5ID	**05-Dec-2018**	**10-Dec-2018**	19-Dec-2018	✓	**10-Dec-2018**	19-Dec-2018	✓
Soil Glass Jar - Unpreserved (EP071)							
BH1_0.5ID	**05-Dec-2018**	**12-Dec-2018**	19-Dec-2018	✓	**13-Dec-2018**	21-Jan-2019	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
BH1_0.5ID	**05-Dec-2018**	**10-Dec-2018**	19-Dec-2018	✓	**10-Dec-2018**	19-Dec-2018	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	1	15	**6.67**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
Volatile Organic Compounds	EP074	SOIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREMENT (Standard TAT may be longer for some tests e.g., Ultra Trace)	☒ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle): Custody Seal Intact? Yes No N/A
OFFICE: Sydney		☐ Non Standard or urgent TAT (List due date):	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PROJECT: 21-27850	ALS QUOTE NO.: EN/005/18	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 8 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
ORDER NUMBER:			Other comment:
PROJECT MANAGER: Emma Harrison	CONTACT PH: 02 9239 7910 / 0408 401 511		
SAMPLER: Terry Nham	SAMPLER MOBILE: 0403 251 883	RELINQUISHED BY: Terry Nham (GHD)	RECEIVED BY: Cho NG
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 14/12/18	DATE/TIME: 14/12
Email Reports to: emma.harrison@ghd.com terry.nham@ghd.com		RELINQUISHED BY:	RECEIVED BY: Sep-ALS Crows Nest
Email Invoice to (will default to PM if no other addresses are listed):		DATE/TIME:	DATE/TIME: 17/12/18 11:57

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Soo 17/12/18 1500 4.3 — 4-3°C

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).					
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	TRH / BTEX / PAH / 8 Metals (W-26)	Manganese	Iron	VHC	PCB	
1	QC02	14/12/18	Water		6	X	X	X	X	X	
					TOTAL						

Environmental Division Sydney Work Order Reference ES1837981

Telephone : +61-2-8784 8555

ES1837981 WO # Assigned at ALS Crows Nest

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

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1837981**

Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: EMMA HARRISON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: emma.harrison@ghd.com	E-mail	: ALSEnviro.Sydney@ALSGlobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 2127850	Page	: 1 of 2
Order number	:	Quote number	: ES2018GHDSER0025 (EN/005/18)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	:		
Sampler	: TERRY NHAM		

Dates

Date Samples Received	: 17-Dec-2018 11:57	Issue Date	: 19-Dec-2018
Client Requested Due Date	: 24-Dec-2018	Scheduled Reporting Date	: **24-Dec-2018**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 4.3 - 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 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) from receipt of samples.

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	Client sampling date / time	Client sample ID	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EP066-PCB-WA Polychlorinated Biphenyls (PCB)	WATER - EP074DEFG VOC - Fumigants, Hal Aliphatics, Hal Aromatics,	WATER - W-26 TRH/BTEXN/PAH/8 Metals
ES1837981-001	14-Dec-2018 00:00	QC02	✓	✓	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE (Hobart)

- A4 - AU Tax Invoice (INV)	Email	ap-fss@ghd.com

EMMA HARRISON

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

GHD LAB REPORTS

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

TERRY NHAM

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1837981**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: EMMA HARRISON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 2127850	Date Samples Received	: 17-Dec-2018 11:57
Order number	:	Date Analysis Commenced	: 19-Dec-2018
C-O-C number	: ----	Issue Date	: 24-Dec-2018 16:48
Sampler	: TERRY NHAM		
Site	:		
Quote number	: EN/005/18		
No. of samples received	: 1		
No. of samples analysed	: 1		

