REPORT TO

HEALTH INFRASTRUCTURE

ON

DETAILED SITE INVESTIGATION (DSI)

FOR

PROPOSED NEPEAN CAMHS DEVELOPMENT

AT

NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Date: 24 June 2022

Ref: E33780PLrpt2

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DOCUMENT REVISION RECORD

Report Reference	Report Status	Report Date
E33780PLrpt2	Final Report	24 June 2022

Executive Summary

Health Infrastructure ('the client') commissioned JK Environments (JKE) to undertake a Detailed Site Investigation (DSI) for the proposed Nepean CAMHS development at Nepean Hospital, Derby Street, Kingswood, NSW. The purpose of the investigation is to make an assessment of site contamination.

For the purpose of this report, 'the site' refers to the proposed CAMHS development area. The surrounds within the hospital are referred to as the 'wider hospital campus'. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

This report has been prepared to support the Review of Environmental Factors (REF) for the proposed Nepean CAMHS development, with regards to State Environmental Planning Policy (Resilience and Hazards) 2021[1] (formerly known as SEPP55).

JKE has previously undertaken a preliminary site investigation (PSI) at the site, included a review of historical information and sampling from four borehole locations. Potential sources of contamination and areas of environmental concern (AEC) were identified that triggered a requirement for a DSI.

The primary aims of the investigation were to make an assessment of the soil and groundwater contamination conditions. The objectives were to:

- Assess the soil and groundwater contamination conditions via implementation of a sampling and analysis program;
- Prepare a conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

The scope of work included the following:

- Review of existing site information from the PSI;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP);
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The DSI included sampling from seven borehole locations and groundwater sampling from three groundwater wells installed for the investigation. No elevations of the contaminants of potential concern (CoPC) above the human-health or ecological based SAC were encountered in the soil samples analysed. Elevations of heavy metals in groundwater were identified above the ecological SAC, however these were considered to be consistent with regional/background groundwater conditions. Soil and groundwater contamination triggering a need for remediation was not identified.

Bonded asbestos containing material (ACM) was previously identified (during the PSI) on the ground surface within the sub-floor of the existing Nepean 2 building in the eastern area of the site. The asbestos-related risks in the context of the current land use were assessed to be low due to the most likely form of the asbestos being ACM (i.e. non-friable) and access to the exposed area currently being restricted (sub-floor). Notwithstanding, any remaining ACM fragments will need to be removed prior to the commencement of construction so that potential risks are adequately mitigated.

Based on the Tier 1 risk assessment, contamination related risks in the context of the current land use and the proposed development were assessed to be low. JKE is of the opinion that the site can be made suitable for the proposed development subject to appropriate implementation of the following recommendations:

[1] *State Environmental Planning Policy (Resilience and Hazards) 2021* (NSW) (referred to as SEPP Resilience and Hazards 2021)

- The buildings/structures are to be appropriately demolished and clearance certificates are to be provided following removal of any hazardous building materials. All demolition and clearances should occur prior to removal of the hardstand in order to reduce the potential for cross contamination with the underlying soils;
- Following completion of the demolition works, undertake an 'emu pick' of the site for fragments of fibre cement/ACM at the surface of the site. The pick should be conducted by a suitably licensed asbestos contractor. On completion of the pick, a clearance certificate should be issued by a competent person or SafeWork NSW Licensed Asbestos Assessor to ensure the area is free of visible asbestos; and
- Development and implementation of an unexpected finds protocol during the proposed development works.

JKE is of the opinion that there is currently no requirement to report the contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[2]. This is to be further evaluated as the project proceeds.

The conclusions and recommendations should be read in conjunction with the limitations presented in the body of this report.

[2] NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997* (referred to as Duty to Report Contamination)

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Abbreviations

Asbestos Fines/Fibrous Asbestos	**AF/FA**
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Australian Height Datum	**AHD**
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JK Environments	**JKE**
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Source, Pathway, Receptor	**SPR**
Specific Contamination Concentration	**SCC**
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Total Recoverable Hydrocarbons	**TRH**
Trip Spike	**TS**
Upper Confidence Limit	**UCL**
United States Environmental Protection Agency	**USEPA**
Underground Storage Tank	**UST**
Virgin Excavated Natural Material	**VENM**
Volatile Organic Compounds	**VOC**
World Health Organisation	**WHO**
Work Health and Safety	**WHS**

Units

Litres	**L**
Metres BGL	**mBGL**
Metres	**m**
Millivolts	**mV**
Millilitres	**ml or mL**
Milliequivalents	**meq**
micro Siemens per Centimetre	**µS/cm**
Micrograms per Litre	**µg/L**
Milligrams per Kilogram	**mg/kg**
Milligrams per Litre	**mg/L**
Parts Per Million	**ppm**
Percentage	**%**
Percentage weight for weight	**%w/w**

1 INTRODUCTION

Health Infrastructure ('the client') commissioned JK Environments (JKE) to undertake a Detailed Site Investigation (DSI) for the proposed Nepean CAMHS development at Nepean Hospital, Derby Street, Kingswood, NSW. The purpose of the investigation is to make an assessment of site contamination.

For the purpose of this report, 'the site' refers to the proposed CAMHS development area. The surrounds within the hospital are referred to as the 'wider hospital campus'. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

This report has been prepared to support the Review of Environmental Factors (REF) for the proposed Nepean CAMHS development, with regards to State Environmental Planning Policy (Resilience and Hazards) 2021[3] (formerly known as SEPP55).

A geotechnical investigation was undertaken previously to this DSI by JK Geotechnics (JKG). The results of the geotechnical investigation are presented in a separate report (Ref: 33780LTrpt, dated 17 May 2021)[4]. This report should be read in conjunction with the JKG report.

JKE has previously undertaken a Hazardous Building Materials Survey (Ref: E33780PLrpt-HAZ, dated February 2021)[5] and a preliminary site investigation (PSI) (Ref: E33780PLrpt, dated 14 May 2021)[6] at the site. A summary of this information has been included in Section 2.

1.1 Proposed Development Details

From the architectural drawings and information provided, we understand that the CAMHS development will consist of a two-storey building with an under-croft basement. The approximate extent of the proposed building is shown on the attached Figure 2. We note that the site boundary may be adjusted slightly in future from that shown on Figures 1 and 2.

Excavation to achieve the ground floor level will be to maximum depths of approximately 1m below ground level (BGL) at the western end, and reducing to the east with the eastern third of the building to be above existing ground levels. Locally deeper excavation will be required for the proposed lift pit.

New pavements will be constructed around the eastern and northern sides of the new building. Existing trees along the southern boundary and north-eastern boundary of the site have been classed as tree protection zones (TPZ) and area to be retained. Although no specific landscaped areas are proposed as part of the development, there is uncertainty around the final finishing process for the TPZ's and whether these will fall within the final site boundary. Please refer to the development plans attached in the appendices.

[3] *State Environmental Planning Policy (Resilience and Hazards) 2021* (NSW) (referred to as SEPP Resilience and Hazards 2021)

[4] JKG, (2021). *Report to Health Infrastructure on Geotechnical Investigation for Proposed CAMHS Development at Nepean Hospital, Derby Street, Kingswood, NSW.* (referred to as JKG report)

[5] JKE, (2021). *Report to Health Infrastructure c/- CBRE on Hazardous Building Materials Survey for Proposed Nepean CAMHS Development at Nepean Hospital, Derby Street, Kingswood, NSW.* (Ref: E33780PLrpt-HAZ) (referred to as Hazmat)

[6] JKE, (2021). *Report to Health Infrastructure c/- CBRE on Preliminary (Stage 1) Site Investigation for Proposed Nepean CAMHS Development at Nepean Hospital, Derby Street, Kingswood, NSW.* (Ref: E33780PLrpt) (referred to as PSI)

1.2 Aims and Objectives

The primary aims of the investigation were to make an assessment of the soil and groundwater contamination conditions. The objectives were to:

- Assess the soil and groundwater contamination conditions via implementation of a sampling and analysis program;
- Prepare a conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

1.3 Scope of Work

The investigation was undertaken generally in accordance with a JKE proposal (Ref: EP55874PL) of 4 February 2022 and written acceptance from the client of 22 June 2022. The scope of work included the following:

- Review of existing site information from the PSI;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP);
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)[7], other guidelines made under or with regards to the Contaminated Land Management Act (1997)[8] and SEPP Resilience and Hazards 2021. A list of reference documents/guidelines is included in the appendices.

[7] National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).* (referred to as NEPM 2013)

[8] Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

2 SITE INFORMATION

2.1 PSI

The PSI included a review of site information and soil sampling from four borehole locations (the PSI borehole locations are shown on Figure 2). Historical reports were reviewed for the PSI, including a Preliminary Environmental Site Assessment (ESA) of the wider hospital campus conducted by JKE in 2017. The 2017 ESA report also referenced and included review of two previous contamination reports prepared by Golder Associates which covered other portions of the wider hospital campus, with some overlap into the site area.

The site has historically been vacant or used for grazing/agricultural purposes. The site was then developed as part of the wider hospital campus from sometime prior to 1970 and has been part of the hospital to the present day.

The historical storage of flammable liquids (notably xylene), an underground storage tank (UST) (within the wider hospital campus) and detectable concentrations of xylene within groundwater were identified during previous investigations by Golder (within the wider hospital campus). The previous investigations did not identify significant, widespread contamination in fill.

The PSI identified bonded asbestos containing material (ACM) on the ground surface within the sub-floor of the existing Nepean 2 building in the eastern area of the site (see sample 8 on Figure 3). The ACM was sampled as part of the Hazmat survey, please refer to the Hazmat report for the relevant laboratory results. Based on the Tier 1 risk assessment, it was concluded that the contamination identified at the site may pose a risk to human-health if the contamination is not managed properly during the construction phase of the proposed development. The asbestos-related risks in the context of the current land use were assessed to be low due to the most likely form of the asbestos being bonded ACM (i.e. non-friable) and access to the exposed area currently being restricted (sub-floor).

A DSI was recommended to be undertaken at the site to address the data gaps, including meeting the minimum EPA sampling density and groundwater sampling.

The tabulated laboratory results and borehole logs from the PSI are provided in Appendix I.

2.2 Site Identification

Table 2-1: Site Identification

Current Site Owner (certificate of title):	Health Infrastructure NSW
Site Address:	Derby Street, Kingswood, NSW
Lot & Deposited Plan:	Part of Lot 4 in DP1238301
Current Land Use:	Hospital
Proposed Land Use:	Hospital
Local Government Authority:	Penrith City Council

Current Zoning:	SP2: Infrastructure
Site Area (m^2) (approx.):	3,500m^2
RL (AHD in m) (approx.):	52-56
Geographical Location (decimal degrees) (approx.):	Latitude: -33.760651 Longitude: 150.71437
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2
SAC Exceedance Plan:	Figure 3
Plan of Notable Features from Previous Investigations:	Figure 4

2.3 Summary of Site Conditions

The site is located within the grounds of the wider hospital campus and is bound by and internal service road to the north and a staff car park and Derby Street to the south. The site is located approximately 450m to the north-west of a small tributary to Werrington Creek.

The regional topography is gently undulating characterised by a local ridgeline that runs on a north-south orientation, roughly along Parker Street and the Northern Road. The site itself consisted of a gentle slope down towards the south-east with a gradient of approximately 2°.

At the time of the inspection, the majority of site was occupied by two hospital buildings named 'Nepean 1' which contained staff payroll to the west and 'Nepean 2' which contained ICT education and training centre to the east (see Figure 2). The space between the buildings and around the boundaries of the site contained landscaped garden beds and paved footpaths, with scattered large native trees around the perimeter. No signs or indicators of former land use other than a hospital were identified.

The site was mostly paved around the boundaries with some small areas of landscaped garden bed along the southern boundary. No signs of erosion or soil wash was encountered at the time of the site inspections. The storage of chemicals (other than very small quantities of cleaning products), fuel or waste was not encountered at the time of the site inspections. The Golder 2010a and Golder 2010b reports identified historical USTs in other areas of the wider hospital campus. However, no obvious indicators of active or former USTs were observed during the inspection.

Portions of the site may have historically been cut and/or filled to create a level platform for the existing buildings, particularly in the western portion of the site at the higher end of the slope. Several fibre cement fragments (FCF) were identified within the sub-floor of the Nepean 2 building. A representative sample of FCF was collected (see sample S8 on Figure 3) as part of the Hazmat conducted by JKE during the PSI in 2021. The FCF was found to contain asbestos and was considered to be bonded ACM, and in reasonable condition.

The surround areas of the site included: Internal service road and 'East Block' to the north; staff car park and Derby Street to the south; hospital multi-storey car park to the east; and the Nepean Hospital Mental Health Centre to the west. JKE did not observe any land uses in the immediate surrounds that were identified as potential contamination sources for the site.

2.4 Summary of Geology and Hydrogeology

Regional geological information was reviewed for the PSI. The information indicated that the site is underlain by Bringelly Shale of the Wianamatta Group, which typically consists of shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.

The site is not located in an ASS risk area according to the risk maps prepared by the Department of Land and Water Conservation.

Salinity information presented in the PSI indicated that the site is located within an area of moderate salinity potential.

The information reviewed for the PSI indicated that the subsurface conditions at the site are likely to consist of fill overlying relatively low permeability (residual) soils and shallow bedrock. The boreholes drilled for the PSI supported this, identifying silty clay soils over relatively shallow bedrock. The potential for viable groundwater abstraction and use of groundwater under these conditions is considered to be low. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur. Use of groundwater is not proposed as part of the development.

Considering the local topography and surrounding land features, JKE anticipate groundwater to flow towards the north or north-east. Surface water bodies were not identified in the immediate vicinity of the site. The closest surface water body is the tributary to Werrington Creek located approximately 450m to the south-east of the site. This is cross-gradient from site and is considered unlikely to be a potential receptor.

2.5 Summary of Site History Information

Based on the information reviewed and a weight of evidence assessment of the site history documentation (including that from the PSI), and site observations made by JKE, we consider that the site has been historically vacant or used for grazing purposes since at least 1943 and it is presumed to have been of similar use before this time.

The site was then included in part of the Nepean Hospital Campus around 1949, however development on the site itself did not occur until sometime between 1970 and 1978. The construction of the existing Nepean 2 building occurred sometime between 1978 and 1991 and the construction of the service delivery ramp in the west of the site occurring sometime between 2015 and 2020. Potential cut and fill works may have taken place at any stage during these development works.

The immediate surrounds appeared to have been used for similar purposes, as part of the wider Nepean Hospital campus.

3 CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the site information (including the site inspection information) and the review of site history information. Reference should also be made to the figures attached in the appendices.

A review of the CSM in relation to source, pathway and receptor (SPR) linkages has been undertaken as part of the Tier 1 risk assessment process, as outlined in Section 8.

3.1 Potential Contamination Sources/AEC and CoPC

The potential contamination sources/AEC and CoPC are presented in the following table:

Table 3-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern

Source / AEC	CoPC
Fill material – The PSI identified fill to depths of between approximately 0.5mBGL and 2.1mBGL. The fill may have been imported from various sources and could be contaminated. The PSI did not identify significant, widespread contamination in fill. However, ACM/FCF was found on the surface of the site. It is unclear whether this ACM was associated with fill or surface impacts from hazardous building materials/demolition.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
Off-site sources of contamination (within the wider hospital campus) – Historical records and findings from the previous investigations identified: bulk diesel storage and flammable liquids (notably xylene) in the north-western section and of the wider hospital campus; at least one UST was identified within the wider hospital campus; and detectable concentrations of xylene in ground water as identified in BH102 in the Golder 2010b investigation. Refer to Figure 4 for the locations of these off-site sources.	Lead, TRH, BTEX, PAHs and BTEX
Historical agricultural use – The site may have been historically used for grazing purposes prior to 1949. This could have resulted in contamination across the site via use of machinery, application of pesticides, installation of pipework containing asbestos etc.	Heavy metals, TRH, PAHs, OCPs, PCBs and asbestos JKE note that OCPs only became commercially available in the 1940s. Prior to this time pesticides were predominantly heavy metal compounds.
Use of pesticides – Pesticides may have been used beneath the buildings and/or around the site for typical pest control applications.	Heavy metals and OCPs
Hazardous Building Material – FCF/ACM and demolition debris were identified on the ground surface within the sub-floor of the Nepean 2 building during the PSI. Asbestos building materials and light fittings potentially	Asbestos, lead and PCBs

Source / AEC	CoPC
containing PCBs have been identified with the existing buildings/structures on site.	

3.2 Mechanism for Contamination, Affected Media, Receptors and Exposure Pathways

The mechanisms for contamination, affected media, receptors and exposure pathways relevant to the potential contamination sources/AEC are outlined in the following CSM table:

Table 3-2: CSM

Potential mechanism for contamination	Potential mechanisms for contamination include: • Fill material – importation of impacted material, 'top-down' impacts (e.g. placement of fill, leaching from surficial material etc), or sub-surface release (e.g. impacts from buried material); • Off-site (wider hospital campus) sources (fuel storage/xylene impacts) – 'top-down', spills (e.g. during filling of the tanks and/or dispensing activities), or sub-surface release (e.g. from leaking tank or pipework); • Historical agricultural use – 'top-down' and spills (e.g. application of pesticides, refuelling or repairing machinery, and other activities at the ground surface level); • Use of pesticides – 'top-down' and spills (e.g. during normal use, application and/or improper storage); and • Hazardous building materials – 'top-down' (e.g. demolition resulting in surficial impacts in unpaved areas).
Affected media	Soil and groundwater have been identified as potentially affected media. It is noted that some of the CoPC are volatile and may affect soil vapour. Soil vapour would need to be considered depending on the contamination status of soil/groundwater.
Receptor identification	Human receptors include site occupants/users (including primarily adults), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users within the same/similar land use setting. Use of the site by children may occur, however is expected to be infrequent. This has been discussed further later in this report. Ecological receptors include terrestrial organisms and plants within unpaved areas. This has been included to incorporate the potential tree protection zones (TPZ) and any associated landscaping which may occur in these areas.
Potential exposure pathways	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, naphthalene and BTEX). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include primary/direct contact and ingestion. Exposure during future site use could occur via inhalation of vapours within enclosed spaces such as buildings and basements. This pathway would only be a consideration

	if elevated concentrations of volatile contaminants be identified in soil or groundwater.
Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into the proposed basement and/or building (either from soil contamination or volatilisation of contaminants from groundwater); and • Contact (dermal, ingestion or inhalation) during construction and/or with exposed soils in the TPZ's and associated unpaved areas. Whilst there are no surface water bodies in the immediate vicinity and no associated receptors, we have assessed the groundwater data against relevant ecological criteria for screening purposes.

4 SAMPLING, ANALYSIS AND QUALITY PLAN

4.1 Data Quality Objectives (DQO)

Data Quality Objectives (DQOs) were developed to define the type and quality of data required to achieve the project objectives outlined in Section 1.2. The DQOs were prepared with reference to the process outlined in Schedule B2 of NEPM (2013). The seven-step DQO approach for this project is outlined in the following sub-sections.

The DQO process is validated in part by the Data Quality Assurance/Quality Control (QA/QC) Evaluation. The Data (QA/QC) Evaluation is summarised in Section 6.1 and the detailed evaluation is provided in the appendices.

4.1.1 Step 1 - State the Problem

The CSM identified potential sources of contamination/AEC at the site that may pose a risk to human health and the environment. Investigation data is required to assess the contamination status of the site, assess the risks posed by the contaminants in the context of the proposed development/intended land use, and assess whether remediation is required. This information will be considered by the consent authority in exercising its planning functions in relation to the development proposal.

A waste classification is required prior to off-site disposal of excavated soil/bedrock.

The DQOs were developed by the author of this report and checked by the reviewer. Both the author and reviewer were joint decision-makers in relation to Step 2 of the DQO process.

The investigation was constrained by access limitations associated with the existing structures on site.

4.1.2 Step 2 - Identify the Decisions of the Study

The objectives of the investigation are outlined in Section 1.2. The decisions to be made reflect these objectives and are as follows:

- Are any results above the SAC?
- Do potential risks associated with contamination exist, and if so, what are they?
- Is remediation required?
- Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

4.1.3 Step 3 - Identify Information Inputs

The primary information inputs required to address the decisions outlined in Step 2 include the following:

- Existing relevant environmental data from previous reports;
- Site information, including site observations and site history documentation;
- Sampling of potentially affected media, including soil and groundwater;
- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining, and groundwater physiochemical parameters;

- Laboratory analysis of soils, fibre cement and groundwater for the CoPC identified in the CSM; and
- Field and laboratory QA/QC data.

4.1.4 Step 4 - Define the Study Boundary

The sampling was confined to the site boundaries as shown in Figure 2 (spatial boundary). The sampling was completed between 28 May 2022 and 6 June 2022 (temporal boundary). The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary.

4.1.5 Step 5 - Develop an Analytical Approach (or Decision Rule)

4.1.5.1 Tier 1 Screening Criteria

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined in Section 5. Exceedances of the SAC do not necessarily indicate a requirement for remediation or a risk to human health and/or the environment. Exceedances are considered in the context of the CSM and valid SPR-linkages.

For this investigation, the individual results have been assessed as either above or below the SAC. Statistical evaluation of the dataset via calculation of mean values and/or 95% upper confidence limit (UCL) values has not been undertaken due to the non-probabilistic sampling plan that had to be implemented to account for access constraints. Exceedances of the SAC are consider in conjunction with our lines of evidence as applicable in order to establish whether there is a risk.

4.1.5.2 Field and Laboratory QA/QC

Field QA/QC included analysis of inter-laboratory duplicates, intra-laboratory duplicates, trip spike, trip blank and rinsate samples. Further details regarding the sampling and analysis undertaken, and the acceptable limits adopted, is provided in the Data Quality (QA/QC) Evaluation in the appendices.

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the attached laboratory reports. These criteria were developed and implemented in accordance with the laboratory's National Association of Testing Authorities, Australia (NATA) accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence are reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, JKE typically adopt the most conservative concentration reported (or in some cases, consider the data from the affected sample as an estimate).

4.1.5.3 Appropriateness of Practical Quantitation Limits (PQLs)

The PQLs of the analytical methods are considered in relation to the SAC to confirm that the PQLs are less than the SAC. In cases where the PQLs are greater than the SAC, a discussion of this is provided.

4.1.6 Step 6 – Specify Limits on Decision Errors

To limit the potential for decision errors, a range of quality assurance processes are adopted. A quantitative assessment of the potential for false positives and false negatives in the analytical results is undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected.

Decision errors can be controlled through the use of hypothesis testing. The test can be used to show either that the baseline condition is false or that there is insufficient evidence to indicate that the baseline condition is false. The null hypothesis is an assumption that is assumed to be true in the absence of contrary evidence. For this investigation, the null hypothesis has been adopted which is that, there is considered to be a complete SPR linkage for the CoPC identified in the CSM unless this linkage can be proven not to (or unlikely to) exist. The null hypothesis has been adopted for this investigation.

Quantitative limits on decision errors were not established as the sampling plan was non-probabilistic.

Data Quality Indicators (DQI) for field and laboratory QA/QC samples are defined in the QA/QC Data Evaluation in the appendices. An assessment of the DQI's was made in relation to precision, accuracy, representativeness, completeness and comparability.

4.1.7 Step 7 - Optimise the Design for Obtaining Data

The most resource-effective design will be used in an optimum manner to achieve the investigation objectives. Adjustment of the investigation design can occur following consultation or feedback from project stakeholders. For this investigation, the design was optimised via consideration of the various lines of evidence used to select the sample locations, the media being sampled, and also by the way in which the data were collected.

The sampling plan and methodology are outlined in the following sub-sections.

4.2 Soil Sampling Plan and Methodology

The soil sampling plan and methodology adopted for this investigation is outlined in the table below:

Table 4-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	Samples for the DSI were obtained from seven locations as shown on the attached Figure 2. This number of locations, combined with the four locations for the PSI, meets the minimum sampling density for hotspot identification, as outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)[9]. However, we note that the sampling plan was non-probabilistic, therefore the minimum sampling density which is applicable to hotspot identification is not strictly applicable.
Sampling Plan	The sampling locations were placed on a judgemental sampling plan and were broadly positioned for site coverage, taking into consideration areas that were not easily accessible (i.e. beneath existing buildings). This sampling plan was considered suitable to make an assessment of potential

[9] NSW EPA, (1995), *Contaminated Sites Sampling Design Guidelines.* (referred to as EPA Sampling Design Guidelines 1995)

Aspect	Input
	risks associated with the AEC and CoPC identified in the CSM, and assess whether further investigation is warranted.
Set-out and Sampling Equipment	Sampling locations were set out using a tape measure. In-situ sampling locations were checked for underground services by an external contractor prior to sampling. Samples were collected using a combination of hand equipment in areas where access was restricted, and a drill rig equipped with spiral flight augers (150mm diameter). Soil samples were obtained from a Standard Penetration Test (SPT) split-spoon sampler, and/or directly from the auger.
Sample Collection and Field QA/QC	Soil samples were obtained on 28 May 2022 and 4 June 2022 in accordance with our standard field procedures. Soil samples were collected from the fill and natural profiles based on field observations. The sample depths are shown on the logs attached in the appendices. Samples were placed in glass jars with plastic caps and teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags. During sampling, soil at selected depths was split into primary and duplicate samples for field QA/QC analysis. The field splitting procedure included alternately filling the sampling containers to obtain a representative split sample.
Field Screening	A portable Photoionisation Detector (PID) fitted with a 10.6mV lamp was used to screen the samples for the presence of volatile organic compounds (VOCs). PID screening for VOCs was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. PID calibration records are maintained on file by JKE. The field screening for asbestos quantification included the following: • A representative bulk sample was collected from fill at 1m intervals, or from each distinct fill profile. The quantity of material for each sample varied based on whatever return could be achieved using the auger. The bulk sample intervals are shown on the attached borehole logs; • Each sample was weighed using an electronic scale; • Each bulk sample was passed through a sieve with a 7.1mm aperture and inspected for the presence of fibre cement; • The condition of fibre cement or any other suspected asbestos materials was noted on the field records; and • If observed, any fragments of fibre cement in the bulk sample were collected, placed in a zip-lock bag and assigned a unique identifier. Calculations for asbestos content were undertaken based on the requirements outlined in Schedule B1 of NEPM (2013), as summarised in Section 5.1. A calibration/check of the accuracy of the scale used for weighing the fibre cement fragments was undertaken using a set of calibration weights. Calibration/check records are maintained on file by JKE. The scale used to weigh the 10L samples was not calibrated, however this is not considered significant as this method of providing a weight for the bulk sample is considered to be considerably more accurate than applying a nominal soil density conversion.