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. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QC02	----	----	----	----
				Client sampling date / time	14-Dec-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1837981-001	--------	--------	--------	--------
					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		**0.062**	----	----	----	----
Lead	7439-92-1	0.001	mg/L		**0.004**	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		**3.40**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.028**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.127**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**2.85**	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
^ **Total Polychlorinated biphenyls**	----	1	µg/L		<1	----	----	----	----
EP074D: Fumigants									
2.2-Dichloropropane	594-20-7	5	µg/L		<5	----	----	----	----
1.2-Dichloropropane	78-87-5	5	µg/L		<5	----	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	5	µg/L		<5	----	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	5	µg/L		<5	----	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	----	----	----	----
Chloromethane	74-87-3	50	µg/L		<50	----	----	----	----
Vinyl chloride	75-01-4	50	µg/L		<50	----	----	----	----
Bromomethane	74-83-9	50	µg/L		<50	----	----	----	----
Chloroethane	75-00-3	50	µg/L		<50	----	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L		<50	----	----	----	----
1.1-Dichloroethene	75-35-4	5	µg/L		<5	----	----	----	----
Iodomethane	74-88-4	5	µg/L		<5	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L		<5	----	----	----	----
1.1-Dichloroethane	75-34-3	5	µg/L		<5	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L		<5	----	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L		<5	----	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L		<5	----	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L		<5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QC02	----	----	----	----
				Client sampling date / time	14-Dec-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1837981-001	--------	--------	--------	--------
					Result	----	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued									
1.2-Dichloroethane	107-06-2	5	µg/L		<5	----	----	----	----
Trichloroethene	79-01-6	5	µg/L		<5	----	----	----	----
Dibromomethane	74-95-3	5	µg/L		<5	----	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L		<5	----	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L		<5	----	----	----	----
Tetrachloroethene	127-18-4	5	µg/L		<5	----	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L		<5	----	----	----	----
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L		<5	----	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L		<5	----	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L		<5	----	----	----	----
Pentachloroethane	76-01-7	5	µg/L		<5	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	----	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L		<5	----	----	----	----
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	----	----	----	----
Bromobenzene	108-86-1	5	µg/L		<5	----	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L		<5	----	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L		<5	----	----	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L		<5	----	----	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L		<5	----	----	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L		<5	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	5	µg/L		<5	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	5	µg/L		<5	----	----	----	----
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	----	----	----	----
Bromodichloromethane	75-27-4	5	µg/L		<5	----	----	----	----
Dibromochloromethane	124-48-1	5	µg/L		<5	----	----	----	----
Bromoform	75-25-2	5	µg/L		<5	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QC02	----	----	----	----
				Client sampling date / time	14-Dec-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1837981-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Phenanthrene	85-01-8	1.0	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	----	----	----	----
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	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QC02	----	----	----	----
				Client sampling date / time	14-Dec-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1837981-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080: BTEXN - Continued									
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	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		**112**	----	----	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	5	%		**100**	----	----	----	----
Toluene-D8	2037-26-5	5	%		**96.3**	----	----	----	----
4-Bromofluorobenzene	460-00-4	5	%		**94.4**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**21.8**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**50.4**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**43.4**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**75.4**	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%		**85.1**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		**89.6**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**100**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**98.4**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**94.9**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	29	129
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
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

QUALITY CONTROL REPORT

Work Order	: **ES1837981**	Page	: 1 of 9
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: EMMA HARRISON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 2127850	Date Samples Received	: 17-Dec-2018
Order number	:	Date Analysis Commenced	: 19-Dec-2018
C-O-C number	: ----	Issue Date	: 24-Dec-2018
Sampler	: TERRY NHAM		
Site	:		
Quote number	: EN/005/18		
No. of samples received	: 1		
No. of samples analysed	: 1		

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. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 2103995)									
ES1838061-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.013	0.013	0.00	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.021	0.022	5.96	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.008	0.008	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.57	0.58	0.00	0% - 50%
EW1805247-004	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.046	0.047	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.21	0.23	6.79	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 2103996)									
ES1837973-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EP074D: Fumigants (QC Lot: 2103881)									
ES1837858-001	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074D: Fumigants (QC Lot: 2103881) - continued									
ES1837858-001	Anonymous	EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.00	No Limit
ES1837858-011	Anonymous	EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	0.00	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 2103881)									
ES1837858-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.00	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.00	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.00	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.00	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.00	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.00	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.00	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.00	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.00	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.00	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.00	No Limit
ES1837858-011	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074E: Halogenated Aliphatic Compounds (QC Lot: 2103881) - continued									
ES1837858-011	Anonymous	EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.00	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.00	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.00	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.00	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.00	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.00	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.00	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.00	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.00	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.00	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.00	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 2103881)									
ES1837858-001	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.00	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.00	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.00	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.00	No Limit
ES1837858-011	Anonymous	EP074: Chlorobenzene	108-90-7	5	µg/L	<5	<5	0.00	No Limit
		EP074: Bromobenzene	108-86-1	5	µg/L	<5	<5	0.00	No Limit
		EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	0.00	No Limit
		EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP074F: Halogenated Aromatic Compounds (QC Lot: 2103881) - continued									
ES1837858-011	Anonymous	EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	0.00	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	0.00	No Limit
EP074G: Trihalomethanes (QC Lot: 2103881)									
ES1837858-001	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.00	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.00	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.00	No Limit
ES1837858-011	Anonymous	EP074: Chloroform	67-66-3	5	µg/L	<5	<5	0.00	No Limit
		EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	<5	0.00	No Limit
		EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	<5	0.00	No Limit
		EP074: Bromoform	75-25-2	5	µg/L	<5	<5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2103882)									
ES1837858-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1837858-011	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2103882)									
ES1837858-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1837858-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 2103882)									
ES1837858-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1837858-011	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (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 Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 2103995)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.8	85	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.0	84	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.0	85	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.9	81	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.6	83	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.7	82	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.3	82	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.4	81	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	94.2	82	112
EG035F: Dissolved Mercury by FIMS (QCLot: 2103996)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	89.6	83	105
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2103977)								
EP066: Total Polychlorinated biphenyls	----	1	µg/L	<1	10 µg/L	89.0	62	107
EP074D: Fumigants (QCLot: 2103881)								
EP074: 2.2-Dichloropropane	594-20-7	5	µg/L	<5	10 µg/L	94.1	68	122
EP074: 1.2-Dichloropropane	78-87-5	5	µg/L	<5	10 µg/L	95.7	76	118
EP074: cis-1.3-Dichloropropylene	10061-01-5	5	µg/L	<5	10 µg/L	94.3	62	120
EP074: trans-1.3-Dichloropropylene	10061-02-6	5	µg/L	<5	10 µg/L	94.1	60	114
EP074: 1.2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	10 µg/L	95.0	69	117
EP074E: Halogenated Aliphatic Compounds (QCLot: 2103881)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	99.0	61	138
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	94.0	67	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	105	69	129
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	109	56	140
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	99.6	61	139
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	101	69	131
EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	98.1	70	124
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	109	70	128
EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	96.3	74	118
EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	93.9	74	120
EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	95.5	77	119
EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	95.8	67	119
EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	94.0	73	119
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	96.2	62	120

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP074E: Halogenated Aliphatic Compounds (QCLot: 2103881) - continued								
EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	91.9	73	123
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	97.0	76	118
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	93.9	73	119
EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	96.2	72	126
EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	98.9	71	129
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	97.4	72	124
EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	99.5	66	114
EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	82.6	60	120
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	87.1	71	128
EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	88.4	70	124
EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	94.2	74	126
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	96.0	72	126
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	78.6	66	136
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	104	58	130
EP074F: Halogenated Aromatic Compounds (QCLot: 2103881)								
EP074: Chlorobenzene	108-90-7	5	µg/L	<5	10 µg/L	97.6	79	117
EP074: Bromobenzene	108-86-1	5	µg/L	<5	10 µg/L	99.0	76	116
EP074: 2-Chlorotoluene	95-49-8	5	µg/L	<5	10 µg/L	94.7	73	119
EP074: 4-Chlorotoluene	106-43-4	5	µg/L	<5	10 µg/L	97.6	73	119
EP074: 1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	10 µg/L	98.7	75	117
EP074: 1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	10 µg/L	97.4	74	118
EP074: 1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	10 µg/L	96.4	75	117
EP074: 1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	10 µg/L	105	61	125
EP074: 1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	10 µg/L	101	67	123
EP074G: Trihalomethanes (QCLot: 2103881)								
EP074: Chloroform	67-66-3	5	µg/L	<5	10 µg/L	99.7	72	120
EP074: Bromodichloromethane	75-27-4	5	µg/L	<5	10 µg/L	95.7	64	118
EP074: Dibromochloromethane	124-48-1	5	µg/L	<5	10 µg/L	97.1	65	115
EP074: Bromoform	75-25-2	5	µg/L	<5	10 µg/L	89.6	74	126
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2103975)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	68.5	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	91.8	64	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	98.1	62	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	82.2	64	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	86.9	63	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	87.0	64	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	101	64	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	102	63	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2103975) - continued								
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	90.7	64	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	90.9	63	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	87.3	62	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	74.0	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	92.4	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	96.0	60	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	92.1	61	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	88.0	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2103882)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	109	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2103976)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	88.7	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	97.5	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	87.7	75	113
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2103882)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	111	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2103976)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	92.2	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	91.9	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	95.4	77	119
EP080: BTEXN (QCLot: 2103882)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	107	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	105	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	99.7	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	99.6	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	100	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	94.3	70	120