Aspect	Input
Decontami-nation and Sample Preservation	Sampling personnel used disposable nitrile gloves during sampling activities. Soil samples were preserved by immediate storage in an insulated sample container with ice. On completion of the fieldwork, the samples were stored temporarily in fridges in the JKE warehouse before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

4.3 Groundwater Sampling Plan and Methodology

The groundwater sampling plan and methodology is outlined in the table below:

Table 4-2: Groundwater Sampling Plan and Methodology

Aspect	Input
Sampling Plan	Groundwater monitoring wells were installed in BH601 (MW601) and BH603 (MW603) by JKG at the time of the PSI and a third well was installed in BH701 (MW107) during the DSI. The wells were positioned to gain a snap-shot of the groundwater conditions. Considering the topography and the location of the nearest down-gradient water body, MW601 was considered to be in the up-gradient area of the site and would be expected to provide an indication of groundwater flowing onto (beneath) the site from the west. MW603 and MW701 were considered to be in the intermediate to down-gradient area of the site and would be expected to provide an indication of groundwater flowing across (beneath) the site and beyond the down-gradient site boundary.
Monitoring Well Installation Procedure	The monitoring well construction details are documented on the appropriate borehole logs attached in the appendices. The monitoring wells were installed to depths of approximately 5.92mBGL to 10mBGL. The wells were generally constructed as follows: • 50mm diameter Class 18 PVC (machine slotted screen) was installed in the lower section of the well to intersect groundwater; • 50mm diameter Class 18 PVC casing was installed in the upper section of the well (screw fixed); • A 2mm sand filter pack was used around the screen section for groundwater infiltration; • A hydrated bentonite seal/plug was used on top of the sand pack to seal the well; and • A gatic cover was installed at the surface with a concrete plug to limit the inflow of surface water. The monitoring well installation, including the screen lengths, were considered suitable for assessment of general groundwater quality with regards to Table 5 in Schedule B2 of NEPM 2013.
Monitoring Well Development	The monitoring wells were developed on 28 May 2022 using a submersible electrical pump. Due to the hydrogeological conditions, groundwater inflow into the wells was relatively low, therefore the wells were pumped until they were effectively dry. The field monitoring records and calibration data are attached in the appendices.
Groundwater Sampling	The monitoring wells were allowed to recharge for approximately nine days after development. Groundwater samples were obtained on 6 June 2022. Prior to sampling, the monitoring wells were checked for the presence of Light Non-Aqueous Phase Liquids (LNAPLs) using an inter-phase probe electronic dip meter. The monitoring well head space was checked for VOCs using a calibrated PID unit. The samples were obtained using a

Aspect	Input
	peristaltic pump. During sampling, the following parameters were monitored using calibrated field instruments: • Standing water level (SWL) using an electronic dip meter; and • pH, temperature, electrical conductivity (EC), dissolved oxygen (DO) and redox potential (Eh) using a YSI Multi-probe water quality meter. Groundwater samples were obtained directly from the single use PVC tubing and placed in the sample containers. Duplicate samples were obtained by alternate filling of sample containers. This technique was adopted to minimise disturbance of the samples and loss of volatile contaminants associated with mixing of liquids in secondary containers, etc. Groundwater removed from the wells during development and sampling was transported to JKE in jerry cans and stored in holding drums prior to collection by a licensed waste water contractor for off-site disposal. The field monitoring record and calibration data are attached in the appendices.
Decontaminant and Sample Preservation	During development, the pump was flushed between monitoring wells with potable water (single-use tubing was used for each well). The pump tubing was discarded after each sampling event and replaced therefore no decontamination procedure was considered necessary. The samples were preserved with reference to the analytical requirements and placed in an insulated container with ice or ice bricks. On completion of the fieldwork, the samples were temporarily stored in a fridge at the JKE office, before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures.

4.3.1 Laboratory Analysis

Samples were analysed by an appropriate, NATA Accredited laboratory using the analytical methods detailed in Schedule B(3) of NEPM 2013. Reference should be made to the laboratory reports attached in the appendices for further details.

Table 4-3: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including (intra-laboratory duplicates, trip blanks, trip spikes and field rinsate samples)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	296694, 297282 & 297295
Inter-laboratory duplicates	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	31757 & 31872

5 SITE ASSESSMENT CRITERIA (SAC)

The SAC were derived from the NEPM 2013 and other guidelines as discussed in the following sub-sections. The guideline values for individual contaminants are presented in the attached report tables and further explanation of the various criteria adopted is provided in the appendices.

The guidelines on specific land use scenarios outlined in the NEPM 2013, Schedule B7, Section 3.2.5.3, state that:

"Adults of working age are the population usually most sensitive to health risks associated with soil contamination within the generic commercial/industrial land use scenario. Although many commercial premises welcome children on an intermittent basis, it is unlikely that children visit the majority of workplaces frequently. Similarly, in commercial premises where children are regular visitors, such as shopping centres, both the duration and frequency of child exposures are generally lower than that of a full-time adult employee."

"In accordance with the recommendations outlined in enHealth (2004), the adult employees addressed in the HIL D values have been considered to work within the same commercial/industrial premises for their full working life (30 years). The HILs developed for the commercial/industrial land use scenario are not applicable to a site used frequently by more sensitive groups such as children (within childcare centres, hospitals and hotels) and the elderly (within hospitals, aged care facilities and hospices)."

For this proposed development and associated land use at the site, we have adopted the commercial/industrial human-health and ecological SAC. This SAC is based on the proposed land use as a mental health service facility which will welcome children on an intermittent basis (for appointments) and it is unlikely that children will be visiting the site frequently or for extended time periods.

5.1 Soil

Soil data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013) as outlined below.

5.1.1 Human Health

- Health Investigation Levels (HILs) for a 'commercial/industrial' exposure scenario (HIL-D);
- Health Screening Levels (HSLs) for a 'commercial/industrial' exposure scenario (HSL-D). HSLs were calculated based on conservative assumptions including a 'sand' type and a depth interval of 0m to 1m;
- HSLs for direct contact presented in the CRC Care Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)[10]; and
- Asbestos was assessed against the HSL-D criteria. A summary of the asbestos criteria is provided in the table below:

[10] Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC Care), (2011). Technical Report No. 10 - *Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document*

Table 5-1: Details for Asbestos SAC

Guideline	Applicability
Asbestos in Soil	The HSL-D criteria were adopted for the assessment of asbestos in soil. The SAC adopted for asbestos were derived from the NEPM 2013 and are based on the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2021)[11]. The SAC include the following: • No visible asbestos at the surface/in the top 10cm of soil; • <0.05% w/w bonded asbestos containing material (ACM) in soil; and • <0.001% w/w asbestos fines/fibrous asbestos (AF/FA) in soil. Concentrations for bonded ACM concentrations in soil are based on the following equation which is presented in Schedule B1 of NEPM (2013): **% w/w asbestos in soil = % asbestos content x bonded ACM (kg)** / Soil volume (L) x soil density (kg/L) However, we are of the opinion that the actual soil volume in a 10L bucket varies considerably due to the presence of voids, particularly when assessing cohesive soils. Therefore, each bucket sample was weighed using electronic scales and the above equation was adjusted as follows (we note that the units have also converted to grams): **% w/w asbestos in soil = % asbestos content x bonded ACM (g)** / Soil weight (g)

5.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for a 'commercial/industrial' exposure scenario. These have only been applied to the top 2m of soil as outlined in NEPM (2013). The criterion for benzo(a)pyrene has been increased from the value presented in NEPM (2013) based on the Canadian Soil Quality Guidelines[12];
- ESLs were adopted based on the soil type;
- EILs for selected metals were calculated based on the most conservative added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013) and published ambient background concentration (ABC) values presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)[13]. This method is considered to be adequate for the Tier 1 screening.

5.1.3 Management Limits for Petroleum Hydrocarbons

Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were considered.

[11] Western Australian (WA) Department of Health (DoH), (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. (referred to as WA DoH 2021)

[12] Canadian Council of Ministers of the Environment, (1999). *Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)* (referred to as the Canadian Soil Quality Guidelines)

[13] Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4*. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

5.1.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)[14] as outlined in the following table:

Table 5-2: Waste Categories

Category	Description
General Solid Waste (non-putrescible)	• If Specific Contaminant Concentration (SCC) ≤ Contaminant Threshold (CT1) then Toxicity Characteristics Leaching Procedure (TCLP) not needed to classify the soil as general solid waste; and • If TCLP ≤ TCLP1 and SCC ≤ SCC1 then treat as general solid waste.
Restricted Solid Waste (non-putrescible)	• If SCC ≤ CT2 then TCLP not needed to classify the soil as restricted solid waste; and • If TCLP ≤ TCLP2 and SCC ≤ SCC2 then treat as restricted solid waste.
Hazardous Waste	• If SCC > CT2 then TCLP not needed to classify the soil as hazardous waste; and • If TCLP > TCLP2 and/or SCC > SCC2 then treat as hazardous waste.
Virgin Excavated Natural Material (VENM)	Natural material (such as clay, gravel, sand, soil or rock fines) that meet the following: • That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities; • That does not contain sulfidic ores or other waste; and • Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette.

5.2 Groundwater

Groundwater data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013), following an assessment of environmental values in accordance with the Guidelines for the Assessment and Management of Groundwater Contamination (2007)[15]. Environmental values for this investigation include human-health risks in non-use scenarios. Aquatic ecosystems are also being considered for completeness.

5.2.1 Human Health

- HSLs for a 'commercial/industrial' exposure scenario (HSL-D). HSLs were calculated based on the soil type and the observed depth to groundwater;
- However, the NEPM (2013) HSLs were not applicable for MW701 as the groundwater was recorded at depths shallower than 2m. On this basis, JKE has undertaken a site-specific assessment (SSA) for MW701 only for the Tier 1 screening of human health risks posed by volatile contaminants in groundwater. The assessment included selection of alternative Tier 1 criteria that were considered suitably protective of human health. These criteria are based on drinking water guidelines and have been referred to as HSL-SSA. The criteria were based on the following (as shown in the attached report tables):

[14] NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* (referred to as Waste Classification Guidelines 2014)

[15] NSW Department of Environment and Conservation, (2007). *Guidelines for the Assessment and Management of Groundwater Contamination.*

- Australian Drinking Water Guidelines 2011 (updated 2021)[16] for BTEX compounds and selected VOCs;
- World Health Organisation (WHO) document titled Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality (2008)[17] for petroleum hydrocarbons;
- USEPA Region 9 screening levels for naphthalene (threshold value for tap water); and
- The use of the laboratory PQLs for other contaminants where there were no Australian guidelines.

5.2.2 Environment (Ecological - aquatic ecosystems)

Groundwater Investigation Levels (GILs) for 95% protection of freshwater species were adopted based on the Default Guideline Values in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018)[18]. The 99% trigger values were adopted where required to account for bioaccumulation. Low and moderate reliability trigger values were also adopted for some contaminants where high-reliability trigger values don't exist.

[16] National Health and Medical Research Council (NHMRC), (2021). *National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011* (referred to as ADWG 2011)

[17] World Health Organisation (WHO), (2008). *Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality* (referred to as WHO 2008)

[18] Australian and New Zealand Governments (ANZG), (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (referred to as ANZG 2018)

6 RESULTS

6.1 Summary of Data (QA/QC) Evaluation

The data evaluation is presented in the appendices. In summary, JKE is of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

6.2 Subsurface Conditions

A summary of the subsurface conditions encountered during the investigation is presented in the following table. Reference should be made to the borehole logs attached in the appendices for further details.

Table 6-1: Summary of Subsurface Conditions

Profile	Description
Pavement	Concrete slab/pavement was encountered at the surface in BH701, BH702, BH704 and BH705 to depths of between approximately 0.06mBGL to 0.17mBGL.
Fill	Fill was encountered at the surface or beneath the pavement in all boreholes and extended to depths of approximately 0.3mBGL to 1.5mBGL. The fill depths are shown on Figure 2. The fill typically comprised silty clay, silty gravelly clay and sandy gravelly clay with inclusions of ash, slag, brick and concrete fragments). Staining or odours were not encountered during drilling.
Natural Soil	Natural silty clay soil was encountered beneath the fill in all boreholes and extended to depths of between approximately 0.3mBGL and 2.0mBGL.
Bedrock	Weathered claystone bedrock was encountered in BH701 and BH705 at depths of between 0.33mBGL and 1.85mBGL. The claystone extended to the termination depth of the boreholes where it was encountered.
Groundwater	Groundwater seepage was not encountered in the boreholes during drilling. All boreholes remained dry on completion of drilling and a short time after.

6.3 Field Screening

A summary of the field screening results is presented in the following table:

Table 6-2: Summary of Field Screening

Aspect	Details
PID Screening of Soil Samples for VOCs	PID soil sample headspace readings are presented in attached report tables and the COC documents attached in the appendices. All results were 0ppm isobutylene equivalents which indicates a lack of PID detectable VOCs.
Bulk Screening for Asbestos	The bulk field screening results are summarised in the attached report tables. All screening results were below the SAC. Visible asbestos/FCF/ACM was not identified in the bulk samples.
Groundwater Depth & Flow	Groundwater seepage was not encountered in the boreholes during drilling and remained dry during and a short time after completion of drilling.

Aspect	Details
	SWLs measured in the monitoring wells installed at the site ranged from 2.91mBGL to 5.92mBGL. The groundwater wells were not surveyed, therefore groundwater RLs were not calculated on these measurements. However, based on the contour plot created as part of a previous investigation at the hospital by JKE, groundwater flow is considered to be generally towards the north-east.
Groundwater Field Parameters	Field measurements recorded during sampling were as follows: - pH ranged from 6.36 to 6.55; - EC ranged from 12,813µS/cm to 22,684µS/cm; - Eh ranged from 57.2mV to 89.6mV; and - DO ranged from 0.3ppm to 3.4ppm. VOC concentrations in the monitoring well headspace were 0ppm at the time of sampling.
LNAPLs petroleum hydrocarbons	Phase separated product (i.e. LNAPL) were not detected using the interphase probe during groundwater sampling.

6.4 Soil Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 5.1. Individual SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

6.4.1 Human Health and Environmental (Ecological) Assessment

Table 6-3: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	11	7	0	0	-
Cadmium	11	<PQL	0	NSL	-
Chromium (total)	11	25	0	0	-
Copper	11	34	0	0	-
Lead	11	16	0	0	-
Mercury	11	<PQL	0	NSL	-
Nickel	11	38	0	0	-
Zinc	11	54	0	0	-
Total PAHs	11	2.3	0	NSL	-
Benzo(a)pyrene	11	0.2	NSL	0	-

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Carcinogenic PAHs (as BaP TEQ)	11	<PQL	0	NSL	-
Naphthalene	11	<PQL	0	NSL	-
DDT+DDE+DDD	11	<PQL	0	NSL	-
DDT	11	<PQL	NSL	0	-
Aldrin and dieldrin	11	6	0	NSL	-
Chlordane	11	1.8	0	NSL	-
Heptachlor	11	0.9	0	NSL	-
Chlorpyrifos (OPP)	11	<PQL	0	NSL	-
PCBs	11	<PQL	0	NSL	-
TRH F1	11	<PQL	0	0	-
TRH F2	11	<PQL	0	0	-
TRH F3	11	130	0	0	-
TRH F4	11	<PQL	0	0	-
Benzene	11	<PQL	0	0	-
Toluene	11	<PQL	0	0	-
Ethylbenzene	11	<PQL	0	0	-
Xylenes	11	<PQL	0	0	-
Asbestos (in soil) ACM >7mm AF/FA	7	<0.01 % w/w AF/FA 0.001% w/w	0 0	-	-

Notes:

N: Total number (primary samples)

NSL: No set limit

NL: Not limiting

6.4.2 Waste Classification Assessment

The laboratory results were assessed against the criteria presented in Section 5.1.4. The results are presented in the report tables attached in the appendices. A summary of the results is presented in the following table:

Table 6-4: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
Arsenic	11	0	0	-
Cadmium	11	0	0	-
Chromium	11	0	0	-
Copper	11	NSL	NSL	-
Lead	11	0	0	-
Mercury	11	0	0	-
Nickel	11	0	0	-
Zinc	11	NSL	NSL	-
TRH (C_6-C_9)	11	0	0	-
TRH (C_{10}-C_{36})	11	0	0	-
BTEX	11	0	0	-
Total PAHs	11	0	0	-
Benzo(a)pyrene	11	0	0	-
OCPs & OPPs	11	0	0	-
PCBs	11	0	0	-
Asbestos	7	-	-	Asbestos was not detected in the samples analysed.

N: Total number (primary samples)

NSL: No set limit

6.5 Groundwater Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 0. Individual SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

Table 6-5: Summary of Groundwater Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N ^	Max. (µg/L)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	3	2	0	0	-
Cadmium	3	0.3	0	0	Cadmium exceeded the ecological SAC in WDUP602 which was the inter-laboratory duplicate of sample MW603.
Chromium (total)	3	5	0	1	One elevated concentration of chromium above the ecological criterion was encountered in MW603, with a maximum concentration of 5µg/L.
Copper	3	3	0	1	One elevated concentration of copper above the ecological criterion was encountered in MW603, with a maximum concentration of 3µg/L.
Lead	3	2	0	0	-
Mercury	3	0.07	0	1	One elevated concentration of mercury above the ecological criterion was encountered in MW603, with a maximum concentration of 0.07µg/L.
Nickel	3	43	0	2	Two elevated concentrations of nickel above the ecological criterion were encountered in MW601 and MW603, with a maximum concentration of 43µg/L identified in the intra-laboratory duplicate (WDUP601) of sample MW601.
Zinc	3	41	0	2	Two elevated concentrations of zinc above the ecological criterion were encountered in MW601 and MW603, with a maximum concentration of 41µg/L identified in the inter-laboratory duplicate (WDUP602) of sample MW603.
Total PAHs	3	<PQL	0	0	-
Benzo(a)pyrene	3	<PQL	0	0	-
Naphthalene	3	<PQL	0	0	-
TRH F1	3	<PQL	0	NSL	-

Analyte	N ^	Max. (µg/L)	N> Human Health SAC	N> Ecological SAC	Comments
TRH F2	3	110	0	NSL	-
TRH F3	3	100	NSL	NSL	-
TRH F4	3	<PQL	NSL	NSL	-
Benzene	3	<PQL	0	0	-
Toluene	3	<PQL	0	0	-
Ethylbenzene	3	<PQL	0	0	-
m+p-Xylene	3	<PQL	NSL	0	-
o-Xylene	3	<PQL	NSL	0	-
Total Xylenes	3	<PQL	0	NSL	-
Other VOCs	3	<PQL	0	0	-
pH	3	7	0	0	-
EC	3	27,000	NSL	NSL	-

Notes:

^: Primary samples

N: Total number

NSL: No set limit

NL: Not limiting

7 WASTE CLASSIFICATION ASSESSMENT

7.1 Waste Classification of Fill

Based on the results of the waste classification assessment, and at the time of reporting, the fill material is assigned a preliminary classification of **General Solid Waste (non-putrescible)**. We note that due to the detection of several scheduled pesticides (OCPs) in sample BH705 (0.14-0.2m), the fill at this location is classified as 'solid scheduled chemical waste' by definition under the *Scheduled Chemical Wastes Chemical Control Order 2004.* Condition 30 of the chemical control order states that solid scheduled chemical waste must be disposed of to a landfill lawfully permitted to receive such waste. On this basis, we recommend that the client/contractor obtain confirmation in writing from the receiving landfill facility that they are approved by the EPA to receive such waste, prior to any excavation/disposal of waste from the site. Reference must be made to the chemical control order for further information.

JKE note that ACM in the form of bonded FCF was identified on the ground surface in the sub-floor of the Nepean 2 building. This material was believed to be a localised issue, and appears to be confined to the ground surface in this area. The ACM/FCF is not considered to be associated with imported fill material or sub-surface soil profiles and therefore, it is not considered to impact the overall waste classification of the fill provided that any remaining fragments are removed and that a clearance certificate is provided prior to the commencement of any excavation works.

7.2 Classification of Natural Soil and Bedrock

Based on the scope of work undertaken for this PSI, and at the time of reporting, JKE is of the opinion that the natural soil and bedrock at the site may meet the definition of **VENM** for off-site disposal or re-use purposes. Further assessment via sampling and/or inspection is required following the removal of the overlying fill (where applicable) to confirm this classification prior to off-site disposal of the waste.

7.3 General Information

Waste must be disposed of to a facility licensed to accept the waste. It is the responsibility of the receiving facility to ensure that the waste material meets their licence conditions. JKE accepts no liability whatsoever for illegal or inappropriate disposal of material.

Section 143 of the POEO Act 1997 states that if waste is transported to a place that cannot lawfully be used as a waste facility for that waste, then the transporter and owner of the waste are each guilty of an offence. The transporter and owner of the waste have a duty to ensure that the waste is disposed of in an appropriate manner. JKE accepts no liability whatsoever for the unlawful disposal of any waste from any site.

8 DISCUSSION

8.1 Tier 1 Risk Assessment and Review of CSM

For a contaminant to represent a risk to a receptor, the following three conditions must be present:

1. Source – The presence of a contaminant;
2. Pathway – A mechanism or action by which a receptor can become exposed to the contaminant; and
3. Receptor – The human or ecological entity which may be adversely impacted following exposure to contamination.

If one of the above components is missing, the potential for adverse risks is relatively low.

8.1.1 Soil/Fill

Asbestos in the form of bonded FCF (i.e. ACM) was identified on the surface of the site within the sub-floor of the Nepean 2 building (see sample S8 on Figure 3) as part of the Hazardous Building Materials Survey.

There is potentially a complete SPR linkage to asbestos in soil in this area given the area is unpaved and the ACM was at the ground surface. However, we note that access to the sub-floor area is restricted for maintenance/service personnel. On this basis, the potential for airborne asbestos fibres to be generated and for exposure to airborne asbestos to occur under the current site conditions is considered to be relatively low. The FCF/ ACM is not considered to be associated with imported fill material.

Asbestos was not identified in any of the bulk field quantification samples or in any of the soil samples analysed at the laboratory.

All remaining (i.e. other than asbestos) CoPC concentrations were below the SAC, indicating that there was no source of contamination associated with these CoPC and no complete SPR linkages.

8.1.2 Groundwater

8.1.2.1 Heavy metals

Elevated concentrations of heavy metals including cadmium, chromium, copper, nickel and zinc above the ecological SAC were encountered in the groundwater sampled from groundwater wells MW601 and MW603. The concentrations were consistent with the heavy metal concentrations encountered during groundwater sampling events undertaken for the previous investigations at the wider hospital campus. Therefore, JKE consider the elevated results are likely to be indicative of regional groundwater background concentrations rather than on on-site contamination source. On this basis, and considering there is no nearby surface water receptor, these heavy metals in groundwater are considered to represent a low risk to ecological receptors.

One elevated concentration of mercury above the ecological SAC was detected in the groundwater sample from MW603. The source of this elevation is unknown, however considering the concentration was only marginally above the SAC and the lack of any potential sources of mercury identified on site or in the surrounds, JKE is of the opinion that this elevation is anomalous and does not represent an on-site contamination issue. Furthermore, in consideration of the depth to groundwater (3.68mBGL) and the lack of

exposure scenarios to any on-site or off-site ecological receptors, JKE consider there is no complete SPR linkage and therefore the potential risk to ecological receptors from mercury is low.

All remaining CoPC concentrations for TRH/BTEX, VOCs and PAHs were below the SAC, indicating that there was no source of contamination associated with these CoPC and no complete SPR linkages.

8.2 Decision Statements

The decision statements are addressed below:

Are any results above the SAC?

Yes, as noted in Section 8.1.

Do potential risks associated with contamination exist, and if so, what are they?

Risks were assessed to be low based on the DSI data.

Is remediation required?

Based on the results of this DSI and in the context of the proposed development, there are no triggers for remediation.

Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

JKE is of the opinion that the site can be made suitable for the proposed development, via appropriate implementation of the recommendations.

8.3 Data Gaps

An assessment of data gaps is provided in the following table:

Table 8-1: Data Gap Assessment

Data Gap	Assessment
Groundwater flow direction not confirmed	Based on the site history and the results reported, the potential for groundwater contamination to pose a risk to the receptors is considered to be low. Additional work to address this data gap is not recommended.
Spatial data gaps with soil sampling	Due to site access constraints, minor spatial data gaps exist in the context of the soil sampling. Recommendations have been made to address this data gap (i.e. development and implementation of an unexpected finds protocol).

9 CONCLUSIONS AND RECOMMENDATIONS

The DSI included sampling from seven borehole locations and groundwater sampling from three groundwater wells installed for the investigation. No elevations of the CoPC above the human-health or ecological based SAC were encountered in the soil samples analysed. Elevations of heavy metals in groundwater were identified above the ecological SAC, however these were considered to be consistent with regional/background groundwater conditions. Soil and groundwater contamination triggering a need for remediation was not identified.

Bonded ACM was previously identified (during the PSI) on the ground surface within the sub-floor of the existing Nepean 2 building in the eastern area of the site. The asbestos-related risks in the context of the current land use were assessed to be low due to the most likely form of the asbestos being ACM (i.e. non-friable) and access to the exposed area currently being restricted (sub-floor). Notwithstanding, any remaining ACM fragments will need to be removed prior to the commencement of construction so that potential risks are adequately mitigated.

Based on the Tier 1 risk assessment, contamination related risks in the context of the current land use and the proposed development were assessed to be low. JKE is of the opinion that the site can be made suitable for the proposed development subject to appropriate implementation of the following recommendations:

- The buildings/structures are to be appropriately demolished and clearance certificates are to be provided following removal of any hazardous building materials. All demolition and clearances should occur prior to removal of the hardstand in order to reduce the potential for cross contamination with the underlying soils;
- Following completion of the demolition works, undertake an 'emu pick' of the site for fragments of FCF/ACM at the surface of the site. The pick should be conducted by a suitably licensed asbestos contractor. On completion of the pick, a clearance certificate should be issued by a competent person or SafeWork NSW Licensed Asbestos Assessor to ensure the area is free of visible asbestos; and
- Development and implementation of an unexpected finds protocol during the proposed development works.

JKE is of the opinion that there is currently no requirement to report the contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[19]. JKE consider that the report objectives outlined in Section 1.2 have been addressed.

[19] NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997* (referred to as Duty to Report Contamination)

10 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified contamination issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or landuse. JKE should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.

Important Information About This Report

These notes have been prepared by JKE to assist with the assessment and interpretation of this report.

The Report is based on a Unique Set of Project Specific Factors
This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, eg addition of basement levels; or
- Ownership of the site changes.

JKE will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the investigation. If the subject site is sold, ownership of the investigation report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the investigation was undertaken. No person should apply an investigation for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions
Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an investigation report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

This Report is based on Professional Interpretations of Factual Data
Site investigations identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an investigation indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Investigation Limitations
Although information provided by a site investigation can reduce exposure to the risk of the presence of contamination, no environmental site investigation can eliminate the risk. Even a rigorous professional investigation may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

Misinterpretation of Site Investigations by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an investigation report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Investigation Report

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the investigation. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the investigation. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete investigation should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

Read Responsibility Clauses Closely

Because an environmental site investigation is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site investigation, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.

Appendix A: Report Figures

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

This plan should be read in conjunction with the Environmental report.

Title: **SITE LOCATION PLAN**

Location: CAMHS SITE, DERBY STREET, KINGSWOOD, NSW

Project No: E33780PL

Figure No: 1

JKEnvironments

PLOT DATE: 22/06/2022 11:09:57 AM DWG FILE: K:\SC EIS JOBS\33000'S\E33780PL KINGSWOOD\CAD\2022-PL\E33780PL.DWG

BH704 (1.5)

BH604 (0.5)

BHMW601 (2.1)

NEPEAN 1

BH705 (0.3)

BH602 (0.5)

BH706 (0.45)

BH/MW701 (0.55)

BH703 (.45)

NEPEAN 2

BH707 (0.45)

APPROXIMATE OUTLINE OF PROPOSED CAMHS BUILDING

BH/MW603 (0.6)

BH702 (0.5)

LEGEND

APPROXIMATE SITE BOUNDARY	
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, PSI)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, PSI)
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, DSI)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, DSI)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 4 8 12 16 20

SCALE 1:400 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAMPLE LOCATION PLAN**

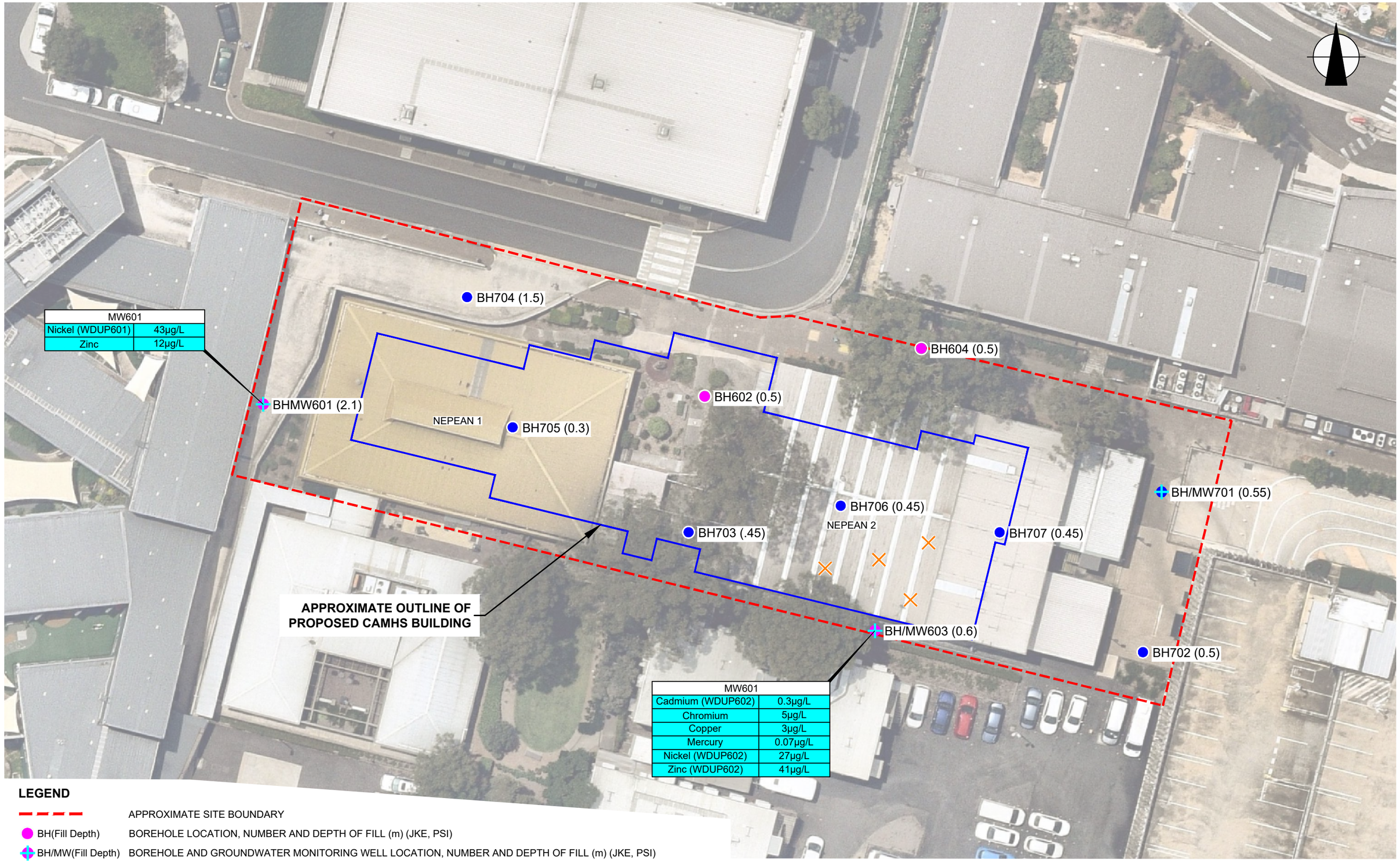
Location: CAMHS SITE, DERBY STREET, KINGSWOOD, NSW

Project No: E33780PL

Figure No: 2

JKEnvironments

PLOT DATE: 23/06/2022 3:02:38 PM DWG FILE: S:\5 EIS\5C EIS JOBS\33000'S\E33780PL KINGSWOOD\CAD\2022-PL\E33780PL.DWG



LEGEND

- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, PSI)
- BH/MW(Fill Depth) — BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, PSI)
- BH(Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, DSI)
- BH/MW(Fill Depth) — BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, DSI)
- APPROXIMATE LOCATION OF FCF/ACM

SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

GROUNDWATER SAMPLE EXCEEDANCE

GROUNDWATER CONCENTRATION ABOVE SAC

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 4 8 12 16 20

SCALE 1:400 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAC EXCEEDANCE PLAN**

Location: CAMHS SITE, DERBY STREET, KINGSWOOD, NSW

Project No: E33780PL

Figure No: 3

JKEnvironments

PLOT DATE: 23/06/2022 3:03:38 PM DWG FILE: S:\5 EIS\5C EIS JOBS\33000'S\E33780PL KINGSWOOD\CAD\2022-PL\E33780PL.DWG

BHI, GOLDER (2010b)

TRH C6-C9	45	µg/L
ETHYLBENZENE	4.4	µg/L
TOTAL XYLENE	43	µg/L
DEPTH TO GROUNDWATER (13/05/2010)	2.8	m

DIESEL STORE 10,000L (FROM RECORDS)

XYLENE IN ROOFED STORE (FROM RECORDS)

APPROXIMATE LOCATION OF ABANDONED UST

BHA, GOLDER (2010b) WHERE ASBESTOS WAS ENCOUNTERED IN FILL SOIL (FILL DEPTH 0.8m)

DIESEL STORE (40L) FORMER RECORDS)

BH102, GOLDER (2010a, 2010b)

TOTAL XYLENE	4.2	µg/L
DEPTH TO GROUNDWATER (30/05/2010)	5.3	m

BHI

BH102

BHA

A44

Lethbridge St

Hope St

Parker St

Somerset St

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE EXTENT OF GOLDER (2010a) INVESTIGATION
- APPROXIMATE EXTENT OF GOLDER (2010b) INVESTIGATION
- APPROXIMATE MONITORING WELL LOCATION (GOLDER 2010a AND 2010b)

0 20 40 60 80 100

SCALE 1:2000 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **NOTABLE FEATURES FROM PREVIOUS INVESTIGATIONS**

Location: NEPEAN HOSPITAL, DERBY STREET KINGSWOOD, NSW

Project No: E33780PL

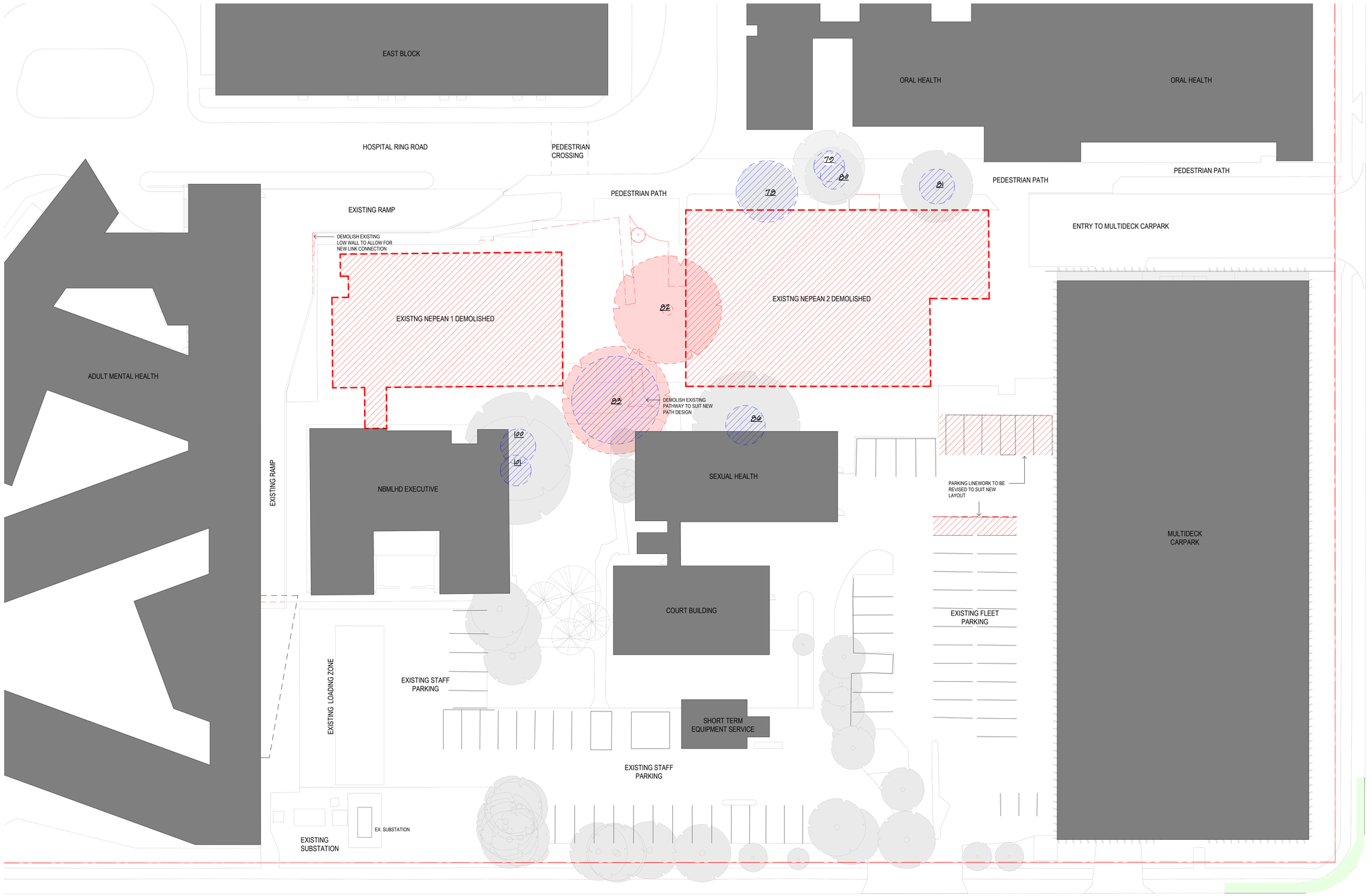
Figure No: 4

JKEnvironments

PLOT DATE: 12/05/2021 12:59:45 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\33000'S\E33780PL KINGSWOOD\CAD\FIG 4\E33780PL.DWG

Appendix B: Site Information and Site History

Proposed Development Plans



SOMERSET STREET

DERBY STREET

KEY PLAN

N

REV	DESCRIPTION	DRN	DATE
A	SCHEMATIC DESIGN ISSUE		19/02/2021
B	SCHEMATIC DESIGN ISSUE		11/03/2021

EXISTING TO REMAIN

DEMOLISH

TREE PROTECTION ZONE (TPZ). REFER TO ARBORIST REPORT

TREE NUMBER. REFER TO ARBORIST REPORT

DIMENSIONS

USE FIGURED DIMENSIONS. DO NOT SCALE. CONTRACTORS MUST VERIFY ALL DIMENSIONS ON THE SITE BEFORE COMMENCING ANY WORK OR MAKING ANY SHOP DRAWING WHICH MUST BE SUBMITTED AND REVIEWED BEFORE MANUFACTURE.

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CLIENT

PROJECT

NEPEAN HOSPITAL CHILD & ADOLESCENT MENTAL HEALTH

Derby Street, Kingswood, NSW, 2747

DRAWING TITLE

EXISTING & DEMOLITION PLAN

SCALE	DATE	DRAWN BY	CHECKED
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PROJECT No	DRAWING No	REVISION
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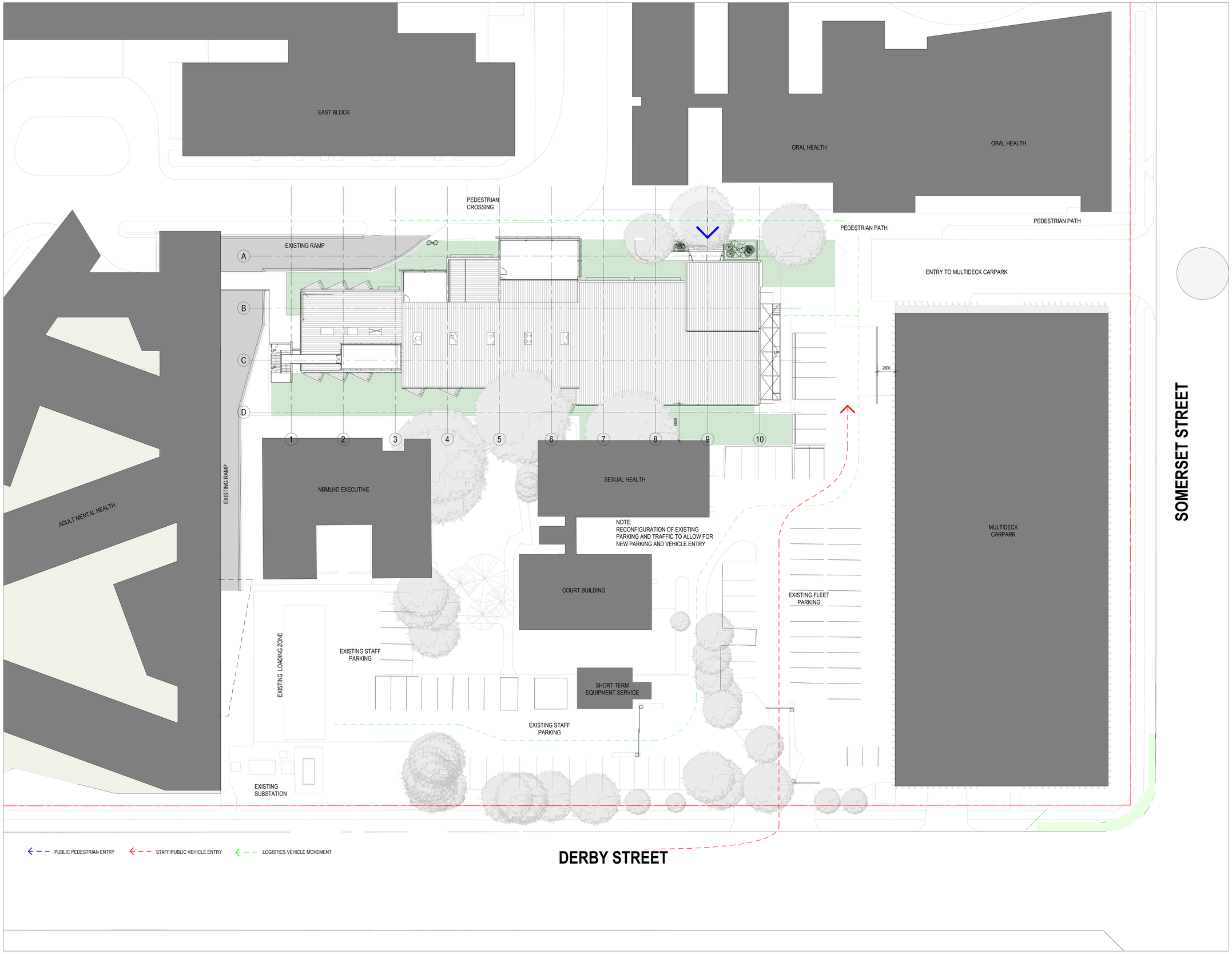

KEY PLAN

N

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NEPEAN HOSPITAL CHILD & ADOLESCENT MENTAL HEALTH

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DRAWING TITLE

PROPOSED SITE PLAN

SCALE	DATE	DRAWN BY	CHECKED
As indicated@A0	19/01/21	EC	EM

PROJECT No	DRAWING No	REVISION
10442	NHR-STH-DRW-ARC-MHS-A10-001	A

EAST BLOCK

HOSPITAL RING ROAD

ORAL HEALTH BUILDING

PEDESTRIAN PATH

SECURE PORT ENTRY RAMP

BUILDING ABOVE

UNDERCROFT

FLEET PARKING

NEPEAN EXECUTIVE BUILDING

SEXUAL HEALTH BUILDING

DRENCHED GLAZED SCREEN AND SLIDING DOORS

CARER BD 18.4 m²

ENS 4.6 m²

ENS 4.6 m²

CARER BD 18.5 m²

LOUNGE / BAY BEV 36.8 m²

CORRIDOR 16.5 m²

EFF/ EWIS TANK 9.2 m²

PHOT 1.5 m²

PHOT

RL 53.08

STAIRS 55.7 m²

SPRINKLER RISER 4.5 m²

ENTRY LOBBY 24.9 m²

LIFT

LOADING DOCK LOBBY 54.9 m²

HOIST

MAIN SWITCH BOARD ROOM 18.5 m²

RL 52320

FIRE PUMP ROOM 22.5 m²

RL 52320

UP

1 A51-001

2 A50-002

A50-001 1

A50-001 2

04 A51-002

03 A51-002

02 A51-002

01 A51-002

1 A50-002

NOTE:
EXISTING TREE NUMBERS AND LOCATIONS ARE INDICATIVE LOCATIONS TBC

KEY PLAN

N

REV	DESCRIPTION	DRN	DATE
A	SCHEMATIC DESIGN ISSUE		15/02/2021

DIMENSIONS

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NEPEAN HOSPITAL CHILD & ADOLESCENT MENTAL HEALTH

Derby Street, Kingswood, NSW, 2747

DRAWING TITLE

LEVEL 01 GENERAL ARRANGEMENT PLAN

SCALE	DATE	DRAWN BY	CHECKED
1 : 100@A0	19/01/21	EC	EM

PROJECT No	DRAWING No	REVISION
10442	NHR-STH-DRW-ARC-MHS-A20-101	A

EAST BLOCK

ORAL HEALTH

HOSPITAL RING ROAD

PEDESTRIAN PATH

EXISTING RAMP

COURTYARD BELOW

COURTYARD BELOW

ROOFTOP PLANT ZONE

SKY

3.00° FALL

2.62° FALL

UP

NBMLHD EXECUTIVE

SEXUAL HEALTH

EXISTING FLEET PARKING

EXISTING RAMP

NOTE:
EXISTING TREE NUMBERS AND LOCATIONS ARE INDICATIVE LOCATION TBC

KEY PLAN

N

REV	DESCRIPTION	DRN	DATE
A	SCHEMATIC DESIGN ISSUE		15/02/2021

SKY : SKYLIGHT

DIMENSIONS

USE FIGURED DIMENSIONS, DO NOT SCALE. CONTRACTORS MUST VERIFY ALL DIMENSIONS ON THE SITE BEFORE COMMENCING ANY WORK OR MAKING ANY SHOP DRAWING WHICH MUST BE SUBMITTED AND REVIEWED BEFORE MANUFACTURE.

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CLIENT

PROJECT

NEPEAN HOSPITAL CHILD & ADOLESCENT MENTAL HEALTH

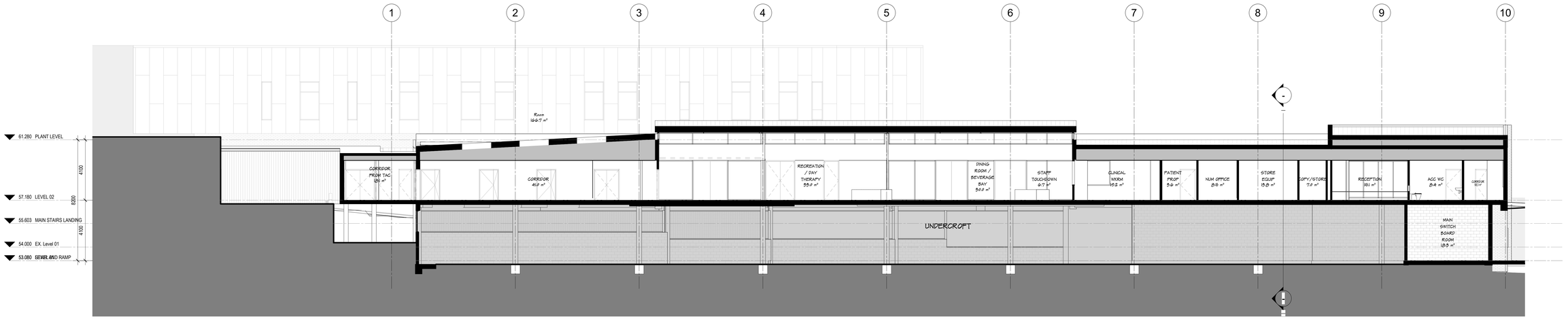
Derby Street, Kingswood, NSW, 2747

DRAWING TITLE

ROOF PLAN

SCALE	DATE	DRAWN BY	CHECKED
1 : 100@A0	19/01/21	EC	EM

PROJECT No	DRAWING No	REVISION
10442	NHR-STH-DRW-ARC-MHS-A20-301	A



1 **SITE SECTIONS EAST - WEST**
SCALE: 1 : 100

KEY PLAN

REV	DESCRIPTION	DRN	DATE
A	SCHEMATIC DESIGN ISSUE		15/02/2021

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NEPEAN HOSPITAL CHILD & ADOLESCENT MENTAL HEALTH

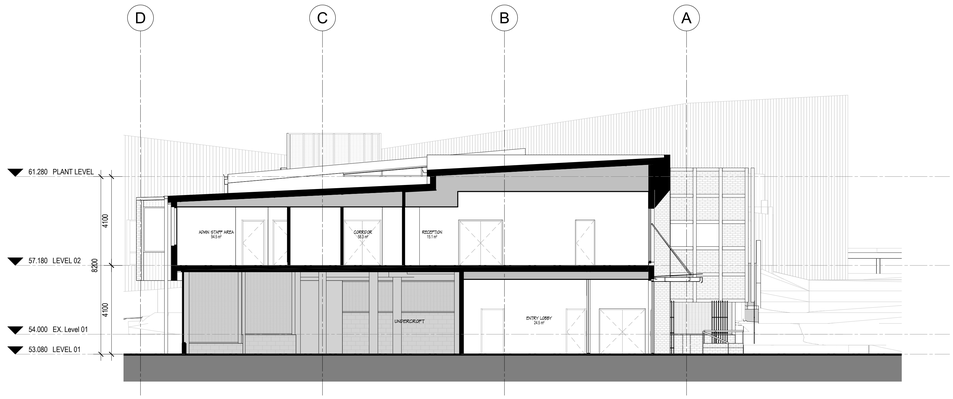
Derby Street, Kingswood, NSW, 2747

DRAWING TITLE

SECTIONS

SCALE	DATE	DRAWN BY	CHECKED
1 : 100@A0	19/01/21	CJ	EM

PROJECT No	DRAWING No	REVISION
10442	NHR-STH-DRW-ARC-MHS-AS1-001	A



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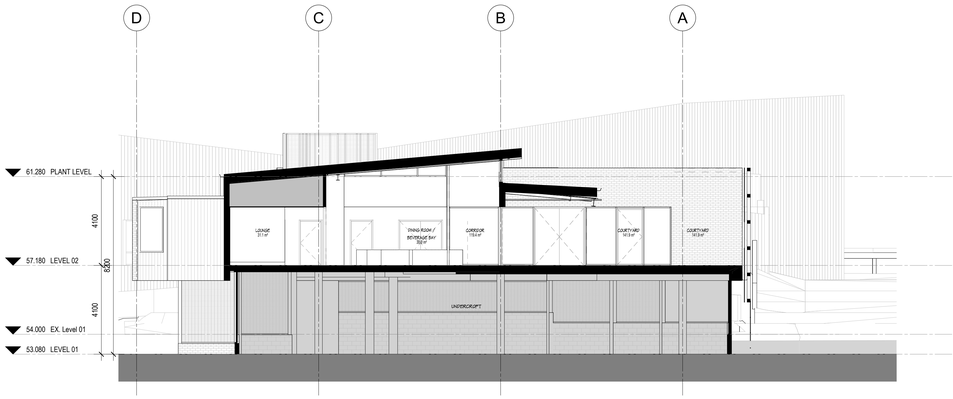
SCALE: 1 : 100



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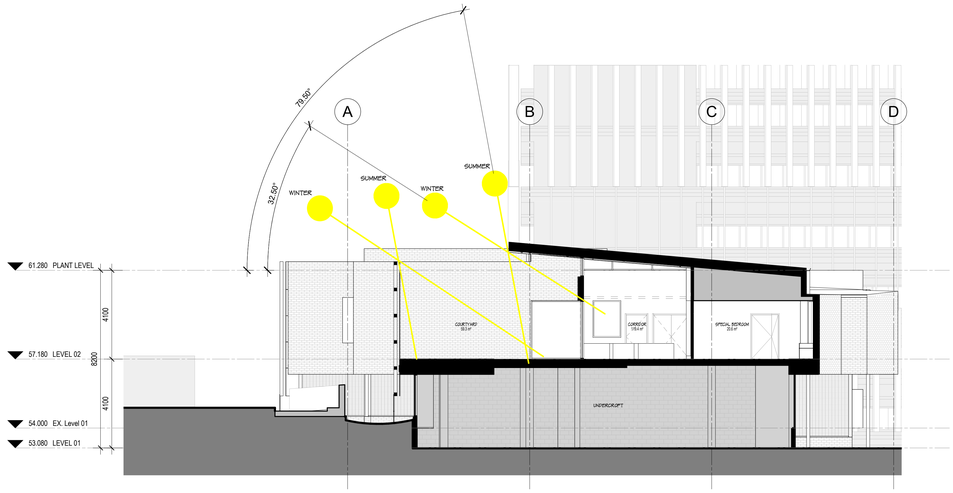
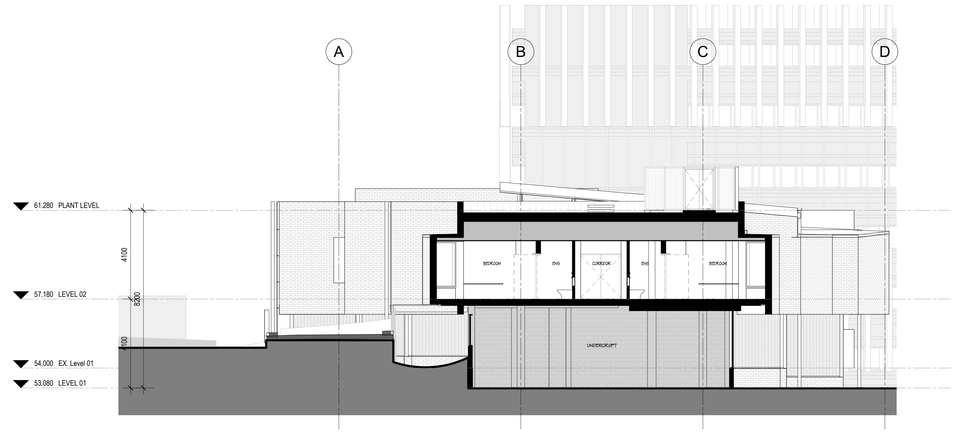
SCALE: 1 : 100



03 **SECTION C**
SCALE: 1 : 100



04 **SECTION D**
SCALE: 1 : 100

KEY PLAN

N

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SECTIONS

SCALE	DATE	DRAWN BY	CHECKED
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PROJECT No	DRAWING No	REVISION
10442	NHR-STH-DRW-ARC-MHS-A51-002	A

Appendix C: Laboratory Results Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration
ACM:	Asbestos Containing Material
ADWG:	AustralianDrinking Water Guidelines
AF:	Asbestos Fines
ANZG	Australian and New Zealand Guidelines
B(a)P:	Benzo(a)pyrene
CEC:	Cation Exchange Capacity
CRC:	Cooperative Research Centre
CT:	Contaminant Threshold
EILs:	Ecological Investigation Levels
ESLs:	Ecological Screening Levels
FA:	Fibrous Asbestos
GIL:	Groundwater Investigation Levels
GSW:	General Solid Waste
HILs:	Health Investigation Levels
HSLs:	Health Screening Levels
HSL-SSA:	Health Screening Level-SiteSpecific Assessment
kg/L	kilograms per litre
NA:	Not Analysed
NC:	Not Calculated
NEPM:	National Environmental Protection Measure
NHMRC:	National Health and Medical Research Council
NL:	Not Limiting
NSL:	No Set Limit
OCP:	Organochlorine Pesticides
OPP:	Organophosphorus Pesticides
PAHs:	Polycyclic Aromatic Hydrocarbons
%w/w:	weight per weight
ppm:	Parts per million
PCBs:	Polychlorinated Biphenyls
PCE:	Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
pH_{KCL} :	pH of filtered 1:20, 1M KCL extract, shaken overnight
pH_{ox} :	pH of filtered 1:20 1M KCl after peroxide digestion
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
RSL:	Regional Screening Levels
RSW:	Restricted Solid Waste
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
S_{Cr}:	Chromium reducible sulfur
S_{POS}:	Peroxide oxidisable Sulfur
SSA:	Site Specific Assessment
SSHSLs:	Site Specific Health Screening Levels
TAA:	Total Actual Acidity in 1M KCL extract titrated to pH6.5
TB:	Trip Blank
TCA:	1,1,1 Trichloroethane (methyl chloroform)
TCE:	Trichloroethylene (Trichloroethene)
TCLP:	Toxicity Characteristics Leaching Procedure
TPA:	Total Potential Acidity, 1M KCL peroxide digest
TS:	Trip Spike
TRH:	Total Recoverable Hydrocarbons
TSA:	Total Sulfide Acidity (TPA-TAA)
UCL:	Upper Level Confidence Limit on Mean Value
USEPA	United States Environmental Protection Agency
VOCC:	Volatile Organic Chlorinated Compounds
WHO:	World Health Organisation

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also refered to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

EIL/ESL Table:

- ABC Values for selected metals have been adopted from the published background concentrations presented in Olszowy et. al., (1995), Trace Element Concentrations in Soils from Rural and Urban New South Wales (the 25th percentile values for old suburbs with low traffic have been quoted).