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 2103995)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 2103995) - continued							
ES1837973-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	119	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	104	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	101	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	108	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	106	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	99.5	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	109	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	107	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 2103996)							
ES1837970-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	108	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 2103881)							
ES1837858-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	25 µg/L	106	70	130
		EP074: Trichloroethene	79-01-6	25 µg/L	90.5	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 2103881)							
ES1837858-001	Anonymous	EP074: Chlorobenzene	108-90-7	25 µg/L	97.7	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2103882)							
ES1837858-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	120	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2103882)							
ES1837858-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	118	70	130
EP080: BTEXN (QCLot: 2103882)							
ES1837858-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	102	70	130
		EP080: Toluene	108-88-3	25 µg/L	96.1	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	96.0	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	96.0	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	97.0	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	94.4	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1837981**	Page	: 1 of 5
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: EMMA HARRISON	Telephone	: +61-2-8784 8555
Project	: 2127850	Date Samples Received	: 17-Dec-2018
Site	:	Issue Date	: 24-Dec-2018
Sampler	: TERRY NHAM	No. of samples received	: 1
Order number	:	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	6	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	0	6	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	7	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	7	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / ***Container*** / Client Sample ID(s)	***Sample Date***	*Extraction / Preparation* ***Date extracted***	*Due for extraction*	*Evaluation*	*Analysis* ***Date analysed***	*Due for analysis*	*Evaluation*
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
QC02	**14-Dec-2018**	**----**	----	----	**19-Dec-2018**	12-Jun-2019	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
QC02	**14-Dec-2018**	**----**	----	----	**20-Dec-2018**	11-Jan-2019	✓
EP066: Polychlorinated Biphenyls (PCB)							
Amber Glass Bottle - Unpreserved (EP066)							
QC02	**14-Dec-2018**	**20-Dec-2018**	21-Dec-2018	✓	**21-Dec-2018**	29-Jan-2019	✓
EP074D: Fumigants							
Amber VOC Vial - Sulfuric Acid (EP074)							
QC02	**14-Dec-2018**	**21-Dec-2018**	28-Dec-2018	✓	**21-Dec-2018**	28-Dec-2018	✓
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
QC02	**14-Dec-2018**	**21-Dec-2018**	28-Dec-2018	✓	**21-Dec-2018**	28-Dec-2018	✓
EP074F: Halogenated Aromatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP074)							
QC02	**14-Dec-2018**	**21-Dec-2018**	28-Dec-2018	✓	**21-Dec-2018**	28-Dec-2018	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074G: Trihalomethanes							
Amber VOC Vial - Sulfuric Acid (EP074)							
QC02	**14-Dec-2018**	**21-Dec-2018**	28-Dec-2018	✓	**21-Dec-2018**	28-Dec-2018	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
QC02	**14-Dec-2018**	**20-Dec-2018**	21-Dec-2018	✓	**21-Dec-2018**	29-Jan-2019	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
QC02	**14-Dec-2018**	**20-Dec-2018**	21-Dec-2018	✓	**21-Dec-2018**	29-Jan-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
QC02	**14-Dec-2018**	**21-Dec-2018**	28-Dec-2018	✓	**21-Dec-2018**	28-Dec-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
QC02	**14-Dec-2018**	**20-Dec-2018**	21-Dec-2018	✓	**21-Dec-2018**	29-Jan-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
QC02	**14-Dec-2018**	**21-Dec-2018**	28-Dec-2018	✓	**21-Dec-2018**	28-Dec-2018	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
QC02	**14-Dec-2018**	**21-Dec-2018**	28-Dec-2018	✓	**21-Dec-2018**	28-Dec-2018	✓

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	1	8	**12.50**	**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
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	6	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	0	6	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	7	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	8	**12.50**	**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
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	8	**12.50**	**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
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	8	**12.50**	**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
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	6	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	0	6	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	7	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
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 AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A 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 (2013) Schedule B(3)
Volatile Organic Compounds	EP074	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B 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 (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 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 (2013) 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 sparging.