Waste Classification Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

QA/QC Table:

- Field blank, Inter and Intra laboratory duplicate results are reported in mg/kg.
- Trip spike results are reported as percentage recovery.
- Field rinsate results are reported in µg/L.

TABLE S1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-D: 'Commercial/Industrial'

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100
Site Assessment Criteria (SAC)			3000	900	3600	240000	1500	730	6000	400000	4000	40	80	2000	2500	45	530	3600	50	2000	7	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
BH701	0.14-0.55	Fill: Silty gravelly clay	**7**	<0.4	**8**	**26**	**7**	<0.1	**13**	**45**	**0.5**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH701 - [LAB_DUP]	0.14-0.55	Fill: Silty gravelly clay	**7**	<0.4	**9**	**32**	**8**	<0.1	**15**	**41**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH701	0.55-0.9	Silty clay	<4	<0.4	**9**	**13**	**5**	<0.1	**4**	**18**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH702	0.06-0.3	Fill: Silty clay	**4**	<0.4	**11**	**19**	**11**	<0.1	**6**	**19**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH703	0.0-0.2	Fill: Clayey silt	<4	<0.4	**11**	**25**	**14**	<0.1	**9**	**50**	**0.2**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH703	0.2-0.5	Fill: Silty clay	**4**	<0.4	**12**	**28**	**12**	<0.1	**11**	**44**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH704	0.17-0.4	Fill: Silty gravelly clay	**5**	<0.4	**13**	**34**	**13**	<0.1	**11**	**45**	**0.57**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH704	1.5-1.7	Silty clay	**6**	<0.4	**9**	**18**	**5**	<0.1	**7**	**31**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH705	0.14-0.2	Fill: Sandy gravelly clay	<4	<0.4	**25**	**13**	**4**	<0.1	**37**	**23**	<0.05	<0.5	<0.1	<0.1	<0.1	**5.9**	**1.7**	<0.1	**0.8**	<0.1	<0.1	Not Detected
BH705 - [LAB_DUP]	0.14-0.2	Fill: Sandy gravelly clay	<4	<0.4	**24**	**14**	**4**	<0.1	**38**	**28**	<0.05	<0.5	<0.1	<0.1	<0.1	**6**	**1.8**	<0.1	**0.9**	<0.1	<0.1	NA
BH706	0-0.2	Fill: Silty gravelly clay	**5**	<0.4	**11**	**22**	**15**	<0.1	**9**	**52**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH706	0.45-0.65	Silty clay	<4	<0.4	**7**	**13**	**6**	<0.1	**10**	**25**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH707	0-0.2	Fill: Silty clay	**6**	<0.4	**13**	**20**	**16**	<0.1	**8**	**54**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
SDUP701	-	Fill: Silty gravelly clay	**5**	<0.4	**5**	**28**	**4**	<0.1	**13**	**32**	**2.3**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP702	-	Fill: Silty clay	**5**	<0.4	**13**	**24**	**9**	<0.1	**11**	**25**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP702 - [LAB_DUP]	-	Fill: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	NA	NA
Total Number of Samples			15	15	15	15	15	15	15	15	15	15	11	11	11	11	11	11	11	12	11	7
Maximum Value			7	<PQL	25	34	16	<PQL	38	54	2.3	<PQL	<PQL	<PQL	<PQL	6	1.8	<PQL	0.9	<PQL	<PQL	Not Detected

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S2
SOIL LABORATORY RESULTS COMPARED TO HSLs
All data in mg/kg unless stated otherwise

					C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					HSL-D: COMMERCIAL/INDUSTRIAL							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH701	0.14-0.55	Fill: Silty gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH701 - [LAB_DUP]	0.14-0.55	Fill: Silty gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH701	0.55-0.9	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH702	0.06-0.3	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH703	0.0-0.2	Fill: Clayey silt	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH703	0.2-0.5	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH704	0.17-0.4	Fill: Silty gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH704	1.5-1.7	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH705	0.14-0.2	Fill: Sandy gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH705 - [LAB_DUP]	0.14-0.2	Fill: Sandy gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH706	0-0.2	Fill: Silty gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH706	0.45-0.65	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH707	0-0.2	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
SDUP701	-	Fill: Silty gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
SDUP702	-	Fill: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
Total Number of Samples					15	15	15	15	15	15	15	14
Maximum Value					<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below

HSL SOIL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
BH701	0.14-0.55	Fill: Silty gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH701 - [LAB_DUP]	0.14-0.55	Fill: Silty gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH701	0.55-0.9	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH702	0.06-0.3	Fill: Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH703	0.0-0.2	Fill: Clayey silt	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH703	0.2-0.5	Fill: Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH704	0.17-0.4	Fill: Silty gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH704	1.5-1.7	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH705	0.14-0.2	Fill: Sandy gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH705 - [LAB_DUP]	0.14-0.2	Fill: Sandy gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH706	0-0.2	Fill: Silty gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH706	0.45-0.65	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH707	0-0.2	Fill: Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP701	-	Fill: Silty gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP702	-	Fill: Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL

TABLE S3
SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS
All data in mg/kg unless stated otherwise

			C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			**COMMERCIAL/INDUSTRIAL**			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH701	0.14-0.55	Coarse	<25	<50	<100	<100
BH701 - [LAB_DUP]	0.14-0.55	Coarse	<25	<50	<100	<100
BH701	0.55-0.9	Coarse	<25	<50	<100	<100
BH702	0.06-0.3	Coarse	<25	<50	<100	<100
BH703	0.0-0.2	Coarse	<25	<50	**130**	<100
BH703	0.2-0.5	Coarse	<25	<50	<100	<100
BH704	0.17-0.4	Coarse	<25	<50	<100	<100
BH704	1.5-1.7	Coarse	<25	<50	<100	<100
BH705	0.14-0.2	Coarse	<25	<50	<100	<100
BH705 - [LAB_DUP]	0.14-0.2	Coarse	<25	<50	<100	<100
BH706	0-0.2	Coarse	<25	<50	**120**	<100
BH706	0.45-0.65	Coarse	<25	<50	<100	<100
BH707	0-0.2	Coarse	<25	<50	<100	<100
SDUP701	-	Coarse	<25	<50	<100	<100
SDUP702	-	Coarse	<25	<50	<100	<100
Total Number of Samples			15	15	15	15
Maximum Value			<PQL	<PQL	130	<PQL

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Soil Texture**	C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
BH701	0.14-0.55	Coarse	700	1000	3500	10000
BH701 - [LAB_DUP]	0.14-0.55	Coarse	700	1000	3500	10000
BH701	0.55-0.9	Coarse	700	1000	3500	10000
BH702	0.06-0.3	Coarse	700	1000	3500	10000
BH703	0.0-0.2	Coarse	700	1000	3500	10000
BH703	0.2-0.5	Coarse	700	1000	3500	10000
BH704	0.17-0.4	Coarse	700	1000	3500	10000
BH704	1.5-1.7	Coarse	700	1000	3500	10000
BH705	0.14-0.2	Coarse	700	1000	3500	10000
BH705 - [LAB_DUP]	0.14-0.2	Coarse	700	1000	3500	10000
BH706	0-0.2	Coarse	700	1000	3500	10000
BH706	0.45-0.65	Coarse	700	1000	3500	10000
BH707	0-0.2	Coarse	700	1000	3500	10000
SDUP701	-	Coarse	700	1000	3500	10000
SDUP702	-	Coarse	700	1000	3500	10000

TABLE S4
SOIL LABORATORY RESULTS COMPARED T0 DIRECT CONTACT CRITERIA
All data in mg/kg unless stated otherwise

Analyte		C_6-C_{10}	>C_{10}-C_{16}	>C_{16}-C_{34}	>C_{34}-C_{40}	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		26,000	20,000	27,000	38,000	430	99,000	27,000	81,000	11,000	
Site Use		**COMMERCIAL/INDUSTRIAL - DIRECT SOIL CONTACT**									
Sample Reference	**Sample Depth**										
BH701	0.14-0.55	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH701 - [LAB_DUP]	0.14-0.55	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH701	0.55-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH702	0.06-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH703	0.0-0.2	<25	<50	**130**	<100	<0.2	<0.5	<1	<1	<1	0
BH703	0.2-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH704	0.17-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH704	1.5-1.7	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH705	0.14-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH705 - [LAB_DUP]	0.14-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH706	0-0.2	<25	<50	**120**	<100	<0.2	<0.5	<1	<1	<1	0
BH706	0.45-0.65	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH707	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
SDUP701	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
SDUP702	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
Total Number of Samples		15	15	15	15	15	15	15	15	15	14
Maximum Value		<PQL	<PQL	130	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HIL-D:Commercial/Industrial

FIELD DATA															LABORATORY DATA											
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample refeference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation %(w/w)	FA and AF Estimation %(w/w)
SAC			**No**					**0.05**			**0.001**			**0.001**											**0.05**	**0.001**
28/05/2022	BH701	0.14-0.55	No	3	1,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	296694	BH701	0.14-0.55	729.75	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
28/05/2022	BH702	0.06-0.5	No	6	5,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	296694	BH702	0.06-0.3	612.45	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
28/05/2022	BH703	0.0-0.2	No	6	5,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	296694	BH703	0.0-0.2	188.85	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
28/05/2022	BH703	0.2-0.3	No	3	1,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	296694	BH704	0.17-0.4	547.6	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
28/05/2022	BH704	0.17-1.0	No	9	7,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	297282	BH705	0.14-0.2	796.69	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
28/05/2022	BH704	1.0-1.5	No	6	5,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	297282	BH706	0-0.2	736.2	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
4/06/2022	BH705	0.14-0.3	No	3	2,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	297282	BH707	0-0.2	706.92	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
4/06/2022	BH706	0-0.3	No	6	5,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/06/2022	BH707	0-0.3	No	6	5,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Concentration above the SAC **VALUE**

TABLE S6
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				COMMERCIAL/INDUSTRIAL																
							AGED HEAVY METALS-EILs						EILs		ESLs							
				pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	8	18	104	5	77	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																				
BH701	0.14-0.55	Fill: Silty gravelly clay	Coarse	NA	NA	NA	**7**	**8**	**26**	**7**	**13**	**45**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.07**
BH701 - [LAB_DUP]	0.14-0.55	Fill: Silty gravelly clay	Coarse	NA	NA	NA	**7**	**9**	**32**	**8**	**15**	**41**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH701	0.55-0.9	Silty clay	Coarse	NA	NA	NA	<4	**9**	**13**	**5**	**4**	**18**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH702	0.06-0.3	Fill: Silty clay	Coarse	NA	NA	NA	**4**	**11**	**19**	**11**	**6**	**19**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH703	0.0-0.2	Fill: Clayey silt	Coarse	NA	NA	NA	<4	**11**	**25**	**14**	**9**	**50**	<1	<0.1	<25	<50	**130**	<100	<0.2	<0.5	<1	<1	<0.05
BH703	0.2-0.5	Fill: Silty clay	Coarse	NA	NA	NA	**4**	**12**	**28**	**12**	**11**	**44**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH704	0.17-0.4	Fill: Silty gravelly clay	Coarse	NA	NA	NA	**5**	**13**	**34**	**13**	**11**	**45**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.07**
BH704	1.5-1.7	Silty clay	Coarse	NA	NA	NA	**6**	**9**	**18**	**5**	**7**	**31**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH705	0.14-0.2	Fill: Sandy gravelly clay	Coarse	NA	NA	NA	<4	**25**	**13**	**4**	**37**	**23**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH705 - [LAB_DUP]	0.14-0.2	Fill: Sandy gravelly clay	Coarse	NA	NA	NA	<4	**24**	**14**	**4**	**38**	**28**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH706	0-0.2	Fill: Silty gravelly clay	Coarse	NA	NA	NA	**5**	**11**	**22**	**15**	**9**	**52**	<1	<0.1	<25	<50	**120**	<100	<0.2	<0.5	<1	<1	<0.05
BH706	0.45-0.65	Silty clay	Coarse	NA	NA	NA	<4	**7**	**13**	**6**	**10**	**25**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH707	0-0.2	Fill: Silty clay	Coarse	NA	NA	NA	**6**	**13**	**20**	**16**	**8**	**54**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SDUP701	-	Fill: Silty gravelly clay	Coarse	NA	NA	NA	**5**	**5**	**28**	**4**	**13**	**32**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.2**
SDUP702	-	Fill: Silty clay	Coarse	NA	NA	NA	**5**	**13**	**24**	**9**	**11**	**25**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
Total Number of Samples				0	0	0	15	15	15	15	15	15	15	11	15	15	15	15	15	15	15	15	15
Maximum Value				NA	NA	NA	7	25	34	16	38	54	<PQL	<PQL	<PQL	<PQL	130	<PQL	<PQL	<PQL	<PQL	<PQL	0.2

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

EIL AND ESL ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Sample Description	Soil Texture	pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
BH701	0.14-0.55	Fill: Silty gravelly clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	640	215	170	1700	3300	75	135	165	180	72
BH701 - [LAB_DUP]	0.14-0.55	Fill: Silty gravelly clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	640	215	170	1700	3300	75	135	165	180	72
BH701	0.55-0.9	Silty clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	--	215	170	1700	3300	75	135	165	180	72
BH702	0.06-0.3	Fill: Silty clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	640	215	170	1700	3300	75	135	165	180	72
BH703	0.0-0.2	Fill: Clayey silt	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	640	215	170	1700	3300	75	135	165	180	72
BH703	0.2-0.5	Fill: Silty clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	--	215	170	1700	3300	75	135	165	180	72
BH704	0.17-0.4	Fill: Silty gravelly clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	640	215	170	1700	3300	75	135	165	180	72
BH704	1.5-1.7	Silty clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	--	215	170	1700	3300	75	135	165	180	72
BH705	0.14-0.2	Fill: Sandy gravelly clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	640	215	170	1700	3300	75	135	165	180	72
BH705 - [LAB_DUP]	0.14-0.2	Fill: Sandy gravelly clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	640	215	170	1700	3300	75	135	165	180	72
BH706	0-0.2	Fill: Silty gravelly clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	640	215	170	1700	3300	75	135	165	180	72
BH706	0.45-0.65	Silty clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	--	215	170	1700	3300	75	135	165	180	72
BH707	0-0.2	Fill: Silty clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	640	215	170	1700	3300	75	135	165	180	72
SDUP701	-	Fill: Silty gravelly clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	640	215	170	1700	3300	75	135	165	180	72
SDUP702	-	Fill: Silty clay	Coarse	NA	NA	NA	160	320	100	1900	60	190	370	640	215	170	1700	3300	75	135	165	180	72

TABLE S7
SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES
All data in mg/kg unless stated otherwise

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total PCBs	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled		C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	25	50	100	100	50	0.2	0.5	1	1	100
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	650		NSL		10,000	10	288	600	1,000	-
General Solid Waste SCC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650		NSL		10,000	18	518	1,080	1,800	-
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600		NSL		40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600		NSL		40,000	72	2,073	4,320	7,200	-
Sample Reference	**Sample Depth**	**Sample Description**																									
BH701	0.14-0.55	Fill: Silty gravelly clay	**7**	<0.4	**8**	**26**	**7**	<0.1	**13**	**45**	**0.5**	**0.07**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH701 - [LAB_DUP]	0.14-0.55	Fill: Silty gravelly clay	**7**	<0.4	**9**	**32**	**8**	<0.1	**15**	**41**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH701	0.55-0.9	Silty clay	<4	<0.4	**9**	**13**	**5**	<0.1	**4**	**18**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH702	0.06-0.3	Fill: Silty clay	**4**	<0.4	**11**	**19**	**11**	<0.1	**6**	**19**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH703	0.0-0.2	Fill: Clayey silt	<4	<0.4	**11**	**25**	**14**	<0.1	**9**	**50**	**0.2**	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	**120**	**120**	<0.2	<0.5	<1	<1	Not Detected
BH703	0.2-0.5	Fill: Silty clay	**4**	<0.4	**12**	**28**	**12**	<0.1	**11**	**44**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH704	0.17-0.4	Fill: Silty gravelly clay	**5**	<0.4	**13**	**34**	**13**	<0.1	**11**	**45**	**0.57**	**0.07**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH704	1.5-1.7	Silty clay	**6**	<0.4	**9**	**18**	**5**	<0.1	**7**	**31**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH705	0.14-0.2	Fill: Sandy gravelly clay	<4	<0.4	**25**	**13**	**4**	<0.1	**37**	**23**	<0.05	<0.05	<0.1	<0.1	<0.1	**8.4**	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH705 - [LAB_DUP]	0.14-0.2	Fill: Sandy gravelly clay	<4	<0.4	**24**	**14**	**4**	<0.1	**38**	**28**	<0.05	<0.05	<0.1	<0.1	<0.1	**8.7**	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH706	0-0.2	Fill: Silty gravelly clay	**5**	<0.4	**11**	**22**	**15**	<0.1	**9**	**52**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	**110**	**110**	<0.2	<0.5	<1	<1	Not Detected
BH706	0.45-0.65	Silty clay	<4	<0.4	**7**	**13**	**6**	<0.1	**10**	**25**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH707	0-0.2	Fill: Silty clay	**6**	<0.4	**13**	**20**	**16**	<0.1	**8**	**54**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
SDUP701	-	Fill: Silty gravelly clay	**5**	<0.4	**5**	**28**	**4**	<0.1	**13**	**32**	**2.3**	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP702	-	Fill: Silty clay	**5**	<0.4	**13**	**24**	**9**	<0.1	**11**	**25**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP702 - [LAB_DUP]	-	Fill: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of Samples			15	15	15	15	15	15	15	15	15	15	11	12	12	12	11	15	15	15	15	15	15	15	15	15	7
Maximum Value			7	<PQL	25	34	16	<PQL	38	54	2.3	0.2	<PQL	<PQL	<PQL	8.7	<PQL	<PQL	<PQL	<PQL	120	120	<PQL	<PQL	<PQL	<PQL	Not Detected

Concentration above the CT1 — **VALUE**
Concentration above SCC1 — **VALUE**
Concentration above the SCC2 — **VALUE**
Concentration above PQL — **Bold**

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TABLE Q1
SOIL QA/QC SUMMARY

			TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene
	PQL Envirolab SYD		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1*	*2*	*1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.05*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1.0*	*2.0*	*1.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*
Intra	BH701	0.14-0.55	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.2	0.1	<0.1	<0.1	<0.2	0.07	<0.1	<0.1	<0.1
laboratory	SDUP701	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	0.5	0.4	0.2	0.2	0.3	0.2	0.1	<0.1	0.2
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.2	nc	0.35	0.25	0.125	0.125	0.2	0.135	0.075	nc	0.125
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	100%	nc	86%	120%	120%	120%	100%	96%	67%	nc	120%
Inter	BH702	0.06-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP702	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field Blank	TB-S701 28/05/22	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
Field Blank	TB-S1 4/06/22	-	<25	NA	NA	NA	<0.2	<0.5	<1	<2	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TS-S701 28/05/22		-	-	-	-	101%	102%	103%	103%	102%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	TS-T1 4/06/22		-	-	-	-	97%	98%	99%	96%	97%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Rinsate	FR-SPT701 28/05/22	µg/L	85	<50	<100	<100	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1

			HCB	alpha- BHC	gamma- BHC	beta- BHC	Heptachlor	delta- BHC	Aldrin	Heptachlor Epoxide	Gamma- Chlordane	alpha- chlordane	Endosulfan I	pp- DDE	Dieldrin	Endrin	pp- DDD	Endosulfan II	pp- DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Intra	BH701	0.14-0.55	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP701	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	BH702	0.06-0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP702	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field Blank	TB-S701 28/05/22	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Blank	TB-S1 4/06/22	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TS-S701 28/05/22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	TS-T1 4/06/22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Rinsate	FR-SPT701 28/05/22	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

			Azinphos-methyl (Guthion)	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*4*	*0.4*	*1*	*1*	*1*	*0.1*	*1*	*1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*4.0*	*0.4*	*1.0*	*1.0*	*1.0*	*0.1*	*1.0*	*1.0*
Intra	BH701	0.14-0.55	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7	<0.4	8	26	7	<0.1	13	45
laboratory	SDUP701	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5	<0.4	5	28	4	<0.1	13	32
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	6	nc	6.5	27	5.5	nc	13	38.5
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	33%	nc	46%	7%	55%	nc	0%	34%
Inter	BH702	0.06-0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4	<0.4	11	19	11	<0.1	6	19
laboratory	SDUP702	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5	<0.4	13	24	9	<0.1	11	25
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	4.5	nc	12	21.5	10	nc	8.5	22
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	22%	nc	17%	23%	20%	nc	59%	27%
Field Blank	TB-S701 28/05/22	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<4	<0.4	3	<1	3	<0.1	<1	1
Field Blank	TB-S1 4/06/22	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TS-S701 28/05/22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	TS-T1 4/06/22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Rinsate	FR-SPT701 28/05/22	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.01	0.3	<0.03	<0.0005	<0.02	<0.02

Result outside of QA/QC acceptance criteria (highlighted)

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ADWG: AustralianDrinking Water Guidelines
ANZG Australian and New Zealand Guidelines
B(a)P: Benzo(a)pyrene
CRC: Cooperative Research Centre
ESLs: Ecological Screening Levels
GIL: Groundwater Investigation Levels
HILs: Health Investigation Levels
HSLs: Health Screening Levels
HSL-SSA: Health Screening Level-SiteSpecific Assessment
NA: Not Analysed
NC: Not Calculated
NEPM: National Environmental Protection Measure
NHMRC: National Health and Medical Research Council
NL: Not Limiting
NSL: No Set Limit
OCP: Organochlorine Pesticides
OPP: Organophosphorus Pesticides
PAHs: Polycyclic Aromatic Hydrocarbons
ppm: Parts per million
PCBs: Polychlorinated Biphenyls
PCE: Perchloroethylene (Tetrachloroethylene or Tetrachloroethene)
PQL: Practical Quantitation Limit
RS: Rinsate Sample
RSL: Regional Screening Levels
SAC: Site Assessment Criteria
SSA: Site Specific Assessment
SSHSLs Site Specific Health Screening Levels
TB: Trip Blank
TCA: 1,1,1 Trichloroethane (methyl chloroform)
TCE: Trichloroethylene (Trichloroethene)
TS: Trip Spike
TRH: Total Recoverable Hydrocarbons
UCL: Upper Level Confidence Limit on Mean Value
USEPA United States Environmental Protection Agency
VOCC: Volatile Organic Chlorinated Compounds
WHO: World Health Organisation

TABLE G1
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO ECOLOGICAL GILs SAC
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	ANZG 2018 Fresh Waters	SAMPLES					
			MW601	MW601 - [LAB DUP]	MW603	MW701	WDUP601	WDUP602
Inorganic Compounds and Parameters								
pH		6.5 - 8.5	7	NA	6.8	6.8	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	**15000**	NA	**23000**	**27000**	NA	NA
Metals and Metalloids								
Arsenic (As III)	1	24	**1**	NA	**2**	<1	**2**	<1
Cadmium	0.1	0.2	<0.1	NA	**0.2**	**0.2**	<0.1	**0.3**
Chromium (SAC for Cr III adopted)	1	3.3	<1	NA	**5**	<1	<1	<1
Copper	1	1.4	<1	NA	**3**	<1	<1	**2**
Lead	1	3.4	<1	NA	**2**	<1	<1	<1
Total Mercury (inorganic)	0.05	0.06	<0.05	<0.05	**0.07**	<0.05	<0.05	<0.05
Nickel	1	11	**40**	NA	**19**	**2**	**43**	**27**
Zinc	1	8	**12**	NA	**26**	**8**	**11**	**41**
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)								
Benzene	1	950	<1	<1	<1	<1	<1	<1
Toluene	1	180	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	80	<1	<1	<1	<1	<1	<1
m+p-xylene	2	75	<2	<2	<2	<2	<2	<2
o-xylene	1	350	<1	<1	<1	<1	<1	<1
Total xylenes	2	NSL	<2	<2	<2	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs								
Dichlorodifluoromethane	10	NSL	<10	<10	<10	<10	<10	<10
Chloromethane	10	NSL	<10	<10	<10	<10	<10	<10
Vinyl Chloride	10	100	<10	<10	<10	<10	<10	<10
Bromomethane	10	NSL	<10	<10	<10	<10	<10	<10
Chloroethane	10	NSL	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane	10	NSL	<10	<10	<10	<10	<10	<10
1,1-Dichloroethene	1	700	<1	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	1	NSL	<1	<1	<1	<1	<1	<1
1,1-dichloroethane	1	90	<1	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	1	NSL	<1	<1	<1	<1	<1	<1
Bromochloromethane	1	NSL	<1	<1	<1	<1	<1	<1
Chloroform	1	370	<1	<1	<1	<1	<1	<1
2,2-dichloropropane	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dichloroethane	1	1900	<1	<1	<1	<1	<1	<1
1,1,1-trichloroethane	1	270	<1	<1	<1	<1	<1	<1
1,1-dichloropropene	1	NSL	<1	<1	<1	<1	<1	<1
Cyclohexane	1	NSL	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	1	240	<1	<1	<1	<1	<1	<1
Benzene	1	950	<1	<1	<1	<1	<1	<1
Dibromomethane	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dichloropropane	1	900	<1	<1	<1	<1	<1	<1
Trichloroethene	1	330	<1	<1	<1	<1	<1	<1
Bromodichloromethane	1	NSL	<1	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	1	NSL	<1	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	1	NSL	<1	<1	<1	<1	<1	<1
1,1,2-trichloroethane	1	6500	<1	<1	<1	<1	<1	<1
Toluene	1	180	<1	<1	<1	<1	<1	<1
1,3-dichloropropane	1	1100	<1	<1	<1	<1	<1	<1
Dibromochloromethane	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dibromoethane	1	NSL	<1	<1	<1	<1	<1	<1
Tetrachloroethene	1	70	<1	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	<1	<1	<1	<1	<1
Chlorobenzene	1	55	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	80	<1	<1	<1	<1	<1	<1
Bromoform	1	NSL	<1	<1	<1	<1	<1	<1
m+p-xylene	2	75	<2	<2	<2	<2	<2	<2
Styrene	1	NSL	<1	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	1	400	<1	<1	<1	<1	<1	<1
o-xylene	1	350	<1	<1	<1	<1	<1	<1
1,2,3-trichloropropane	1	NSL	<1	<1	<1	<1	<1	<1
Isopropylbenzene	1	30	<1	<1	<1	<1	<1	<1
Bromobenzene	1	NSL	<1	<1	<1	<1	<1	<1
n-propyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
2-chlorotoluene	1	NSL	<1	<1	<1	<1	<1	<1
4-chlorotoluene	1	NSL	<1	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
Tert-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,3-dichlorobenzene	1	260	<1	<1	<1	<1	<1	<1
Sec-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,4-dichlorobenzene	1	60	<1	<1	<1	<1	<1	<1
4-isopropyl toluene	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dichlorobenzene	1	160	<1	<1	<1	<1	<1	<1
n-butyl benzene	1	NSL	<1	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	1	NSL	<1	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	1	85	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	1	NSL	<1	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	1	3	<1	<1	<1	<1	<1	<1
Polycyclic Aromatic Hydrocarbons (PAHs)								
Naphthalene	0.2	16	<0.2	NA	<0.2	<0.2	<0.2	<0.1
Acenaphthylene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	0.6	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	0.01	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	1	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	NA	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1	<0.1

Concentration above the SAC	**VALUE**
Concentration above the PQL	**Bold**
GIL >PQL	Red

TABLE G2
GROUNDWATER LABORATORY RESULTS COMPARED TO HSLs
All data in µg/L unless stated otherwise

				C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	
PQL - Envirolab Services				10	50	1	1	1	2	1	PID
NEPM 2013 - Land Use Category				HSL-D: COMMERCIAL/INDUSTRIAL							
Sample Reference	**Water Depth**	**Depth Category**	**Soil Category**								
MW601	5.92	2m to <4m	Clay	<10	<50	<1	<1	<1	<2	<1	0
MW601 - [LAB	5.92	2m to <4m	Clay	<10	NA	<1	<1	<1	<2	<1	NA
MW603	3.68	2m to <4m	Clay	<10	**110**	<1	<1	<1	<2	<1	0
MW701	2.91	0m to <2m	Clay	<10	<50	<1	<1	<1	<2	<1	0
WDUP601	5.92	2m to <4m	Clay	<10	<50	<1	<1	<1	<2	<1	NA
WDUP602	3.68	2m to <4m	Clay	<10	<50	<1	<1	<1	<2	<1	NA
Total Number of Samples				6	5	6	6	6	6	6	3
Maximum Value				<PQL	110	<PQL	<PQL	<PQL	<PQL	<PQL	0

Concentration above the SAC **VALUE**
Site specific assesment (SSA) required **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the elevated value is highlighted in grey in the Groundwater Assessment Criteria Table below

HSL GROUNDWATER ASSESSMENT CRITERIA

Sample Reference	Water Depth	Depth Category	Soil Category	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
MW601	5.92	2m to <4m	Clay	NL	NL	30000	NL	NL	NL	NL
MW601 - [LAB	5.92	2m to <4m	Clay	NL	NA	30000	NL	NL	NL	NL
MW603	3.68	2m to <4m	Clay	NL	NL	30000	NL	NL	NL	NL
MW701	2.91	0m to <2m	Clay	SSA	SSA	SSA	SSA	SSA	SSA	SSA
WDUP601	5.92	2m to <4m	Clay	NL	NL	30000	NL	NL	NL	NL
WDUP602	3.68	2m to <4m	Clay	NL	NL	30000	NL	NL	NL	NL

TABLE G3
GROUNDWATER LABORATORY RESULTS COMPARED TO SITE SPECIFIC HSLs - RISK ASSESSMENT
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NHMRC ADWG 2011	WHO 2008	USEPA RSL Tapwater 2017	SAMPLES MW701
Total Recoverable Hydrocarbons (TRH)					
C_6-C_9 Aliphatics (assessed using F1)	10	-	15000	-	<10
>C_9-C_{14} Aliphatics (assessed using F2)	50	-	100	-	<50
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)					
Benzene	1	1	-	-	<1
Toluene	1	800	-	-	<1
Ethylbenzene	1	300	-	-	<1
Total xylenes	2	600	-	-	<2
Polycyclic Aromatic Hydrocarbons (PAHs)					
Naphthalene	1	-	-	6.1	<1
Volatile Organic Compounds (VOCs), including chlorinated VOCs					
Dichlorodifluoromethane	10	-	-	-	<10
Chloromethane	10	-	-	-	<10
Vinyl Chloride	10	0.3	-	-	<10
Bromomethane	10	-	-	-	<10
Chloroethane	10	-	-	-	<10
Trichlorofluoromethane	10	-	-	-	<10
1,1-Dichloroethene	1	30	-	-	<1
Trans-1,2-dichloroethene	1	60	-	-	<1
1,1-dichloroethane	1	-	-	-	<1
Cis-1,2-dichloroethene	1	60	-	-	<1
Bromochloromethane	1	250	-	-	<1
Chloroform	1		-	-	<1
2,2-dichloropropane	1	-	-	-	<1
1,2-dichloroethane	1	3	-	-	<1
1,1,1-trichloroethane	1	-	-	-	<1
1,1-dichloropropene	1	-	-	-	<1
Cyclohexane	1	-	-	-	<1
Carbon tetrachloride	1	3	-	-	<1
Benzene	1	1	-	-	<1
Dibromomethane	1	-	-	-	<1
1,2-dichloropropane	1	-	-	-	<1
Trichloroethene	1	-	-	-	<1
Bromodichloromethane	1	-	-	-	<1
trans-1,3-dichloropropene	1	100	-	-	<1
cis-1,3-dichloropropene	1	100	-	-	<1
1,1,2-trichloroethane	1	-	-	-	<1
Toluene	1	800	-	-	<1
1,3-dichloropropane	1	-	-	-	<1
Dibromochloromethane	1	-	-	-	<1
1,2-dibromoethane	1	-	-	-	<1
Tetrachloroethene	1	50	-	-	<1
1,1,1,2-tetrachloroethane	1	-	-	-	<1
Chlorobenzene	1	300	-	-	<1
Ethylbenzene	1	300	-	-	<1
Bromoform	1	-	-	-	<1
m+p-xylene	2	-	-	-	<2
Styrene	1	30	-	-	<1
1,1,2,2-tetrachloroethane	1	-	-	-	<1
o-xylene	1	-	-	-	<1
1,2,3-trichloropropane	1	-	-	-	<1
Isopropylbenzene	1	-	-	-	<1
Bromobenzene	1	-	-	-	<1
n-propyl benzene	1	-	-	-	<1
2-chlorotoluene	1	-	-	-	<1
4-chlorotoluene	1	-	-	-	<1
1,3,5-trimethyl benzene	1	-	-	-	<1
Tert-butyl benzene	1	-	-	-	<1
1,2,4-trimethyl benzene	1	-	-	-	<1
1,3-dichlorobenzene	1	20	-	-	<1
Sec-butyl benzene	1	-	-	-	<1
1,4-dichlorobenzene	1	40	-	-	<1
4-isopropyl toluene	1	-	-	-	<1
1,2-dichlorobenzene	1	1500	-	-	<1
n-butyl benzene	1	-	-	-	<1
1,2-dibromo-3-chloropropane	1	-	-	-	<1
1,2,4-trichlorobenzene	1	30	-	-	<1
1,2,3-trichlorobenzene	1		-	-	<1
Hexachlorobutadiene	1	7	-	-	<1

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
GIL >PQL — Red

TABLE Q2
GROUNDWATER QA/QC SUMMARY

		Dichlorodifluoromethane	Chloromethane	Vinyl Chloride	Bromomethane	Chloroethane	Trichlorofluoromethane	1,1-Dichloroethene	Trans-1,2-dichloroethene	1,1-dichloroethane	Cis-1,2-dichloroethene	Bromochloromethane	Chloroform	2,2-dichloropropane	1,2-dichloroethane	1,1,1-trichloroethane	1,1-dichloropropene	Cyclohexane	Carbon tetrachloride	Benzene	Dibromomethane	1,2-dichloropropane	Trichloroethene	Bromodichloromethane	trans-1,3-dichloropropene	cis-1,3-dichloropropene	1,1,2-trichloroethane	Toluene	1,3-dichloropropane	Dibromochloromethane	1,2-dibromoethane	Tetrachloroethene	1,1,1,2-tetrachloroethane	Chlorobenzene	Ethylbenzene	Bromoform	m+p-xylene	Styrene	1,1,2,2-tetrachloroethane	o-xylene	1,2,3-trichloropropane	Isopropylbenzene	Bromobenzene	n-propyl benzene	2-chlorotoluene	4-chlorotoluene	1,3,5-trimethyl benzene	Tert-butyl benzene	1,2,4-trimethyl benzene	1,3-dichlorobenzene	Sec-butyl benzene	1,4-dichlorobenzene	4-isopropyl toluene	1,2-dichlorobenzene	n-butyl benzene	1,2-dibromo-3-chloropropane	1,2,4-trichlorobenzene	Hexachlorobutadiene	1,2,3-trichlorobenzene
	PQL Envirolab SYD	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	2	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
	PQL Envirolab VIC	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Intra	MW601	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP601	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	MW603	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP602	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc

		TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene	Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD	*10*	*50*	*100*	*100*	*1*	*1*	*1*	*2*	*1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
	PQL Envirolab VIC	*10*	*50*	*100*	*100*	*1.0*	*1.0*	*1.0*	*2.0*	*1.0*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
Intra	MW601	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	1	<0.1	<1	<1	<1	<0.05	40	12
laboratory	WDUP601	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	2	<0.1	<1	<1	<1	<0.05	43	11
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	1.5	nc	nc	nc	nc	nc	41.5	11.5
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	nc	nc	nc	nc	nc	7%	9%
Inter	MW603	<10	110	100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	2	0.2	5	3	2	0.07	19	26
laboratory	WDUP602	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	0.3	<1	2	<1	<0.05	27	41
duplicate	MEAN	nc	67.5	75	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	1.25	0.25	2.75	2.5	1.25	0.0475	23	33.5
	RPD %	nc	126%	67%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	120%	40%	164%	40%	120%	95%	35%	45%
Field	TB-W601	-	-	-	-	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blank	6/06/2022																																
Trip	TS-W601	-	-	-	-	85%	92%	96%	96%	98%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	6/06/2022																																

Result outside of QA/QC acceptance criteria Value

Appendix D: Borehole Logs

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 701 **1/2**

SDUP701 (0.14-0.55)

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: E33780PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 28/5/22 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			CONCRETE: 140mm.t				
									-	FILL: Silty gravelly clay, low to medium plasticity, brown, fine to coarse grained igneous, sub-angular.	w<PL			SCREEN: 1.70kg 0.14-0.55m NO FCF
							0.5		CI-CH	Silty CLAY: medium to high plasticity, grey mottled red brown, trace of ironstone gravel and root fibres.	w<PL			RESIDUAL
						N = 9 2,4,5								
							1							
							1.5							
						N = 15 5,7,8								
									-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, dark grey.	XW / w<PL			BRINGELLY SHALE
							2			CLAYSTONE: grey brown.	DW			LOW RESISTANCE
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 701 **2/2**

SDUP701 (0.14-0.55)

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: E33780PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 28/5/22 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
							4							MODERATE RESISTANCE GROUNDWATER MONITORING WELL INSTALLED TO 6.0m CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 6.0m TO 2.0m. CASING 2.0m TO 0m. 2mm SAND FILTER PACK 6.0m TO 2.1m. BENTONITE SEAL 2.1m TO 1.0m. BACKFILLED WITH SAND (AND/OR CUTTINGS) TO THE SURFACE. COMPLETED WITH CONCRETED GATIC COVER.
							4.5							
							5							
							5.5							
							6			END OF BOREHOLE AT 6.0m				
							6.5							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 702 **1/1**

SDUP702 (0.06-0.3)

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: E33780PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 28/5/22 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			CONCRETE: 60mm.t				
									-	FILL: Silty clay, medium to high plasticity, brown and orange brown, trace of root fibres.				SCREEN: 5.1kg 0.06-0.5m NO FCF
						N = 7 3,3,4	0.5		CI-CH	Silty CLAY: medium to high plasticity, grey mottled red brown, trace of ironstone gravel and root fibres.				RESIDUAL
							1			END OF BOREHOLE AT 1.0m				
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 703 **1/1**

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: E33780PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 28/5/22 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Clayey silt, low to medium plasticity, dark brown, with organic material, trace of concrete fragments.	w<PL			MULCH COVER SCREEN: 5.7kg 0-0.2m NO FCF
										FILL: Silty clay, low to medium plasticity, brown, trace of ironstone and igneous gravel.	w<PL			SCREEN: 1.4kg 0.2-0.3m NO FCF
						N = 10 4,5,5	0.5		CI-CH	Silty CLAY: medium to high plasticity, brown mottled red brown, trace of ironstone gravel.	w<PL			RESIDUAL
							1			END OF BOREHOLE AT 1.0m				
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Log No. 704 1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: E33780PL **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 28/5/22 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			CONCRETE: 170mm.t				
									-	FILL: Silty gravelly clay, low to medium plasticity, brown, fine to coarse grained igneous, sub-angular, trace of ironstone, igneous and sandstone gravel, brick fragments, slag, ash and root fibres.	w≈PL			SCREEN: 7.4kg 0.17-1.0m NO FCF SCREEN: 5.9kg 1.0-1.5m NO FCF
						N = 6 2,3,3	0.5							
							1							
							1.5		CI-CH	Silty CLAY: medium to high plasticity, grey mottled red brown and orange brown, trace of ironstone gravel.	w<PL			RESIDUAL
						N = 14 3,6,8	2			END OF BOREHOLE AT 2.0m				
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 705 **1/1**

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: E33780PL **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 4/6/22 **Datum:** -

Plant Type: **Logged/Checked by:** H.L./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			CONCRETE: 140mm.t				VINYL COVER
									-	FILL: Sandy gravelly clay, low to medium plasticity, dark brown, fine to coarse grained igneous gravel, sub-angular.	w<PL			SCREEN: 2.1kg 0.14-0.3m NO FCF
									-	Extremely Weathered claystone: silty CLAY, low to medium plasticity, grey brown.	XW / w<PL			HAND AUGER REFUSAL AT 0.33m ON CLAYSTONE BEDROCK
							0.5			END OF BOREHOLE AT 0.33m				
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 706 **1/1**

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: E33780PL **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 4/6/22 **Datum:** -

Plant Type: **Logged/Checked by:** H.L./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty gravelly clay, low to medium plasticity, brown, fine to coarse grained, sub-angular igneous gravel, trace of ironstone gravel and root fibres.	w<PL			SCREEN: 5.6kg 0-0.3m NO FCF
										FILL: Silty clay, low plasticity, dark brown, trace of igneous gravel and metal.	w<PL			INSUFFICIENT RETURN FOR BULK SCREEN
	■		■				0.5		CL-CI	Silty CLAY: low to medium plasticity, orange brown.	w<PL			RESIDUAL
										END OF BOREHOLE AT 0.65m				
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Log No. 707 **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: E33780PL **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 4/6/22 **Datum:** -

Plant Type: **Logged/Checked by:** H.L./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty clay, low to medium plasticity, brown, trace of igneous and sandstone gravel and metal.	w<PL			SCREEN: 5.9kg 0-0.3m NO FCF
	■		■							FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel and root fibres.	w<PL			INSUFFICIENT RETURN FOR BULK SCREEN
	■						0.5		CL-CI	Silty CLAY: low to medium plasticity, orange brown.	w<PL			RESIDUAL
										END OF BOREHOLE AT 0.85m				
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the

structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N > 30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N_c' on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

The borehole or test pit logs presented herein are an interpretation of the subsurface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
ine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	–	–	–	–

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $Cu > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_U = \frac{D_{60}}{D_{10}} \qquad and \qquad C_C = \frac{(D_{30})^2}{D_{10}\, D_{60}}$$

Where D_{10}, D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

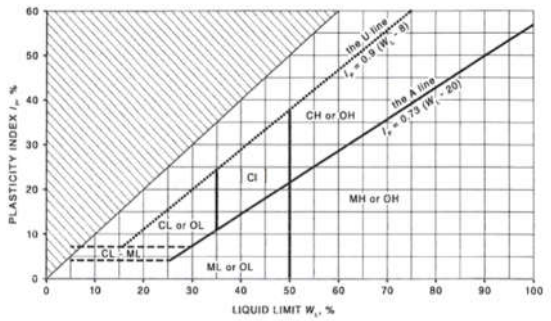
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

2 Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.

3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.
		Extent of borehole/test pit collapse shortly after drilling/excavation.
		Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
	PFAS	Soil sample taken over depth indicated, for analysis of Per- and Polyfluoroalkyl Substances.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	w > PL $w \approx$ PL w < PL $w \approx$ LL w > LL	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. Moisture content estimated to be near liquid limit. Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D M W	DRY – runs freely through fingers. MOIST – does not run freely but no free water visible on soil surface. WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS S F St VSt Hd Fr ( )	VERY SOFT – unconfined compressive strength ≤ 25kPa. SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa. FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa. STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa. VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa. HARD – unconfined compressive strength > 400kPa. FRIABLE – strength not attainable, soil crumbles. Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)** VERY LOOSE ≤ 15 / 0 – 4 LOOSE > 15 and ≤ 35 / 4 – 10 MEDIUM DENSE > 35 and ≤ 65 / 10 – 30 DENSE > 65 and ≤ 85 / 30 – 50 VERY DENSE > 85 / > 50 Bracketed symbol indicates estimated density based on ease of drilling or other assessment.

Log Column	Symbol	Definition
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: *'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'*. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Appendix E: Laboratory Report(s) & COC Documents

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CERTIFICATE OF ANALYSIS 296694

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33780PL, Kingswood**
Number of Samples	14 Soil, 1 Water
Date samples received	30/05/2022
Date completed instructions received	30/05/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	06/06/2022
Date of Issue	06/06/2022

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Josh Williams, Organics and LC Supervisor
Kyle Gavrily, Chemist
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		296694-1	296694-2	296694-3	296694-5	296694-6
Your Reference	UNITS	BH701	BH701	BH702	BH703	BH703
Depth		0.14-0.55	0.55-0.9	0.06-0.3	0.0-0.2	0.2-0.5
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	95	98	101	87	100

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		296694-8	296694-10	296694-11	296694-12	296694-13
Your Reference	UNITS	BH704	BH704	TB-S701	TS-S701	SDUP701
Depth		0.17-0.4	1.5-1.7	-	-	-
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	[NA]	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	[NA]	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	[NA]	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	101%	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	102%	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	103%	<1
m+p-xylene	mg/kg	<2	<2	<2	103%	<2
o-Xylene	mg/kg	<1	<1	<1	102%	<1
Naphthalene	mg/kg	<1	<1	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	[NA]	<1
Surrogate aaa-Trifluorotoluene	%	100	97	101	99	96

svTRH (C10-C40) in Soil						
Our Reference		296694-1	296694-2	296694-3	296694-5	296694-6
Your Reference	UNITS	BH701	BH701	BH702	BH703	BH703
Depth		0.14-0.55	0.55-0.9	0.06-0.3	0.0-0.2	0.2-0.5
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	03/06/2022	03/06/2022	03/06/2022	03/06/2022	03/06/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	120	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	120	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	130	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	130	<50
Surrogate o-Terphenyl	%	84	79	81	91	81

svTRH (C10-C40) in Soil					
Our Reference		296694-8	296694-10	296694-11	296694-13
Your Reference	UNITS	BH704	BH704	TB-S701	SDUP701
Depth		0.17-0.4	1.5-1.7	-	-
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	03/06/2022	03/06/2022	03/06/2022	03/06/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	83	88	88	94

PAHs in Soil						
Our Reference		296694-1	296694-2	296694-3	296694-5	296694-6
Your Reference	UNITS	BH701	BH701	BH702	BH703	BH703
Depth		0.14-0.55	0.55-0.9	0.06-0.3	0.0-0.2	0.2-0.5
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	0.2	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.07	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	0.5	<0.05	<0.05	0.2	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	86	84	77	94	78

PAHs in Soil					
Our Reference		296694-8	296694-10	296694-11	296694-13
Your Reference	UNITS	BH704	BH704	TB-S701	SDUP701
Depth		0.17-0.4	1.5-1.7	-	-
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	0.3
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<0.1	<0.1	0.5
Pyrene	mg/kg	0.2	<0.1	<0.1	0.4
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	0.2
Chrysene	mg/kg	<0.1	<0.1	<0.1	0.2
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	0.3
Benzo(a)pyrene	mg/kg	0.07	<0.05	<0.05	0.2
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	0.2
Total +ve PAH's	mg/kg	0.57	<0.05	<0.05	2.3
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	83	83	75	83

Organochlorine Pesticides in soil						
Our Reference		296694-1	296694-3	296694-5	296694-8	296694-13
Your Reference	UNITS	BH701	BH702	BH703	BH704	SDUP701
Depth		0.14-0.55	0.06-0.3	0.0-0.2	0.17-0.4	-
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	81	80	90	88	82

Organophosphorus Pesticides in Soil						
Our Reference		296694-1	296694-3	296694-5	296694-8	296694-13
Your Reference	UNITS	BH701	BH702	BH703	BH704	SDUP701
Depth		0.14-0.55	0.06-0.3	0.0-0.2	0.17-0.4	-
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	81	80	90	88	82

PCBs in Soil						
Our Reference		296694-1	296694-3	296694-5	296694-8	296694-13
Your Reference	UNITS	BH701	BH702	BH703	BH704	SDUP701
Depth		0.14-0.55	0.06-0.3	0.0-0.2	0.17-0.4	-
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	81	80	90	88	82

Acid Extractable metals in soil						
Our Reference		296694-1	296694-2	296694-3	296694-5	296694-6
Your Reference	UNITS	BH701	BH701	BH702	BH703	BH703
Depth		0.14-0.55	0.55-0.9	0.06-0.3	0.0-0.2	0.2-0.5
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	03/06/2022	03/06/2022	03/06/2022	03/06/2022	03/06/2022
Arsenic	mg/kg	7	<4	4	<4	4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	9	11	11	12
Copper	mg/kg	26	13	19	25	28
Lead	mg/kg	7	5	11	14	12
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	13	4	6	9	11
Zinc	mg/kg	45	18	19	50	44

Acid Extractable metals in soil					
Our Reference		296694-8	296694-10	296694-11	296694-13
Your Reference	UNITS	BH704	BH704	TB-S701	SDUP701
Depth		0.17-0.4	1.5-1.7	-	-
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	03/06/2022	03/06/2022	03/06/2022	03/06/2022
Arsenic	mg/kg	5	6	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	13	9	3	5
Copper	mg/kg	34	18	<1	28
Lead	mg/kg	13	5	3	4
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	11	7	<1	13
Zinc	mg/kg	45	31	1	32

Moisture						
Our Reference		296694-1	296694-2	296694-3	296694-5	296694-6
Your Reference	UNITS	BH701	BH701	BH702	BH703	BH703
Depth		0.14-0.55	0.55-0.9	0.06-0.3	0.0-0.2	0.2-0.5
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/06/2022	01/06/2022	01/06/2022	01/06/2022	01/06/2022
Date analysed	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Moisture	%	17	18	19	26	15

Moisture					
Our Reference		296694-8	296694-10	296694-11	296694-13
Your Reference	UNITS	BH704	BH704	TB-S701	SDUP701
Depth		0.17-0.4	1.5-1.7	-	-
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Date analysed	-	03/06/2022	03/06/2022	03/06/2022	03/06/2022
Moisture	%	21	18	<0.1	8.2

Asbestos ID - soils NEPM - ASB-001					
Our Reference		296694-1	296694-3	296694-5	296694-8
Your Reference	UNITS	BH701	BH702	BH703	BH704
Depth		0.14-0.55	0.06-0.3	0.0-0.2	0.17-0.4
Date Sampled		28/05/2022	28/05/2022	28/05/2022	28/05/2022
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	02/06/2022	02/06/2022	02/06/2022	02/06/2022
Sample mass tested	g	729.75	612.45	188.85	547.6
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown fine-grained soil & debris	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–
FA and AF Estimation*	g	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001

vTRH(C6-C10)/BTEXN in Water		
Our Reference		296694-15
Your Reference	UNITS	FR-SPT701
Depth		-
Date Sampled		28/05/2022
Type of sample		Water
Date extracted	-	01/06/2022
Date analysed	-	02/06/2022
TRH C_6 - C_9	µg/L	85
TRH C_6 - C_{10}	µg/L	85
TRH C_6 - C_{10} less BTEX (F1)	µg/L	85
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	98
Surrogate toluene-d8	%	97
Surrogate 4-BFB	%	93

svTRH (C10-C40) in Water		
Our Reference		296694-15
Your Reference	UNITS	FR-SPT701
Depth		-
Date Sampled		28/05/2022
Type of sample		Water
Date extracted	-	01/06/2022
Date analysed	-	02/06/2022
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	<50
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	<50
Surrogate o-Terphenyl	%	86

PAHs in Water		
Our Reference		296694-15
Your Reference	UNITS	FR-SPT701
Depth		-
Date Sampled		28/05/2022
Type of sample		Water
Date extracted	-	01/06/2022
Date analysed	-	01/06/2022
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b,j+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	116

Metals in Water - Dissolved		
Our Reference		296694-15
Your Reference	UNITS	FR-SPT701
Depth		-
Date Sampled		28/05/2022
Type of sample		Water
Date digested	-	01/06/2022
Date analysed	-	02/06/2022
Arsenic - Dissolved	mg/L	<0.05
Cadmium - Dissolved	mg/L	<0.01
Chromium - Dissolved	mg/L	<0.01
Copper - Dissolved	mg/L	0.3
Lead - Dissolved	mg/L	<0.03
Mercury - Dissolved	mg/L	<0.0005
Nickel - Dissolved	mg/L	<0.02
Zinc - Dissolved	mg/L	<0.02

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	296694-3
Date extracted	-			02/06/2022	1	02/06/2022	02/06/2022		02/06/2022	02/06/2022
Date analysed	-			06/06/2022	1	06/06/2022	06/06/2022		06/06/2022	06/06/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	98	90
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	98	90
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	82	76
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	99	91
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	99	90
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	105	96
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	104	96
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	101	1	95	97	2	99	91

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	296694-3
Date extracted	-			02/06/2022	1	02/06/2022	02/06/2022		02/06/2022	02/06/2022
Date analysed	-			03/06/2022	1	03/06/2022	03/06/2022		03/06/2022	03/06/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	123	108
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	104	96
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	100	106
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	123	108
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	104	96
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	100	106
Surrogate o-Terphenyl	%		Org-020	97	1	84	86	2	87	81