Appendix G – Waste tracking documents

NSW Environment Protection Authority - Online Waste Tracking System

TRANSPORT CERTIFICATE - No. 2T00955002

Created by : TOM CUBIS 09-Jan-2019 11:36 am **Status:** Processed

CA no: 2C00149931 **CA start date:**01-Jan-2019 **CA end date:** 31-Dec-2019

PART 1 (this part to be completed by consignor at pickup)

CONSIGNOR

GHD Pty Ltd - Sydney
Level 15 / 133 Castlereagh ST
Sydney, NSW 2000

Role: Producer
Contact: Sophie Thrower **Email:** N/A
Phone: (04) 2100 1801 **Fax:** N/A **Emergency:** (04) 2100 1801
ABN: 39 008 488 373 **ANZSIC code:** 0 **Licence no.:** n/a

Pickup details: 2 Bent St Lindfield NSW

WASTE

Waste code: N220 - Asbestos
Description: Asbestos
Form: Solid **Liquid waste levy applies:** No
Proposed treatment: Storage **Classification:** Special
Contaminants: N/A
Dangerous goods class: N/A **Subsidiary risk class:** N/A **UN no.:** N/A
Packaging type: N/A **Packing group no:** N/A **No. package:** N/A

PICKUP

Pick-up date: 11-Jan-2019 **Intended delivery date:** 16-Jan-2019 **Waste amount at pick up:** 914.00 kg (required - Yes)

PART 2 - TRANSPORTER (this part to be completed by the transporter at pickup)

ENVIRONMENTAL TREATMENT SOLUTIONS (TRANSPORTER)
7 PEMBURY ROAD
MINTO, NSW 2566

Contact: JOCK GERMANY **Email:** jock@envirotreat.com.au
Phone: (02) 9603 3666 **Fax :** (02) 8078 0197 **Transit state:** N/A
Licence no.: 13157 **Vehicle reg:** TBA **Transport type:** Road

PART 3 - RECEIVING FACILITY (this part to be completed by the receiving facility)

ENVIRONMENTAL TREATMENT SOLUTIONS PTY LTD - MINTO
WAREHOUSE B, 7 PEMBURY ROAD
MINTO, NSW 2566

Contact: JOCK GERMANY **Email:** jock@envirotreat.com.au
Phone: (02) 9605 8543 **Fax:**
Licence no.: 20696

Receiving facility ref no.: N/A
Arrival date: 11-Jan-2019 **Waste amt at arrival:** 914.00 kg **Did paper TC accompany load?** Yes
Acceptance date: 11-Jan-2019
Processing date: 11-Jan-2019 **Processing treatment:** Storage

NOTE

NOTE: The Protection of the Environment Operations (Waste) Regulation 2014 ("the Regulation") requires that an approved transport certificate accompany certain wastes when transported into, out of or within NSW. This transport certificate is in the approved form and meets the requirements of the Regulation provided that:

(a) the consignor certifies, by signing this certificate, that the information in Part 1 of the certificate is correct;
(b) the transporter certifies, by signing the certificate, that the information in Part 2 of the certificate is correct; and
(c) the receiving facility (receiver) certifies, by signing this certificate, that the information in Part 3 of the certificate is correct; and
(d) the receiving facility records any discrepancies between the waste received and the information recorded on this certificate in the EPA online waste tracking system.

If any of the information in Parts 1 and 2 of the certificate is not correct and it is not practical at the time to change the information in the EPA online tracking system and print a new version of the certificate, the consignor or transporter must write and initial any corrections on the certificate. The receiving facility must ensure these corrections are entered into the EPA online system as soon as is practicable afterwards.

The receiving facility must retain this certificate for four years.

GHD

Level 15
133 Castlereagh Street, Sydney 2000
T: 61 2 9239 7100 F: OfficeFax E: sydmail@ghd.com

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21-SO1-1359719083-42/https://projects.ghd.com/oc/sydney2/kuringgaicouncillind/Delivery/Documents/2127850_Lindfield_Groundwater_Investigation_Report_31Jan2019.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	Emma Harrison	Andre Smit		Joanna Curry		7 March 2019
1	Emma Harrison	Andre Smit		Joanna Curry		14 March 2019

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