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	296694-3
Date extracted	-			02/06/2022	1	02/06/2022	02/06/2022		02/06/2022	02/06/2022
Date analysed	-			02/06/2022	1	02/06/2022	02/06/2022		02/06/2022	02/06/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	92
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	81	91
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	95
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	<0.1	0	90	102
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	<0.1	67	90	96
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	<0.1	0	95	107
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	83	85
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	0.07	<0.05	33	84	86
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	81	1	86	87	1	76	85

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	296694-3
Date extracted	-			02/06/2022	1	02/06/2022	02/06/2022		02/06/2022	02/06/2022
Date analysed	-			02/06/2022	1	02/06/2022	02/06/2022		02/06/2022	02/06/2022
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	92
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	110
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	103
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	107
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	101
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	103
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	98
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	100
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	100
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	96
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	76	1	81	83	2	72	79

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	296694-3
Date extracted	-			02/06/2022	1	02/06/2022	02/06/2022		02/06/2022	02/06/2022
Date analysed	-			02/06/2022	1	02/06/2022	02/06/2022		02/06/2022	02/06/2022
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	106
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	95
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	89	95
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	116
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	106
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	99
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	92
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	76	1	81	83	2	72	79

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	296694-3
Date extracted	-			02/06/2022	1	02/06/2022	02/06/2022		02/06/2022	02/06/2022
Date analysed	-			02/06/2022	1	02/06/2022	02/06/2022		02/06/2022	02/06/2022
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	87	80
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	76	1	81	83	2	72	79

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-10	296694-3
Date prepared	-			02/06/2022	1	02/06/2022	02/06/2022		02/06/2022	02/06/2022
Date analysed	-			03/06/2022	1	03/06/2022	03/06/2022		03/06/2022	03/06/2022
Arsenic	mg/kg	4	Metals-020	<4	1	7	7	0	91	71
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	85	78
Chromium	mg/kg	1	Metals-020	<1	1	8	9	12	90	70
Copper	mg/kg	1	Metals-020	<1	1	26	32	21	92	88
Lead	mg/kg	1	Metals-020	<1	1	7	8	13	88	#
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	101	103
Nickel	mg/kg	1	Metals-020	<1	1	13	15	14	90	#
Zinc	mg/kg	1	Metals-020	<1	1	45	41	9	86	#

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			01/06/2022	15	01/06/2022	02/06/2022		01/06/2022	[NT]
Date analysed	-			02/06/2022	15	02/06/2022	03/06/2022		02/06/2022	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	15	85	85	0	92	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	15	85	85	0	92	[NT]
Benzene	µg/L	1	Org-023	<1	15	<1	<1	0	95	[NT]
Toluene	µg/L	1	Org-023	<1	15	<1	<1	0	96	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	15	<1	<1	0	88	[NT]
m+p-xylene	µg/L	2	Org-023	<2	15	<2	<2	0	91	[NT]
o-xylene	µg/L	1	Org-023	<1	15	<1	<1	0	93	[NT]
Naphthalene	µg/L	1	Org-023	<1	15	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	94	15	98	99	1	99	[NT]
Surrogate toluene-d8	%		Org-023	97	15	97	97	0	98	[NT]
Surrogate 4-BFB	%		Org-023	95	15	93	94	1	94	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			01/06/2022	15	01/06/2022	01/06/2022		01/06/2022	[NT]
Date analysed	-			01/06/2022	15	02/06/2022	02/06/2022		01/06/2022	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	15	<50	<50	0	97	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	15	<100	<100	0	90	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	15	<100	<100	0	109	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	15	<50	<50	0	97	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	15	<100	<100	0	90	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	15	<100	<100	0	109	[NT]
Surrogate o-Terphenyl	%		Org-020	87	15	86	90	5	100	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			01/06/2022	15	01/06/2022	01/06/2022		01/06/2022	[NT]
Date analysed	-			01/06/2022	15	01/06/2022	01/06/2022		01/06/2022	[NT]
Naphthalene	µg/L	1	Org-022/025	<1	15	<1	<1	0	95	[NT]
Acenaphthylene	µg/L	1	Org-022/025	<1	15	<1	<1	0	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	15	<1	<1	0	95	[NT]
Fluorene	µg/L	1	Org-022/025	<1	15	<1	<1	0	97	[NT]
Phenanthrene	µg/L	1	Org-022/025	<1	15	<1	<1	0	106	[NT]
Anthracene	µg/L	1	Org-022/025	<1	15	<1	<1	0	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	15	<1	<1	0	102	[NT]
Pyrene	µg/L	1	Org-022/025	<1	15	<1	<1	0	107	[NT]
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	15	<1	<1	0	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	15	<1	<1	0	97	[NT]
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	15	<2	<2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	15	<1	<1	0	102	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	15	<1	<1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	15	<1	<1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	15	<1	<1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	95	15	116	107	8	91	[NT]

QUALITY CONTROL: Metals in Water - Dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			01/06/2022	[NT]	[NT]	[NT]	[NT]	01/06/2022	[NT]
Date analysed	-			02/06/2022	[NT]	[NT]	[NT]	[NT]	02/06/2022	[NT]
Arsenic - Dissolved	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	114	[NT]
Cadmium - Dissolved	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	108	[NT]
Chromium - Dissolved	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	109	[NT]
Copper - Dissolved	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	108	[NT]
Lead - Dissolved	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	109	[NT]
Mercury - Dissolved	mg/L	0.0005	Metals-021	<0.0005	[NT]	[NT]	[NT]	[NT]	114	[NT]
Nickel - Dissolved	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	110	[NT]
Zinc - Dissolved	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	113	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

8 metals in soil - # Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Harry Leonard

Sample Login Details

Your reference	E33780PL, Kingswood
Envirolab Reference	296694
Date Sample Received	30/05/2022
Date Instructions Received	30/05/2022
Date Results Expected to be Reported	06/06/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	14 Soil, 1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	7
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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12 Ashley St Chatswood NSW 2067
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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHsin Water	Metals in Water - Dissolved	On Hold
BH701-0.14-0.55	✓	✓	✓	✓	✓	✓	✓	✓					
BH701-0.55-0.9	✓	✓	✓				✓						
BH702-0.06-0.3	✓	✓	✓	✓	✓	✓	✓	✓					
BH702-0.5-0.7													✓
BH703-0.0-0.2	✓	✓	✓	✓	✓	✓	✓	✓					
BH703-0.2-0.5	✓	✓	✓				✓						
BH703-0.5-0.7													✓
BH704-0.17-0.4	✓	✓	✓	✓	✓	✓	✓	✓					
BH704-1.0-1.2													✓
BH704-1.5-1.7	✓	✓	✓				✓						
TB-S701	✓	✓	✓				✓						
TS-S701	✓												
SDUP701	✓	✓	✓	✓	✓	✓	✓						
-													✓
FR-SPT701									✓	✓	✓	✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:
ENVIROLAB SERVICES PTY LTD
12 ASHLEY STREET
CHATSWOOD NSW 2067
P: (02) 99106200
F: (02) 99106201

Attention: Aileen

JKE Job Number: E33780PL

Date Results Required: STANDARD

Page: 1 of 1

FROM:
JKEnvironments
REAR OF 115 WICKS ROAD
MACQUARIE PARK, NSW 2113
P: 02-9888 5000 F: 02-9888 5001
Attention: Harry Leonard
hleonard@jkenvironments.com.au

Location: Kingswood
Sampler: AM

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	Asbestos (WA 500ml method)	BTEX
28/05/2022	1	BH701	0.14 - 0.55	G, A	0.0	F: Silty Gravelly Clay	X		X	
28/05/2022	2	BH701	0.55 - 0.9	G	0.0	Silty Clay		X		
28/05/2022	3	BH702	0.06 - 0.3	G, A	0.0	F: Silty Clay	X		X	
28/05/2022	4	BH702	0.5 - 0.7	G	0.0	Silty Clay				
28/05/2022	5	BH703	0.0 - 0.2	G, A	0.0	F: Clayey Silt	X		X	
28/05/2022	6	BH703	0.2 - 0.5	G, A	0.0	Silty Clay		X		
28/05/2022	7	BH703	0.5 - 0.7	G	0.0	Silty Clay				
28/05/2022	8	BH704	0.17 - 0.4	G, A	0.0	F: Silty Gravelly Clay	X		X	
28/05/2022	9	BH704	1.0 - 1.2	G, A	0.0	F: Silty Gravelly Clay				
28/05/2022	10	BH704	1.5 - 1.7	G	0.0	Silty Clay		X		
28/05/2022	11	TB-S701	-	G, A	-	Soil Trip Blank		X		
28/05/2022	12	TS-S701	-	G, A	-	Soil Trip Spike				X
28/05/2022	13	SDUP701	-	G	0.0	Soil DUP	X			
28/05/2022	14#	SDUP702	-	G	0.0	Soil DUP	X			
28/05/2022	15	FR-SPT701	-	2 x G1, 3 x V, 1 x HN03	-	Field Rinsate		X		

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 296694
Date Received: 30/5/22
Time Received: 1210
Received by: AP
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):
SDUP701 - Intra-laboratory duplicate
SDUP702 - Inter-laboratory duplicate (Melb)

Sample Containers:
G - 250mg Glass Jar G1- 125mL Amber Glass Bottle
V - BTEX Vial H - HNO3 Wash PVC

Relinquished By: EW	Date: 30/05/2022	Time: 1210	Received By: AP	Date: 30/5/22

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CERTIFICATE OF ANALYSIS 297282

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33780PL, Kingswood**
Number of Samples	10 Soil
Date samples received	06/06/2022
Date completed instructions received	06/06/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	14/06/2022
Date of Issue	14/06/2022

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Asbestos Approved By
Analysed by Asbestos Approved Analyst: Nyovan Moonean
Authorised by Asbestos Approved Signatory: Matt Mansfield

Results Approved By
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Josh Williams, Organics and LC Supervisor
Kyle Gavrily, Senior Chemist
Matt Mansfield, QHSE manager

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		297282-1	297282-3	297282-5	297282-6	297282-9
Your Reference	UNITS	BH705	BH706	BH706	BH707	TS-T1
Depth		0.14-0.2	0-0.2	0.45-0.65	0-0.2	-
Date Sampled		4/06/2022	4/06/2022	4/06/2022	4/06/2022	4/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022
Date analysed	-	09/06/2022	09/06/2022	09/06/2022	09/06/2022	09/06/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	[NA]
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	97%
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	98%
Ethylbenzene	mg/kg	<1	<1	<1	<1	99%
m+p-xylene	mg/kg	<2	<2	<2	<2	96%
o-Xylene	mg/kg	<1	<1	<1	<1	97%
Naphthalene	mg/kg	<1	<1	<1	<1	[NA]
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	[NA]
Surrogate aaa-Trifluorotoluene	%	87	85	82	85	104

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		297282-10
Your Reference	UNITS	TB-S1
Depth		-
Date Sampled		4/06/2022
Type of sample		Soil
Date extracted	-	08/06/2022
Date analysed	-	09/06/2022
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	116

svTRH (C10-C40) in Soil					
Our Reference		297282-1	297282-3	297282-5	297282-6
Your Reference	UNITS	BH705	BH706	BH706	BH707
Depth		0.14-0.2	0-0.2	0.45-0.65	0-0.2
Date Sampled		4/06/2022	4/06/2022	4/06/2022	4/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	110	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	110	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	120	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	120	<50	<50
Surrogate o-Terphenyl	%	80	85	82	80

PAHs in Soil					
Our Reference		297282-1	297282-3	297282-5	297282-6
Your Reference	UNITS	BH705	BH706	BH706	BH707
Depth		0.14-0.2	0-0.2	0.45-0.65	0-0.2
Date Sampled		4/06/2022	4/06/2022	4/06/2022	4/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	83	85	85	84

Organochlorine Pesticides in soil				
Our Reference		297282-1	297282-3	297282-6
Your Reference	UNITS	BH705	BH706	BH707
Depth		0.14-0.2	0-0.2	0-0.2
Date Sampled		4/06/2022	4/06/2022	4/06/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	08/06/2022	08/06/2022	08/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.8	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	4.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	1.5	<0.1	<0.1
alpha-chlordane	mg/kg	0.2	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	1.8	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	94	86

Organophosphorus Pesticides in Soil				
Our Reference		297282-1	297282-3	297282-6
Your Reference	UNITS	BH705	BH706	BH707
Depth		0.14-0.2	0-0.2	0-0.2
Date Sampled		4/06/2022	4/06/2022	4/06/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	08/06/2022	08/06/2022	08/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	94	86

PCBs in Soil				
Our Reference		297282-1	297282-3	297282-6
Your Reference	UNITS	BH705	BH706	BH707
Depth		0.14-0.2	0-0.2	0-0.2
Date Sampled		4/06/2022	4/06/2022	4/06/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	08/06/2022	08/06/2022	08/06/2022
Date analysed	-	08/06/2022	08/06/2022	08/06/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	94	86

Acid Extractable metals in soil					
Our Reference		297282-1	297282-3	297282-5	297282-6
Your Reference	UNITS	BH705	BH706	BH706	BH707
Depth		0.14-0.2	0-0.2	0.45-0.65	0-0.2
Date Sampled		4/06/2022	4/06/2022	4/06/2022	4/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022
Date analysed	-	10/06/2022	10/06/2022	10/06/2022	10/06/2022
Arsenic	mg/kg	<4	5	<4	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	25	11	7	13
Copper	mg/kg	13	22	13	20
Lead	mg/kg	4	15	6	16
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	37	9	10	8
Zinc	mg/kg	23	52	25	54

Moisture					
Our Reference		297282-1	297282-3	297282-5	297282-6
Your Reference	UNITS	BH705	BH706	BH706	BH707
Depth		0.14-0.2	0-0.2	0.45-0.65	0-0.2
Date Sampled		4/06/2022	4/06/2022	4/06/2022	4/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	08/06/2022	08/06/2022	08/06/2022	08/06/2022
Date analysed	-	09/06/2022	09/06/2022	09/06/2022	09/06/2022
Moisture	%	15	4.4	18	12

Asbestos ID - soils NEPM - ASB-001				
Our Reference		297282-1	297282-3	297282-6
Your Reference	UNITS	BH705	BH706	BH707
Depth		0.14-0.2	0-0.2	0-0.2
Date Sampled		4/06/2022	4/06/2022	4/06/2022
Type of sample		Soil	Soil	Soil
Date analysed	-	14/06/2022	14/06/2022	14/06/2022
Sample mass tested	g	796.69	736.2	706.92
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–
FA and AF Estimation*	g	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	297282-3
Date extracted	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
Date analysed	-			09/06/2022	1	09/06/2022	09/06/2022		09/06/2022	09/06/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	92	85
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	92	85
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	82	75
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	92	84
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	95	87
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	96	89
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	97	90
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	81	1	87	86	1	93	83

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	297282-3
Date extracted	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
Date analysed	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	120	116
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	98	102
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	83	#
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	120	116
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	98	102
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	83	#
Surrogate o-Terphenyl	%		Org-020	83	1	80	89	11	90	90

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	297282-3
Date extracted	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
Date analysed	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	86
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	89
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	92
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	90
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	86
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	85	91
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	83	83
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	96	100
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	87	1	83	84	1	81	88

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	297282-3
Date extracted	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
Date analysed	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	86
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	89
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	0.8	0.9	12	89	97
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	4.1	4.2	2	91	95
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	92
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	1.5	1.6	6	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	90
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	1.8	1.8	0	88	94
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	98
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	102
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	100
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	92	1	87	94	8	86	84

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	297282-3
Date extracted	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
Date analysed	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	112
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	101
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	121
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	120	124
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	100
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	119
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	129
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	92	1	87	94	8	86	84

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	297282-3
Date extracted	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
Date analysed	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	92	80
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	92	1	87	94	8	86	84

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	297282-3
Date prepared	-			08/06/2022	1	08/06/2022	08/06/2022		08/06/2022	08/06/2022
Date analysed	-			10/06/2022	1	10/06/2022	10/06/2022		10/06/2022	10/06/2022
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	102	89
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	100	77
Chromium	mg/kg	1	Metals-020	<1	1	25	24	4	105	85
Copper	mg/kg	1	Metals-020	<1	1	13	14	7	100	104
Lead	mg/kg	1	Metals-020	<1	1	4	4	0	105	77
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	97	123
Nickel	mg/kg	1	Metals-020	<1	1	37	38	3	103	83
Zinc	mg/kg	1	Metals-020	<1	1	23	28	20	105	106

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

TRH Soil C10-C40 NEPM - # Percent recovery for the matrix spike is not possible to report as the high concentration of analytes in sample 297282-3ms have caused interference.

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Harry Leonard

Sample Login Details

Your reference	E33780PL, Kingswood
Envirolab Reference	297282
Date Sample Received	06/06/2022
Date Instructions Received	06/06/2022
Date Results Expected to be Reported	14/06/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	10 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	18
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
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www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	On Hold
BH705-0.14-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH705-0.3-0.33									✓
BH706-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH706-0.3-0.45									✓
BH706-0.45-0.65	✓	✓	✓				✓		
BH707-0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH707-0.3-0.5									✓
BH707-0.5-0.7									✓
TS-T1	✓								
TB-S1	✓								

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E33780PL Date Results Required: STANDARD Page: 1 of 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard hleonard@jkenvironments.com.au

Location:	Kingswood	Sample Preserved In Esky on Ice
Sampler:	HL	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	Asbestos (WA 500ml method)	BTEX
4/06/2022	1	BH705	0.14-0.2	G, A	0	Fill: Sandy gravelly clay	X		X	
4/06/2022	2	BH705	0.3-0.33	G	0	Claystone				
4/06/2022	3	BH706	0-0.2	G, A	0	F: Silty gravelly clay	X		X	
4/06/2022	4	BH706	0.3-0.45	G, A	0	F: Silty clay				
4/06/2022	5	BH706	0.45-0.65	G	0	Silty clay		X		
4/06/2022	6	BH707	0-0.2	G, A	0	F: Silty clay	X		X	
4/06/2022	7	BH707	0.3-0.5	G, A	0	F: Silty clay				
4/06/2022	8	BH707	0.5-0.7	G	0	Silty clay				
4/06/2022	9	TS-S1	-	G	-	Spike				X
4/06/2022	10	TB-S1	-	G	-	Blank				X

ENVIROLAB
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 297282
Date Received: 6.6.22
Time Received: 1400
Received By: AP - ELS
Temp: Cool/Ambient
Cooling: Ice/Ice pack

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag

Relinquished By: HL	Date: 06/06/2022	Time: 1400	Received By: AP - ELS SYD	Date: 6.6.22

Envirolab Services Pty Ltd
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www.envirolab.com.au

CERTIFICATE OF ANALYSIS 31757

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33780PL**
Number of Samples	1 Soil
Date samples received	01/06/2022
Date completed instructions received	01/06/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	08/06/2022
Date of Issue	08/06/2022

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Chris De Luca, Operations Manager

Authorised By

Pamela Adams, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		31757-1
Your Reference	UNITS	SDUP702
Date Sampled		28/05/2022
Type of sample		Soil
Date extracted	-	06/06/2022
Date analysed	-	06/06/2022
vTRH C_6 - C_9	mg/kg	<25
vTRH C_6 - C_{10}	mg/kg	<25
TRH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total BTEX	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	103

TRH Soil C10-C40 NEPM		
Our Reference		31757-1
Your Reference	UNITS	SDUP702
Date Sampled		28/05/2022
Type of sample		Soil
Date extracted	-	06/06/2022
Date analysed	-	07/06/2022
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	82

PAHs in Soil		
Our Reference		31757-1
Your Reference	UNITS	SDUP702
Date Sampled		28/05/2022
Type of sample		Soil
Date extracted	-	06/06/2022
Date analysed	-	07/06/2022
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j&k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	<0.05
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (Half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d_{14}	%	98

OCP in Soil		
Our Reference		31757-1
Your Reference	UNITS	SDUP702
Date Sampled		28/05/2022
Type of sample		Soil
Date extracted	-	06/06/2022
Date analysed	-	07/06/2022
alpha-BHC	mg/kg	<0.1
Hexachlorobenzene	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve reported Aldrin + Dieldrin	mg/kg	<0.1
Total +ve reported DDT+DDD+DDE	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	82

OP in Soil		
Our Reference		31757-1
Your Reference	UNITS	SDUP702
Date Sampled		28/05/2022
Type of sample		Soil
Date extracted	-	06/06/2022
Date analysed	-	07/06/2022
Azinphos-methyl	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyrifos	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorovos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	82

PCBs in Soil		
Our Reference		31757-1
Your Reference	UNITS	SDUP702
Date Sampled		28/05/2022
Type of sample		Soil
Date extracted	-	06/06/2022
Date analysed	-	07/06/2022
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate 2-fluorobiphenyl	%	92

Acid Extractable metals in soil		
Our Reference		31757-1
Your Reference	UNITS	SDUP702
Date Sampled		28/05/2022
Type of sample		Soil
Date digested	-	06/06/2022
Date analysed	-	07/06/2022
Arsenic	mg/kg	5
Cadmium	mg/kg	<0.4
Chromium	mg/kg	13
Copper	mg/kg	24
Lead	mg/kg	9
Mercury	mg/kg	<0.1
Nickel	mg/kg	11
Zinc	mg/kg	25

Moisture		
Our Reference		31757-1
Your Reference	UNITS	SDUP702
Date Sampled		28/05/2022
Type of sample		Soil
Date prepared	-	06/06/2022
Date analysed	-	07/06/2022
Moisture	%	19

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105°C for a minimum of 12 hours.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021/022	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD or GC-MS. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Note, For OCs the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

Method ID	Methodology Summary
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			06/06/2022	[NT]	[NT]	[NT]	[NT]	06/06/2022	[NT]
Date analysed	-			06/06/2022	[NT]	[NT]	[NT]	[NT]	06/06/2022	[NT]
vTRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	85	[NT]
vTRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	85	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	89	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	90	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	79	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	84	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	111	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: TRH Soil C10-C40 NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			06/06/2022	[NT]	[NT]	[NT]	[NT]	06/06/2022	[NT]
Date analysed	-			07/06/2022	[NT]	[NT]	[NT]	[NT]	07/06/2022	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	88	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	85	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	107	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	88	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	85	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	107	[NT]
Surrogate o-Terphenyl	%		Org-020	81	[NT]	[NT]	[NT]	[NT]	78	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			06/06/2022	[NT]	[NT]	[NT]	[NT]	06/06/2022	[NT]
Date analysed	-			07/06/2022	[NT]	[NT]	[NT]	[NT]	07/06/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Acenaphthylene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Fluorene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Phenanthrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Pyrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-022	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022	<0.05	[NT]	[NT]	[NT]	[NT]	106	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d_{14}	%		Org-022	96	[NT]	[NT]	[NT]	[NT]	96	[NT]

QUALITY CONTROL: OCP in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			06/06/2022	[NT]	[NT]	[NT]	[NT]	06/06/2022	[NT]
Date analysed	-			07/06/2022	[NT]	[NT]	[NT]	[NT]	07/06/2022	[NT]
alpha-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Hexachlorobenzene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	88	[NT]
gamma-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
delta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
alpha-chlordane	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Dieldrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Endrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Methoxychlor	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	84	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: OP in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	31757-1
Date extracted	-			06/06/2022	1	06/06/2022	06/06/2022		06/06/2022	06/06/2022
Date analysed	-			07/06/2022	1	07/06/2022	07/06/2022		07/06/2022	07/06/2022
Azinphos-methyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	88	93
Chlorpyrifos-methyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	88	90
Diazinon	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	90	90
Dichlorovos	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	90	98
Fenitrothion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	76	82
Malathion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	84	1	82	78	5	88	82

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			06/06/2022	[NT]	[NT]	[NT]	[NT]	06/06/2022	[NT]
Date analysed	-			07/06/2022	[NT]	[NT]	[NT]	[NT]	07/06/2022	[NT]
Aroclor 1016	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Aroclor 1260	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-fluorobiphenyl	%		Org-022	88	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			06/06/2022	[NT]	[NT]	[NT]	[NT]	06/06/2022	[NT]
Date analysed	-			07/06/2022	[NT]	[NT]	[NT]	[NT]	07/06/2022	[NT]
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	[NT]	[NT]	102	[NT]
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	[NT]	[NT]	103	[NT]
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
ph 03 9763 2500 fax 03 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Harry Leonard

Sample Login Details

Your reference	E33780PL
Envirolab Reference	31757
Date Sample Received	01/06/2022
Date Instructions Received	01/06/2022
Date Results Expected to be Reported	08/06/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	8.8
Cooling Method	Icepack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Pamela Adams	Chris De Luca
Phone: 03 9763 2500	**Phone: 03 9763 2500**
Fax: 03 9763 2633	**Fax: 03 9763 2633**
Email: padams@envirolab.com.au	**Email: cdeluca@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
ph 03 9763 2500 fax 03 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	OCP in Soil	OP in Soil	PCBsin Soil	Acid Extractable metalsin soil
SDUP702	✓	✓	✓	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E33780PL Date Results Required: STANDARD Page: 1 of 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard hleonard@jkenvironments.com.au

Location: Kingswood
Sampler: AM
Sample Preserved in Esky on Ice
Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	Asbestos (WA 500ml method)	BTEX
28/05/2022	1	BH701	0.14 - 0.55	G, A	0.0	F: Silty Gravelly Clay	X		X	
28/05/2022	2	BH701	0.55 - 0.9	G	0.0	Silty Clay		X		
28/05/2022	3	BH702	0.06 - 0.3	G, A	0.0	F: Silty Clay	X		X	
28/05/2022	4	BH702	0.5 - 0.7	G	0.0	Silty Clay				
28/05/2022	5	BH703	0.0 - 0.2	G, A	0.0	F: Clayey Silt	X		X	
28/05/2022	6	BH703	0.2 - 0.5	G, A	0.0	Silty Clay		X		
28/05/2022	7	BH703	0.5 - 0.7	G	0.0	Silty Clay				
28/05/2022	8	BH704	0.17 - 0.4	G, A	0.0	F: Silty Gravelly Clay	X		X	
28/05/2022	9	BH704	1.0 - 1.2	G, A	0.0	F: Silty Gravelly Clay				
28/05/2022	10	BH704	1.5 - 1.7	G	0.0	Silty Clay		X		
28/05/2022	11	TB-S701	-	G, A	-	Soil Trip Blank		X		
28/05/2022	12	TS-S701	-	G, A	-	Soil Trip Spike				X
28/05/2022	13	SDUP701	-	G	0.0	Soil DUP	X			
28/05/2022	14#	SDUP702	-	G	0.0	Soil DUP	X			
28/05/2022	15	FR-SPT701	-	2 x G1, 3 x V, 1 x HN03	-	Field Rinsate		X		

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 296694
Date Received: 30/5/22
Time Received: 1210
Received by: AP
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Envirolab Services
12 Research Drive
Croydon South VIC 3136
Ph: (03) 9763 2500
Job No: 317574
Date Received: 31/5/22
Time Received: 2:35pm
Received by: AP
Temp: Cool/Ambient 8.8C
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):
SDUP701 - Intra-laboratory duplicate
SDUP702 - Inter-laboratory duplicate (Melb)

Sample Containers:
G - 250mg Glass Jar G1- 125mL Amber Glass Bottle
V - BTEX Vial H - HNO3 Wash PVC

Relinquished By: EW	Date: 30/05/2022	Time: 1210	Received By: AP	Date: 30/5/22

ELS Sydney
C Roseman 31/05/22
1120

Login

From: Poonam RAJ <poonam1679@hotmail.com>
Sent: Tuesday, 31 May 2022 8:18 AM
To: Login
Subject: Fwd: morning

Get Outlook for Android

From: Geoff Weir <GWeir@envirolab.com.au>
Sent: Tuesday, May 31, 2022 7:40:35 AM
To: Poonam RAJ <poonam1679@hotmail.com>
Subject: morning

Relinquished by Christine. ES Grp
31/05/22 1120

296694 - #14 to Melbourne pls

Kind Regards,

Geoff Weir | Senior Customer Service & Purchasing | Envirolab Services

Great Science. Great Service.

12 Ashley Street Chatswood NSW 2067
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E GWeir@envirolab.com.au | W www.envirolab.com.au

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www.envirolab.com.au

CERTIFICATE OF ANALYSIS 297295

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33780PL, Kingswood**
Number of Samples	6 Water
Date samples received	06/06/2022
Date completed instructions received	06/06/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	14/06/2022
Date of Issue	21/06/2022
Reissue Details	This report replaces R00 created on 14/06/2022 due to: sample ID error

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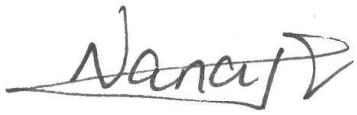
Results Approved By
Diego Bigolin, Inorganics Supervisor
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Josh Williams, Organics and LC Supervisor
Kyle Gavrily, Senior Chemist
Thomas Lovatt, Chemist

Authorised By



Nancy Zhang, Laboratory Manager

VOCs in water					
Our Reference		297295-1	297295-2	297295-3	297295-4
Your Reference	UNITS	MW601	MW603	MW701	WDUP601
Date Sampled		06/06/2022	06/06/2022	06/06/2022	06/06/2022
Type of sample		Water	Water	Water	Water
Date extracted	-	09/06/2022	09/06/2022	09/06/2022	09/06/2022
Date analysed	-	10/06/2022	10/06/2022	10/06/2022	10/06/2022
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1

VOCs in water					
Our Reference	UNITS	297295-1	297295-2	297295-3	297295-4
Your Reference		MW601	MW603	MW701	WDUP601
Date Sampled		06/06/2022	06/06/2022	06/06/2022	06/06/2022
Type of sample		Water	Water	Water	Water
Bromoform	µg/L	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	115	115	115	116
Surrogate toluene-d8	%	99	99	99	99
Surrogate 4-BFB	%	101	103	101	101

vTRH(C6-C10)/BTEXN in Water						
Our Reference		297295-1	297295-2	297295-3	297295-4	297295-5
Your Reference	UNITS	MW601	MW603	MW701	WDUP601	TS-W601
Date Sampled		06/06/2022	06/06/2022	06/06/2022	06/06/2022	06/06/2022
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	09/06/2022	09/06/2022	09/06/2022	09/06/2022	09/06/2022
Date analysed	-	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	[NA]
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	[NA]
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	<10	[NA]
Benzene	µg/L	<1	<1	<1	<1	85%
Toluene	µg/L	<1	<1	<1	<1	92%
Ethylbenzene	µg/L	<1	<1	<1	<1	96%
m+p-xylene	µg/L	<2	<2	<2	<2	96%
o-xylene	µg/L	<1	<1	<1	<1	98%
Naphthalene	µg/L	<1	<1	<1	<1	[NA]
Surrogate Dibromofluoromethane	%	93	93	93	94	118
Surrogate toluene-d8	%	100	100	99	100	99
Surrogate 4-BFB	%	106	107	105	105	98

vTRH(C6-C10)/BTEXN in Water		
Our Reference		297295-6
Your Reference	UNITS	TB-W601
Date Sampled		06/06/2022
Type of sample		Water
Date extracted	-	09/06/2022
Date analysed	-	10/06/2022
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Surrogate Dibromofluoromethane	%	115
Surrogate toluene-d8	%	98
Surrogate 4-BFB	%	98

svTRH (C10-C40) in Water					
Our Reference	UNITS	297295-1	297295-2	297295-3	297295-4
Your Reference		MW601	MW603	MW701	WDUP601
Date Sampled		06/06/2022	06/06/2022	06/06/2022	06/06/2022
Type of sample		Water	Water	Water	Water
Date extracted	-	10/06/2022	10/06/2022	10/06/2022	10/06/2022
Date analysed	-	11/06/2022	11/06/2022	11/06/2022	11/06/2022
TRH C_{10} - C_{14}	µg/L	<50	120	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	120	<50	<50
TRH >C_{10} - C_{16}	µg/L	<50	110	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	110	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	220	<50	<50
Surrogate o-Terphenyl	%	87	92	95	90

PAHs in Water - Low Level					
Our Reference	UNITS	297295-1	297295-2	297295-3	297295-4
Your Reference		MW601	MW603	MW701	WDUP601
Date Sampled		06/06/2022	06/06/2022	06/06/2022	06/06/2022
Type of sample		Water	Water	Water	Water
Date extracted	-	10/06/2022	10/06/2022	10/06/2022	10/06/2022
Date analysed	-	10/06/2022	10/06/2022	10/06/2022	10/06/2022
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	86	88	95	87

HM in water - dissolved					
Our Reference	UNITS	297295-1	297295-2	297295-3	297295-4
Your Reference		MW601	MW603	MW701	WDUP601
Date Sampled		06/06/2022	06/06/2022	06/06/2022	06/06/2022
Type of sample		Water	Water	Water	Water
Date prepared	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	07/06/2022	07/06/2022	07/06/2022	07/06/2022
Arsenic-Dissolved	µg/L	1	2	<1	2
Cadmium-Dissolved	µg/L	<0.1	0.2	0.2	<0.1
Chromium-Dissolved	µg/L	<1	5	<1	<1
Copper-Dissolved	µg/L	<1	3	<1	<1
Lead-Dissolved	µg/L	<1	2	<1	<1
Mercury-Dissolved	µg/L	<0.05	0.07	<0.05	<0.05
Nickel-Dissolved	µg/L	40	19	2	43
Zinc-Dissolved	µg/L	12	26	8	11

Miscellaneous Inorganics				
Our Reference	UNITS	297295-1	297295-2	297295-3
Your Reference		MW601	MW603	MW701
Date Sampled		06/06/2022	06/06/2022	06/06/2022
Type of sample		Water	Water	Water
Date prepared	-	6/06/2022	6/06/2022	6/06/2022
Date analysed	-	6/06/2022	6/06/2022	6/06/2022
pH	pH Units	7.0	6.8	6.8
Electrical Conductivity	µS/cm	15,000	23,000	27,000

Cations in water Dissolved				
Our Reference		297295-1	297295-2	297295-3
Your Reference	UNITS	MW601	MW603	MW701
Date Sampled		06/06/2022	06/06/2022	06/06/2022
Type of sample		Water	Water	Water
Date digested	-	07/06/2022	07/06/2022	07/06/2022
Date analysed	-	07/06/2022	07/06/2022	07/06/2022
Calcium - Dissolved	mg/L	190	220	290
Magnesium - Dissolved	mg/L	610	1,200	1,400
Hardness	mgCaCO 3 /L	3,000	5,300	6,600

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			09/06/2022	1	09/06/2022	09/06/2022		09/06/2022	[NT]
Date analysed	-			10/06/2022	1	10/06/2022	10/06/2022		10/06/2022	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	99	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	1	<1	<1	0	100	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	105	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	101	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	101	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	100	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	100	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	102	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	114	1	115	116	1	121	[NT]
Surrogate toluene-d8	%		Org-023	98	1	99	99	0	99	[NT]
Surrogate 4-BFB	%		Org-023	101	1	101	102	1	101	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			09/06/2022	1	09/06/2022	09/06/2022		09/06/2022	[NT]
Date analysed	-			10/06/2022	1	10/06/2022	10/06/2022		10/06/2022	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	1	<10	<10	0	96	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	1	<10	<10	0	96	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	95	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	96	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	97	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	97	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	98	[NT]
Naphthalene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	92	1	93	116	22	98	[NT]
Surrogate toluene-d8	%		Org-023	98	1	100	99	1	100	[NT]
Surrogate 4-BFB	%		Org-023	106	1	106	102	4	105	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			10/06/2022	[NT]	[NT]	[NT]	[NT]	10/06/2022	[NT]
Date analysed	-			10/06/2022	[NT]	[NT]	[NT]	[NT]	10/06/2022	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	97	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	94	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	97	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	94	[NT]
Surrogate o-Terphenyl	%		Org-020	90	[NT]	[NT]	[NT]	[NT]	114	[NT]

QUALITY CONTROL: PAHs in Water - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			10/06/2022	[NT]	[NT]	[NT]	[NT]	10/06/2022	[NT]
Date analysed	-			10/06/2022	[NT]	[NT]	[NT]	[NT]	10/06/2022	[NT]
Naphthalene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	93	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	99	[NT]	[NT]	[NT]	[NT]	90	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			07/06/2022	1	07/06/2022	07/06/2022		07/06/2022	[NT]
Date analysed	-			07/06/2022	1	07/06/2022	07/06/2022		07/06/2022	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	1	[NT]		99	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	[NT]		98	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		94	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		98	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		97	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	119	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	40	[NT]		101	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	12	[NT]		100	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			06/06/2022	[NT]	[NT]	[NT]	[NT]	06/06/2022	[NT]
Date analysed	-			06/06/2022	[NT]	[NT]	[NT]	[NT]	06/06/2022	[NT]
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: Cations in water Dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			07/06/2022	[NT]	[NT]	[NT]	[NT]	07/06/2022	[NT]
Date analysed	-			07/06/2022	[NT]	[NT]	[NT]	[NT]	07/06/2022	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	105	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	109	[NT]
Hardness	mgCaCO 3 /L	3	Metals-020	<3	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Harry Leonard

Sample Login Details

Your reference	E33780PL, Kingswood
Envirolab Reference	297295
Date Sample Received	06/06/2022
Date Instructions Received	06/06/2022
Date Results Expected to be Reported	14/06/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	6 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	4
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
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Sample ID	VOCs in water	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water - Low Level	HM in water - dissolved	pH	Electrical Conductivity	Cations in water Dissolved
MW601	✓	✓	✓	✓	✓	✓	✓	✓
MW603	✓	✓	✓	✓	✓	✓	✓	✓
MW701	✓	✓	✓	✓	✓	✓	✓	✓
WDUP601	✓	✓	✓	✓	✓			
TS-W601		✓						
TB-W601		✓						

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E33780PL Date Results Required: STANDARD Page: 1 of 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard HLeonard@jkenvironments.com.au

Location:	Kingswood	Sample Preserved In Esky on Ice
Sampler:	EW / AM	Tests Required

Date Sampled	Lab Ref:	Sample Number	Sample Containers	PID	Sample Description	Combo 2	Combo 3L	VOCs	pH / EC	8 Metals	PAHs	TRH/BTEX	BTEX	Hardness			
6/06/2022	1	MW601	2xG1, 4xV, 1xH, 1xPVC	0	Water		X	X	X					X			
6/06/2022	2	MW603	2xG1, 4xV, 1xH, 1xPVC	0	Water		X	X	X					X			
6/06/2022	3	MW701	2xG1, 4xV, 1xH, 1xPVC	0	Water		X	X	X					X			
6/06/2022	4	WDUP601	1xG1, 4xV, 1xH	-	Water		X	X									
6/06/2022	#	WDUP602	2xG1, 4xV, 1xH	-	Water		X	X	Send to Envirolab VIC								
6/06/2022	5	TS-W601	1xBTEX	-	Water								X				
6/06/2022	6	TB-W601	1xBTEX	-	Water								X				

12 Ashley Chatswood NSW 2067 Ph: (02) 9910 6200

Job No: 297295

Date Received: 6/6/2022

Time Received: 1535

Received By:

Cool/Ambient

Ice Brick

4.0C

Remarks (comments/detection limits required):	Sample Containers:
# Send to Envirolab VIC	G1 - Amber Glass Bottle V - BTEX Vial H - HNO3 Wash PVC PVC - HDPE Plastic Bottles

Relinquished By: AM	Date: 6/6/22	Time: 1535	Received By:	Date: 6/6/22 1535

Envirolab Services Pty Ltd
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CERTIFICATE OF ANALYSIS 31872

Client Details

Client	JK Environments
Attention	Harry Leonard
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E33780PL**
Number of Samples	1 Water
Date samples received	08/06/2022
Date completed instructions received	08/06/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	16/06/2022
Date of Issue	16/06/2022

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Chris De Luca, Operations Manager

Authorised By

Pamela Adams, Laboratory Manager

VOCs in water - Routine Level		
Our Reference		31872-1
Your Reference	UNITS	WDUP602
Date Sampled		06/06/2022
Type of sample		Water
Date extracted	-	14/06/2022
Date analysed	-	14/06/2022
Dichlorodifluoromethane	µg/L	<10
Chloromethane	µg/L	<10
Vinyl Chloride	µg/L	<10
Bromomethane	µg/L	<10
Chloroethane	µg/L	<10
Trichlorofluoromethane	µg/L	<10
1,1-Dichloroethene	µg/L	<1
Trans-1,2-dichloroethene	µg/L	<1
1,1-dichloroethane	µg/L	<1
Cis-1,2-dichloroethene	µg/L	<1
Bromochloromethane	µg/L	<1
Chloroform	µg/L	<1
2,2-dichloropropane	µg/L	<1
1,2-dichloroethane	µg/L	<1
1,1,1-trichloroethane	µg/L	<1
1,1-dichloropropene	µg/L	<1
Cyclohexane	µg/L	<1
Carbon tetrachloride	µg/L	<1
Benzene	µg/L	<1
Dibromomethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
Trichloroethene	µg/L	<1
Bromodichloromethane	µg/L	<1
trans-1,3-dichloropropene	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
1,1,2-trichloroethane	µg/L	<1
Toluene	µg/L	<1
1,3-dichloropropane	µg/L	<1
Dibromochloromethane	µg/L	<1
1,2-dibromoethane	µg/L	<1
Tetrachloroethene	µg/L	<1
1,1,1,2-tetrachloroethane	µg/L	<1
Chlorobenzene	µg/L	<1
Ethylbenzene	µg/L	<1

VOCs in water - Routine Level		
Our Reference		31872-1
Your Reference	UNITS	WDUP602
Date Sampled		06/06/2022
Type of sample		Water
Bromoform	µg/L	<1
m+p-xylene	µg/L	<2
Styrene	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	<1
o-xylene	µg/L	<1
1,2,3-trichloropropane	µg/L	<1
Isopropylbenzene	µg/L	<1
Bromobenzene	µg/L	<1
n-propyl benzene	µg/L	<1
2-chlorotoluene	µg/L	<1
4-chlorotoluene	µg/L	<1
1,3,5-trimethyl benzene	µg/L	<1
Tert-butyl benzene	µg/L	<1
1,2,4-trimethyl benzene	µg/L	<1
1,3-dichlorobenzene	µg/L	<1
Sec-butyl benzene	µg/L	<1
1,4-dichlorobenzene	µg/L	<1
4-isopropyl toluene	µg/L	<1
1,2-dichlorobenzene	µg/L	<1
n-butyl benzene	µg/L	<1
1,2-dibromo-3-chloropropane	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
Hexachlorobutadiene	µg/L	<1
1,2,3-trichlorobenzene	µg/L	<1
Surrogate Dibromofluoromethane	%	102
Surrogate toluene-d8	%	98
Surrogate 4-BFB	%	96

vTRH(C6-C10)/BTEXN in Water		
Our Reference	UNITS	31872-1
Your Reference		WDUP602
Date Sampled		06/06/2022
Type of sample		Water
Date extracted	-	14/06/2022
Date analysed	-	14/06/2022
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 -C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Total +ve Xylenes	µg/L	<1
Total BTEX in water	µg/L	<1
Surrogate Dibromofluoromethane	%	108
Surrogate toluene-d8	%	104
Surrogate 4-BFB	%	98

TRH Water(C10-C40) NEPM		
Our Reference		31872-1
Your Reference	UNITS	WDUP602
Date Sampled		06/06/2022
Type of sample		Water
Date extracted	-	09/06/2022
Date analysed	-	09/06/2022
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	<50
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	<50
Surrogate o-Terphenyl	%	78

PAHs in Water - Low Level		
Our Reference		31872-1
Your Reference	UNITS	WDUP602
Date Sampled		06/06/2022
Type of sample		Water
Date extracted	-	09/06/2022
Date analysed	-	10/06/2022
Naphthalene	µg/L	<0.1
Acenaphthylene	µg/L	<0.1
Acenaphthene	µg/L	<0.1
Fluorene	µg/L	<0.1
Phenanthrene	µg/L	<0.1
Anthracene	µg/L	<0.1
Fluoranthene	µg/L	<0.1
Pyrene	µg/L	<0.1
Benzo(a)anthracene	µg/L	<0.1
Chrysene	µg/L	<0.1
Benzo(b,j&k)fluoranthene	µg/L	<0.2
Benzo(a)pyrene	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1
Total +ve PAH's	µg/L	NIL (+)VE PAH
Benzo(a)pyrene TEQ	µg/L	<0.5
Surrogate p-Terphenyl-d_{14}	%	86

HM in water - dissolved		
Our Reference		31872-1
Your Reference	UNITS	WDUP602
Date Sampled		06/06/2022
Type of sample		Water
Date prepared	-	10/06/2022
Date analysed	-	10/06/2022
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	0.3
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	2
Lead-Dissolved	µg/L	<1
Nickel-Dissolved	µg/L	27
Zinc-Dissolved	µg/L	41
Mercury-Dissolved	µg/L	<0.05

Method ID	Methodology Summary
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: VOCs in water - Routine Level					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
Date analysed	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water - Routine Level					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate toluene-d8	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	93	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
Date analysed	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	100	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	103	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Surrogate Dibromofluoromethane	%		Org-023	105	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate toluene-d8	%		Org-023	104	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate 4-BFB	%		Org-023	95	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: TRH Water(C10-C40) NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			09/06/2022	[NT]	[NT]	[NT]	[NT]	09/06/2022	[NT]
Date analysed	-			09/06/2022	[NT]	[NT]	[NT]	[NT]	09/06/2022	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	72	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	90	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	72	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	90	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	93	[NT]
Surrogate o-Terphenyl	%		Org-020	75	[NT]	[NT]	[NT]	[NT]	69	[NT]

QUALITY CONTROL: PAHs in Water - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			09/06/2022	[NT]	[NT]	[NT]	[NT]	09/06/2022	[NT]
Date analysed	-			10/06/2022	[NT]	[NT]	[NT]	[NT]	10/06/2022	[NT]
Naphthalene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	66	[NT]
Acenaphthylene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Fluorene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Phenanthrene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Anthracene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Pyrene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Benzo(b,j&k)fluoranthene	µg/L	0.2	Org-022	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d_{14}	%		Org-022	96	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			10/06/2022	[NT]	[NT]	[NT]	[NT]	10/06/2022	[NT]
Date analysed	-			10/06/2022	[NT]	[NT]	[NT]	[NT]	10/06/2022	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	[NT]	[NT]	106	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
ph 03 9763 2500 fax 03 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Harry Leonard

Sample Login Details

Your reference	E33780PL
Envirolab Reference	31872
Date Sample Received	08/06/2022
Date Instructions Received	08/06/2022
Date Results Expected to be Reported	16/06/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	6.2
Cooling Method	Icepack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Pamela Adams	Chris De Luca
Phone: 03 9763 2500	**Phone: 03 9763 2500**
Fax: 03 9763 2633	**Fax: 03 9763 2633**
Email: padams@envirolab.com.au	**Email: cdeluca@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
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melbourne@envirolab.com.au
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Sample ID	VOCs in water - Routine Level	vTRH(C6-C10)/BTEXN in Water	TRH Water(C10-C40) NEPM	PAHs in Water - Low Level	HM in water - dissolved
WDUP602	✓	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E33780PL Date Results Required: STANDARD Page: 1 of 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Harry Leonard HLeonard@jkenvironments.com.au

Location:	Kingswood	Sample Preserved in Esky on Ice
Sampler:	EW / AM	Tests Required

Date Sampled	Lab Ref:	Sample Number	Sample Containers	PID	Sample Description	Combo 2	Combo 3L	VOCs	pH / EC	8 Metals	PAHs	TRH/BTEX	BTEX	Hardness			
6/06/2022	1	MW601	2xG1, 4xV, 1xH, 1xPVC	0	Water		X	X	X					X			
6/06/2022	2	MW603	2xG1, 4xV, 1xH, 1xPVC	0	Water		X	X	X					X			
6/06/2022	3	MW701	2xG1, 4xV, 1xH, 1xPVC	0	Water		X	X	X					X			
6/06/2022	4	WDUP601	1xG1, 4xV, 1xH	-	Water		X	X									
6/06/2022	#	WDUP602	2xG1, 4xV, 1xH	-	Water		X	X	Send to Envirolab VIC								
6/06/2022	5	TS-W601	1xBTEX	-	Water								X				
6/06/2022	6	TB-W601	1xBTEX	-	Water								X				

(1)

Envirolab Services
Croydon South VIC 3136
Ph: (03) 9763 2500

12 Ashley
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 31872
Date Received: 6/6/22
Time Received: 1535pm
Received By: AP
Temp: Cool/Ambient 6.2
Cooling: Ice/Icepack
Security: Intact/Broken/None

Job No: 297295
Date Received: 6/6/2022
Time Received: 1535
Received By:
Temp: Cool/Ambient 4.0°C
Cooling: Ice/Icepack

Remarks (comments/detection limits required):	Sample Containers:
# Send to Envirolab VIC	G1 - Amber Glass Bottle V - BTEX Vial H - HNO3 Wash PVC PVC - HDPE Plastic Bottles

Relinquished By: AM	Date: 6/6/22	Time:	Received By:	Date:
Els Sachney	7/6/22 1130	1535	Roy	6/6/22 1535

circle one

CM

Appendix F: Report Explanatory Notes

QA/QC Definitions

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)[20] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[21]. The NEPM (2013) is consistent with these documents.

A. Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit*" (Keith, 1991).

B. Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

D. Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

E. Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;
- All blank data reported;

[20] US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[21] Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*

- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. Comparability

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

G. Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

H. Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

I. Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

J. Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

Appendix G: Data (QA/QC) Evaluation

Data (QA/QC) Evaluation

A. INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 4.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

1. Field and Laboratory Considerations

The quality of the analytical data produced for this project has been considered in relation to the following:

- Sample collection, storage, transport and analysis;
- Laboratory PQLs;
- Field QA/QC results; and
- Laboratory QA/QC results.

2. Field QA/QC Samples and Analysis

A summary of the field QA/QC samples collected and analysed for this investigation is provided in the following table:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	SDUP701 (primary sample BH701 0.14-0.55m)	Approximately 10% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Inter-laboratory duplicate (soil)	SDUP702 (primary sample BH702 0.06-0.3m)	Approximately 10% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Intra-laboratory duplicate (water)	WDUP601 (primary sample MW601)	Approximately 30% of primary samples	Heavy metals, TRH/BTEX, PAHs and VOCs
Inter-laboratory duplicate (water)	WDUP602 (primary sample MW603)	Approximately 30% of primary samples	Heavy metals, TRH/BTEX, PAHs and VOCs
Trip spike (soil)	TS-S701 (28/05/2022)	One per day of soil sampling	BTEX
Trip spike (soil)	TS-T1 (04/06/2022)	One per day of soil sampling	BTEX
Trip spike (water)	TS-W601 (06/06/2022)	One for the investigation to demonstrate adequacy of preservation, storage and transport methods	BTEX
Trip blank (soil)	TB-S701 (28/05/2022)	One per day of soil sampling	TRH/BTEX, PAHs and heavy metals
Trip blank (soil)	TB-S1 (04/06/2022)	One per day of soil sampling	TRH/BTEX

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Trip blank (water)	TB-W601 (06/06/2022)	One for the investigation to demonstrate adequacy of preservation, storage and transport methods	BTEX
Rinsate (soil SPT)	FR-SPT701 (28/05/2022)	One for the investigation to demonstrate adequacy of decontamination methods	Heavy metals, TRH/BTEX and PAHs

The results for the field QA/QC samples are detailed in the laboratory summary tables (Table Q1 to Table Q2 inclusive) attached to the investigation report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.

3. Data Assessment Criteria

JKE adopted the following criteria for assessing the field and laboratory QA/QC analytical results:

Field Duplicates

Acceptable targets for precision of field duplicates in this report will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Field/Trip Blanks and Rinsates

Acceptable targets for field blank and rinsate samples in this report will be less than the PQL for organic analytes. Metals will be considered on a case-by-case basis with regards to typical background concentrations in soils and published drinking water guidelines for waters.

Trip Spikes

Acceptable targets for trip spike samples in this report will be 70% to 130%.

Laboratory QA/QC

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the laboratory reports. These criteria were developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the acceptable limits adopted by the primary laboratory (Envirolab) is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics;
- 60-140% recovery acceptable for organics; and
- 10-140% recovery acceptable for VOCs.

Surrogate Spikes

- 60-140% recovery acceptable for general organics; and
- 10-140% recovery acceptable for VOCs.

Method Blanks

- All results less than PQL.

B. DATA EVALUATION

1. Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance. Field sampling procedures were designed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997.

Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within specified holding times generally in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies.

JKE note that the temperature on receipt of soil samples was reported to be up to 18°C in one batch. JKE understand that the temperature is measured at the laboratory using an infrared temperature probe by scanning the outside of the sample container (i.e. one sample jar/container at the time of registering the samples). This procedure is not considered to be robust as there is a potential for the outside of the jar to warm to ambient temperature, or at least to increase from that of the internal contents, relatively quickly. On this basis, JKE is of the opinion that the temperatures reported on the Sample Receipts are unlikely to be reliable or representative of the overall batch. This is further supported by the soil trip spike recovery results (discussed further below) for this batch which reported adequate recovery in the range of 96% to 103%.

Envirolab noted that the asbestos results were reported to be consistent with the recommendations in NEPM (2013), however this level of reporting is outside the scope of their NATA accreditation. In the absence of other available analytical methods for asbestos, this was found to be acceptable for the purpose of this investigation.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

2. Laboratory PQLs

Appropriate PQLs were adopted for the analysis and all PQLs were below the SAC with the exception of the anthracene PQL for groundwater analysis which was 10 times greater than the ecological SAC and vinyl chloride for groundwater analysis which was approximately three times greater than the SSA SAC regarding human health. In light of the PAH and VOC concentrations reported, JKE is of the opinion that this is not significant, and it does not affect the quality of the dataset as a whole or the outcome of the investigation.

3. Field QA/QC Sample Results

Field Duplicates

The results indicated that field precision was acceptable. RPD non-conformances were reported for some analytes as discussed below:

- Elevated RPDs were reported for several PAH compounds and heavy metals in SDUP701/BH701 (0.014-0.55m). As both the primary and duplicate sample results were less than the SAC, the exceedances are not considered to have had an adverse impact on the data set as a whole;
- Elevated RPDs were reported for several heavy metals in WDUP2/MW603 and arsenic in MW601/WDUP601. Where the RPD exceedances are attributed to an increased sediment load in the lower part of the well given that the samples needed to be collected without steady state conditions being achieved;
- Elevated RPDs were reported for TRH (>C_{10}-C_{16}) and TRH (>C_{16}-C_{34}), in WDUP2/MW603. The RPD exceedances may be attributed to an increased sediment load in the lower part of the well given that the samples needed to be collected without steady state conditions being achieved.

Values outside the acceptable limits have been attributed to sample heterogeneity and the difficulties associated with obtaining homogenous duplicate samples of heterogeneous matrices. Where applicable, the higher duplicate value has been adopted as a conservative measure (see attached report tables).

Field/Trip Blanks

During the investigation, two soil trip blanks and one water trip blank were placed in the esky during sampling and transported back to the laboratory. The water trip blank analysis results were all less than the PQLs. The soil trip blank results were all less than the PQLs with the exception of chromium, copper and zinc in TB—S701 with reported concentrations of 3mg/kg, 3mg/kg and 1mg/kg respectively. Low level heavy metals concentrations are typical in washed sand which is utilised as blank material. In JKE's experience, the concentrations reported were consistent with background concentrations in a sand matrix and were not indicative of cross-contamination. On this basis, cross contamination between samples that may have significance for data validity did not occur.

Rinsates

All results were below the PQL with the exception of a trace detection of TRH (>C_{10}-C_{16}). The detectable concentration of TRH is most likely attributed to the deionised water used for the decontamination process being stored in plastic containers for extended periods of time. As there were no detection of TRH (>C_{10}-C_{16}) above the SAC in the soil samples, the exceedance in the rinsate sample is not considered to have had an adverse impact on the soil data set as a whole

Trip Spikes

The results ranged from 85% to 103% and indicated that field preservation methods were appropriate.

4. Laboratory QA/QC

The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) was considered to be acceptable for the purpose of this investigation.

A review of the laboratory QA/QC data identified the following minor non-conformances:

- Matrix spike recovery for some PAHs was not possible as the high concentration of analytes in sample BH706 (0-0.2). All results were below the SAC; and
- Matrix spike recovery for some heavy metals was not possible due to the inhomogeneous nature of the elements in the sample, however an acceptable recovery was obtained for the laboratory control sample.

The laboratory QA/QC non-conformances were considered to be minor and do not impact the data quality.

C. DATA QUALITY SUMMARY

JKE is of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

Non-conformances were reported for some field QA/QC samples and laboratory QA/QC analysis. These non-conformances were considered to be sporadic and minor, and were not considered to be indicative of systematic sampling or analytical errors. On this basis, these non-conformances are not considered to materially impact the report findings.

There was only one groundwater monitoring event undertaken for the investigation. On this basis there is some uncertainty around the representativeness of the groundwater data, particularly during different climatic conditions and after wet/dry periods. However, given the low contaminant concentrations reported, the site history and the surrounding land uses, this is not considered to alter the conclusions of the investigation. It is also noted that JKE has undertaken groundwater investigations throughout various parts of the hospital during redevelopment projects over the past five or more years and the groundwater results were broadly consistent with the results obtained previously.

Appendix H: Field Work Documents

JKEnvironments

Client:	Health Infrastructure	**Job No.:**	E33780PL
Project:	Proposed CAMHS Building	**Well No.:**	601
Location:	Nepean Hospital, Derby Street, KINGSWOOD, NSW	**Depth (m):**	9

WELL FINISH

X	**Gatic Cover**		**Standpipe**		**Other (describe)**

WELL PURGE DETAILS:

Method:	Low flow - peristaltic	**SWL – Before:**	5.92
Date:	6/6/22	**Time – Before:**	09:23
Undertaken By:	EW / AM	**Total Vol Removed:**	6
Pump Program No:	12:00 on dial	**PID (ppm):**	0.0

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
9:38	6.29	1		19.2	1.2	12662	6.63	72.6
9:42	6.85	2		19.9	0.5	12502	6.57	67.0
9:46	7.30	3		20.1	0.3	12681	6.57	65.9
9:50	7.80	4		20.4	0.3	12813	6.55	57.2
			Stabilised Sampling					

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))

Low Silt load, 1 DUP601 taken

Sampling Containers Used: 3 x glass amber, 8 x BTEX vials, 2 x HNO3 plastic, 0 x H2SO4 plastic, 1 x unpreserved plastic

YSI used: 4

Tested By: Alistair Mitchell AEW

Date Tested: 6/6

Checked By: HL

Date: 14/6/2022

Remarks:

- Steady state conditions
- difference in the pH less than 0.2 units, difference in conductivity less than 10%
10% and SWL stable/not in drawdown

JKEnvironments

Client:	Health Infrastructure	**Job No.:**	E33780PL
Project:	Proposed CAMHS Building	**Well No.:**	603
Location:	Nepean Hospital, Derby Street, KINGSWOOD, NSW	**Depth (m):**	10

WELL FINISH

X	Gatic Cover	✓	Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Low Flow - Peris	**SWL – Before:**	3.68
Date:	6/6/22	**Time – Before:**	10:16
Undertaken By:	EW/AM	**Total Vol Removed:**	15
Pump Program No:	12:00 as dual	**PID (ppm):**	0.00

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
10:27	3.95	1		18.2	0.9	18687	6.28	83.3
10:31	4.42	2		18.7	0.4	18984	6.21	83.7
10:35	4.90	3		18.7	0.3	18988	6.21	83.8
10:39/41	5.31	5		18.6	0.2	18997	6.20	84.2
10:45	6.27	6		18.6	0.2	19020	6.20	84.4
10:49	6.78	7		18.6	0.2	19040	6.20	84.0
10:53	7.24	8		18.6	0.6	19041	6.20	83.4
10:57	7.61	9		18.5	0.4	18978	6.22	81.8
11:01	7.85	10		18.1	0.5	18746	6.22	79.9
11:05	7.77	11		17.2	1.7	17871	6.36	78.0
11:09	7.76	12		17.1	2.0	17509	6.48	73.2
			Unable to pump due to high silt load - Started Sampling					

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

high flow silt load. LWDUP602

Sampling Containers Used: 4 x glass amber, 8 x BTEX vials, 2 x HNO3 plastic, 0 x H2SO4 plastic, 1 x unpreserved plastic

YSI used: 4

Tested By: Alistair Mitchell / EW	**Remarks:**
Date Tested: 6/6/22	- Steady state conditions - difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Checked By: HL	
Date: 14/6/2022	

JKEnvironments

Client:	Health Infrastructure	**Job No.:**	E33780PL
Project:	Proposed CAMHS Building	**Well No.:**	201
Location:	Nepean Hospital, Derby Street, KINGSWOOD, NSW	**Depth (m):**	6

WELL FINISH

X	**Gatic Cover**		**Standpipe**		**Other (describe)**

WELL PURGE DETAILS:

Method:	low flow - Peri	**SWL – Before:**	2.91
Date:	06/06/22	**Time – Before:**	8:16
Undertaken By:	EW/AM	**Total Vol Removed:**	8
Pump Program No:	12:00 on dial	**PID (ppm):**	0.0

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
8:35	3.11	1		20.2	3.3	20576	5.4	101.3
8:40	3.58	2		20.9	3.4	22116	6.37	93.7
8:44	3.94	3		21.1	3.8	22010	6.34	90.1
8:48	4.19	4		21.1	3.9	21542	6.25	89.0
8:52	4.55	5		21.1	3.7	22093	6.26	89.2
8:56	4.80	6		20.9	4.1	22437	6.31	89.7
9:00	5.03	7		20.9	3.4	22684	6.36	89.6
			Started Sampling					

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))

Low Silt Low

Sampling Containers Used: 2x glass amber, 4 x BTEX vials, 1 x HNO3 plastic, 0 x H2SO4 plastic, 1 x unpreserved plastic

YSI used: 4

Tested By: Alistair Mitchell /EW	**Remarks:**
Date Tested: 6/6/22	- Steady state conditions - difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Checked By: HL	
Date: 14/6/2022	

JKEnvironments

WATER QUALITY METER CALIBRATION FORM

Client:	Health Infrastructure		
Project:	Proposed CAMHS Building		
Location:	Nepean Hospital, Derby Street, KINGSWOOD, NSW		
Job Number:	E33780PL		
DISSOLVED OXYGEN			
Make: YSI		Model: 4	
Date of calibration: 06/06/2022		Name of Calibrator: EW	
Span value: 70% to 130%			
Measured value: 99			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI		Model: 4	
Date of calibration: 7/6		Name of Calibrator: EW	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: Nov 22	Lot No: 373135
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: APR 23	Lot No: 380832
Measured reading of Buffer 1: 7.18			
Measured reading of Buffer 2: 4.09			
Slope:		Measured reading Acceptable (Yes/No):	
EC			
Make: YSI		Model: 4	
Date: 7/6	Name of Calibrator: EW		Temperature: 13 °C
Calibration solution: Conductivity Standard		Expiry date: 05/23	Lot No: 381243
Theoretical conductivity at temperature (see solution container):		1089 µS/cm	
Measured conductivity: 1349 µS/cm		Measured reading Acceptable (Yes/No):	
REDOX			
Make: YSI		Model: 4	
Date of calibration: 06/06/2022		Name of Calibrator: EW	
Calibration solution: 240mV		Expiry date: 11/26	Lot No: 7221
Theoretical redox value: 240mV			
Measured redox reading: 224.7 mV		Measured reading Acceptable (Yes/No):	

JKEnvironments

PID FIELD CALIBRATION FORM

Client:	Health Infrastructure		
Project:	Proposed CAMHS Building		
Location:	Nepean Hospital, Derby Street, KINGSWOOD, NSW		
Job Number:	E33780PL		
PID			
Make: Mini Rae	Model: PGM 7350	Unit: Mini Rae Lite	Date of last factory calibration: 21/4/22
Date of calibration: 27/5/22		Name of Calibrator: EW	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 102.3 ppm		Error in measured reading: ± 0 ppm	
Measured reading Acceptable ([✓ Yes]/No):			
PID			
Make: Mini Rae	Model: PGM7350	Unit: Mini Rae Lite	Date of last factory calibration: 21/4/22
Date of calibration: 1/6/22		Name of Calibrator: AM	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 100.1 ppm		Error in measured reading: ± 0 ppm	
Measured reading Acceptable ([✓ Yes]/No):			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

JKEnvironments

Client:	Health Infrastructure	Job No.:	E33780PL
Project:	Proposed CAMHS Building	Well No.:	601
Location:	Nepean Hospital, Derby Street, KINGSWOOD, NSW	Depth (m):	8.2

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Development	SWL – Before (m):	4.53
Date:	28/5/22	Time – Before:	12:02
Undertaken By:	AM	SWL – After (m):	—
Total Vol. Removed:	11	Time – After:	12:20
PID Reading (ppm):	0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
5	21.2	1.0	13340	6.79	109.3
10	21.2	0.6	13287	6.65	101.2
11	21.0 Well	0.7 Pumped	13248 Dry	6.68	89.6

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO) Steady State Achieved (YES / NO)

YSI Used: 4 Organic odour, High silt Coal

		Remarks:
Tested By:	AM	- Steady state conditions
Date Tested:	28/5/22	- Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
Checked By:	HL	- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Date:	14/6/2022	

JKEnvironments

Client:	Health Infrastructure	Job No.:	E33780PL
Project:	Proposed CAMHS Building	Well No.:	603
Location:	Nepean Hospital, Derby Street, KINGSWOOD, NSW	Depth (m):	10.2

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Development	SWL – Before (m):	3.49
Date:	28/5/22	Time – Before:	12:27
Undertaken By:	AM	SWL – After (m):	–
Total Vol. Removed:	16	Time – After:	12:40
PID Reading (ppm):	0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
5	19.5	4.0	19468	6.41	102.4
10	19.5	1.6	19513	6.31	101.7
14	19.5	2.2	19785	6.32	92.6
	Well Pumped Dry				

Comments: Odours (YES / (NO)) NAPL/PSH (YES / (NO)) Sheen (YES / (NO)) Steady State Achieved (YES / (NO))

YSI Used: 4 Medium silt Coal, low recharge

Tested By:	AM	**Remarks:**
Date Tested:	28/5/22	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Checked By:	HL	
Date:	14/6/2022	

JKEnvironments

Client:	Health Infrastructure	Job No.:	E33780PL
Project:	Proposed CAMHS Building	Well No.:	701
Location:	Nepean Hospital, Derby Street, KINGSWOOD, NSW	Depth (m):	6m

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Development	SWL – Before (m):	4.17
Date:	28/5/22	Time – Before:	11:36
Undertaken By:	AM	SWL – After (m):	-
Total Vol. Removed:	6	Time – After:	11:48
PID Reading (ppm):	0.7		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
3	22.1	5.7	15277	6.28	227.5
4	22.1	5.5	16450	6.35	209.5
6	22.5	5.4	19120	6.50	160.9
	Well Pumped Dry				

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used: 4 Medium silt Coarl, low recharge

Tested By:	AM
Date Tested:	28/5/22
Checked By:	HL
Date:	14/6/2022

Remarks:

- Steady state conditions
- Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry

JKEnvironments

WATER QUALITY METER CALIBRATION FORM

Client:	Health Infrastructure		
Project:	Proposed CAMHS Building		
Location:	Nepean Hospital, Derby Street, KINGSWOOD, NSW		
Job Number:	E33780PL		
DISSOLVED OXYGEN			
Make:		Model:	
Date of calibration: 28/5/22		Name of Calibrator: AM	
Span value: 70% to 130%			
Measured value: 99			
Measured reading Acceptable (Yes/No):			
pH			
Make:		Model:	
Date of calibration: 28/5/22		Name of Calibrator: AM	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: 11/22	Lot No: 373185
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: 4/23	Lot No: 380832
Measured reading of Buffer 1: 6.97			
Measured reading of Buffer 2: 397			
Slope:		Measured reading Acceptable (Yes/No):	
EC			
Make:		Model:	
Date: 28/5/22	Name of Calibrator: AM		Temperature: 19 °C
Calibration solution: Conductivity Standard		Expiry date: 5/23	Lot No: 381243
Theoretical conductivity at temperature (see solution container): 1251 µS/cm			
Measured conductivity: 1066 µS/cm		Measured reading Acceptable (Yes/No):	
REDOX			
Make:		Model:	
Date of calibration: 28/5/22		Name of Calibrator: AM	
Calibration solution: ORP Test Solution		Expiry date: 11/22	Lot No: 7221
Theoretical redox value: 240mV			
Measured redox reading: 239.5 mV		Measured reading Acceptable (Yes/No):	

Appendix I: PSI Information

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration
ACM:	Asbestos Containing Material
ADWG:	AustralianDrinking Water Guidelines
AF:	Asbestos Fines
ANZG	Australian and New Zealand Guidelines
B(a)P:	Benzo(a)pyrene
CEC:	Cation Exchange Capacity
CRC:	Cooperative Research Centre
CT:	Contaminant Threshold
EILs:	Ecological Investigation Levels
ESLs:	Ecological Screening Levels
FA:	Fibrous Asbestos
GIL:	Groundwater Investigation Levels
GSW:	General Solid Waste
HILs:	Health Investigation Levels
HSLs:	Health Screening Levels
HSL-SSA:	Health Screening Level-SiteSpecific Assessment
kg/L	kilograms per litre
NA:	Not Analysed
NC:	Not Calculated
NEPM:	National Environmental Protection Measure
NHMRC:	National Health and Medical Research Council
NL:	Not Limiting
NSL:	No Set Limit
OCP:	Organochlorine Pesticides
OPP:	Organophosphorus Pesticides
PAHs:	Polycyclic Aromatic Hydrocarbons
%w/w:	weight per weight
ppm:	Parts per million
PCBs:	Polychlorinated Biphenyls
PCE:	Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
pH_{KCL} :	pH of filtered 1:20, 1M KCL extract, shaken overnight
pH_{ox} :	pH of filtered 1:20 1M KCl after peroxide digestion
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
RSL:	Regional Screening Levels
RSW:	Restricted Solid Waste
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
S_{Cr}:	Chromium reducible sulfur
S_{POS}:	Peroxide oxidisable Sulfur
SSA:	Site Specific Assessment
SSHSLs:	Site Specific Health Screening Levels
TAA:	Total Actual Acidity in 1M KCL extract titrated to pH6.5
TB:	Trip Blank
TCA:	1,1,1 Trichloroethane (methyl chloroform)
TCE:	Trichloroethylene (Trichloroethene)
TCLP:	Toxicity Characteristics Leaching Procedure
TPA:	Total Potential Acidity, 1M KCL peroxide digest
TS:	Trip Spike
TRH:	Total Recoverable Hydrocarbons
TSA:	Total Sulfide Acidity (TPA-TAA)
UCL:	Upper Level Confidence Limit on Mean Value
USEPA	United States Environmental Protection Agency
VOCC:	Volatile Organic Chlorinated Compounds
WHO:	World Health Organisation

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also refered to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

EIL/ESL Table:

- Site specific ABC values for specific metals have been adopted.

Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

QA/QC Table:

- Field blank, Inter and Intra laboratory duplicate results are reported in mg/kg.
- Trip spike results are reported as percentage recovery.
- Field rinsate results are reported in µg/L.

TABLE S1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-D: 'Commercial/Industrial'

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100
Site Assessment Criteria (SAC)			3000	900	3600	240000	1500	730	6000	400000	4000	40	80	2000	2500	45	530	3600	50	2000	7	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
BH601	1.6-1.8	Fill: Gravelly clay	**5**	<0.4	**12**	**31**	**13**	**0.2**	**13**	**50**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH601 - [LAB_DUP]	1.6-1.8	Fill: Gravelly clay	**5**	<0.4	**11**	**35**	**12**	**0.1**	**14**	**49**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH601	2.4-2.6	Claystone	<4	<0.4	**12**	**36**	**11**	<0.1	**37**	**82**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH602	0.3-0.4	F: Silty clay	**5**	<0.4	**15**	**24**	**12**	<0.1	**10**	**48**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH602	0.3-0.5	F: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH602	1.0-1.2	Silty clay	<4	<0.4	**11**	**26**	**10**	<0.1	**8**	**45**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH603	0-0.1	F: Sandy silty clay	**5**	<0.4	**12**	**23**	**15**	<0.1	**9**	**75**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH603 - [LAB_DUP]	0-0.1	F: Sandy silty clay	**5**	<0.4	**12**	**20**	**14**	<0.1	**9**	**68**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH603	0.5-0.6	Silty clay	<4	<0.4	**10**	**78**	**14**	<0.1	**8**	**54**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH603	0.7-0.8	Silty clay	<4	<0.4	**10**	**28**	**11**	<0.1	**5**	**29**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH604	0.15-0.3	Fill; Gravelly sand	**4**	<0.4	**13**	**38**	**19**	<0.1	**9**	**44**	**20**	**3.5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH604	0.3-0.5	F: Silty clay	<4	<0.4	**13**	**18**	**14**	<0.1	**15**	**47**	**2.9**	**0.5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH604	1.3-1.5	Silty clay	**12**	<0.4	**11**	**24**	**12**	<0.1	**8**	**47**	**0.71**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP1	-	F: Sandy silty clay	**6**	<0.4	**20**	**27**	**17**	<0.1	**14**	**100**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of Samples			13	13	13	13	13	13	13	13	13	13	8	8	8	8	8	8	8	8	8	7
Maximum Value			12	<PQL	20	78	19	0.2	37	100	20	3.5	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Not Detected

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S2
SOIL LABORATORY RESULTS COMPARED TO HSLs
All data in mg/kg unless stated otherwise

					C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					HSL-D: COMMERCIAL/INDUSTRIAL							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH601	1.6-1.8	Fill: Gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH601 - [LAB_DUP]	1.6-1.8	Fill: Gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH601	2.4-2.6	Claystone	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	1
BH602	0.3-0.4	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH602	1.0-1.2	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH603	0-0.1	F: Sandy silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH603 - [LAB_DUP]	0-0.1	F: Sandy silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH603	0.5-0.6	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH603	0.7-0.8	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH604	0.15-0.3	Fill; Gravelly sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	1
BH604	0.3-0.5	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
BH604	1.3-1.5	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	0
SDUP1	-	F: Sandy silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<3	<1	-
Total Number of Samples					13	13	13	13	13	13	13	12
Maximum Value					<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	1

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below

HSL SOIL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
BH601	1.6-1.8	Fill: Gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH601 - [LAB_DUP]	1.6-1.8	Fill: Gravelly clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH601	2.4-2.6	Claystone	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH602	0.3-0.4	F: Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH602	1.0-1.2	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH603	0-0.1	F: Sandy silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH603 - [LAB_DUP]	0-0.1	F: Sandy silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH603	0.5-0.6	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH603	0.7-0.8	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH604	0.15-0.3	Fill; Gravelly sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH604	0.3-0.5	F: Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH604	1.3-1.5	Silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP1	-	F: Sandy silty clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL

TABLE S3
SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS
All data in mg/kg unless stated otherwise

			C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			**COMMERCIAL/INDUSTRIAL**			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH601	1.6-1.8	Coarse	<25	<50	<100	<100
BH601 - [LAB_DUP]	1.6-1.8	Coarse	<25	<50	<100	<100
BH601	2.4-2.6	Coarse	<25	<50	<100	<100
BH602	0.3-0.4	Coarse	<25	<50	<100	<100
BH602	1.0-1.2	Coarse	<25	<50	<100	<100
BH603	0-0.1	Coarse	<25	<50	<100	<100
BH603 - [LAB_DUP]	0-0.1	Coarse	<25	<50	<100	<100
BH603	0.5-0.6	Coarse	<25	<50	<100	<100
BH603	0.7-0.8	Coarse	<25	<50	<100	<100
BH604	0.15-0.3	Coarse	<25	<50	**510**	**470**
BH604	0.3-0.5	Coarse	<25	<50	<100	<100
BH604	1.3-1.5	Coarse	<25	<50	<100	<100
SDUP1	-	Coarse	<25	<50	<100	<100
Total Number of Samples			13	13	13	13
Maximum Value			<PQL	<PQL	510	470

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Soil Texture**	C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
BH601	1.6-1.8	Coarse	700	1000	3500	10000
BH601 - [LAB_DUP]	1.6-1.8	Coarse	700	1000	3500	10000
BH601	2.4-2.6	Coarse	700	1000	3500	10000
BH602	0.3-0.4	Coarse	700	1000	3500	10000
BH602	1.0-1.2	Coarse	700	1000	3500	10000
BH603	0-0.1	Coarse	700	1000	3500	10000
BH603 - [LAB_DUP]	0-0.1	Coarse	700	1000	3500	10000
BH603	0.5-0.6	Coarse	700	1000	3500	10000
BH603	0.7-0.8	Coarse	700	1000	3500	10000
BH604	0.15-0.3	Coarse	700	1000	3500	10000
BH604	0.3-0.5	Coarse	700	1000	3500	10000
BH604	1.3-1.5	Coarse	700	1000	3500	10000
SDUP1	-	Coarse	700	1000	3500	10000

TABLE S4
SOIL LABORATORY RESULTS COMPARED T0 DIRECT CONTACT CRITERIA
All data in mg/kg unless stated otherwise

Analyte		C_6-C_{10}	>C_{10}-C_{16}	>C_{16}-C_{34}	>C_{34}-C_{40}	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		26,000	20,000	27,000	38,000	430	99,000	27,000	81,000	11,000	
Site Use		**COMMERCIAL/INDUSTRIAL - DIRECT SOIL CONTACT**									
Sample Reference	**Sample Depth**										
BH601	1.6-1.8	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH601 - [LAB_DUP]	1.6-1.8	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH601	2.4-2.6	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	**1**
BH602	0.3-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH602	1.0-1.2	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH603	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH603 - [LAB_DUP]	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH603	0.5-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH603	0.7-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH604	0.15-0.3	<25	<50	**510**	**470**	<0.2	<0.5	<1	<3	<1	**1**
BH604	0.3-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
BH604	1.3-1.5	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	0
SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1	-
Total Number of Samples		13	13	13	13	13	13	13	13	13	12
Maximum Value		<PQL	<PQL	510	470	<PQL	<PQL	<PQL	<PQL	<PQL	1

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HIL-D:Commercial/Industrial

LABORATORY DATA											
Lab Report Number	Sample refeference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation %(w/w)	FA and AF Estimation %(w/w)
								0.05		**0.01**	**0.001**
266432	BH602	0.3-0.5	443.15	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
262113	BH603	0-0.1	558.94	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
262113	BH603	0.5-0.6	512.49	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001

Concentration above the SAC **VALUE**

TABLE S6
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				COMMERCIAL/INDUSTRIAL																	
							AGED HEAVY METALS-EILs						EILs		ESLs							
				pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																			
BH601	1.6-1.8	Fill: Gravelly clay	Coarse	**7.35**	**21.5**	**41.5**	**5**	**12**	**31**	**13**	**13**	**50**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH601 - [LAB_DUP]	1.6-1.8	Fill: Gravelly clay	Coarse	**7.35**	**21.5**	**41.5**	**5**	**11**	**35**	**12**	**14**	**49**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH601	2.4-2.6	Claystone	Coarse	**7.35**	**21.5**	**41.5**	<4	**12**	**36**	**11**	**37**	**82**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH602	0.3-0.4	F: Silty clay	Coarse	**7.35**	**21.5**	**41.5**	**5**	**15**	**24**	**12**	**10**	**48**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH602	1.0-1.2	Silty clay	Coarse	**7.35**	**21.5**	**41.5**	<4	**11**	**26**	**10**	**8**	**45**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH603	0-0.1	F: Sandy silty clay	Coarse	**7.35**	**21.5**	**41.5**	**5**	**12**	**23**	**15**	**9**	**75**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH603 - [LAB_DUP]	0-0.1	F: Sandy silty clay	Coarse	**7.35**	**21.5**	**41.5**	**5**	**12**	**20**	**14**	**9**	**68**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH603	0.5-0.6	Silty clay	Coarse	**7.35**	**21.5**	**41.5**	<4	**10**	**78**	**14**	**8**	**54**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH603	0.7-0.8	Silty clay	Coarse	**7.35**	**21.5**	**41.5**	<4	**10**	**28**	**11**	**5**	**29**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH604	0.15-0.3	Fill; Gravelly sand	Coarse	**7.35**	**21.5**	**41.5**	**4**	**13**	**38**	**19**	**9**	**44**	<1	<0.1	<25	<50	**510**	**470**	<0.2	<0.5	<1	<3	**2.6**
BH604	0.3-0.5	F: Silty clay	Coarse	**7.35**	**21.5**	**41.5**	<4	**13**	**18**	**14**	**15**	**47**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.3**
BH604	1.3-1.5	Silty clay	Coarse	**7.35**	**21.5**	**41.5**	**12**	**11**	**24**	**12**	**8**	**47**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.1**
SDUP1	-	F: Sandy silty clay	Coarse	**7.35**	**21.5**	**41.5**	**6**	**20**	**27**	**17**	**14**	**100**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
Total Number of Samples				13	13	13	13	13	13	13	13	13	13	8	13	13	13	13	13	13	13	13	13
Maximum Value				7.35	21.5	41.5	12	20	78	19	37	100	<PQL	<PQL	<PQL	<PQL	510	470	<PQL	<PQL	<PQL	<PQL	2.6

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

EIL AND ESL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**	pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
BH601	1.6-1.8	Fill: Gravelly clay	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	640	215	170	1700	3300	75	135	165	180	72
BH601 - [LAB_DUP]	1.6-1.8	Fill: Gravelly clay	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	640	215	170	1700	3300	75	135	165	180	72
BH601	2.4-2.6	Claystone	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	--	215	170	1700	3300	75	135	165	180	72
BH602	0.3-0.4	F: Silty clay	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	640	215	170	1700	3300	75	135	165	180	72
BH602	1.0-1.2	Silty clay	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	--	215	170	1700	3300	75	135	165	180	72
BH603	0-0.1	F: Sandy silty clay	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	640	215	170	1700	3300	75	135	165	180	72
BH603 - [LAB_DUP]	0-0.1	F: Sandy silty clay	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	640	215	170	1700	3300	75	135	165	180	72
BH603	0.5-0.6	Silty clay	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	640	215	170	1700	3300	75	135	165	180	72
BH603	0.7-0.8	Silty clay	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	--	215	170	1700	3300	75	135	165	180	72
BH604	0.15-0.3	Fill; Gravelly sand	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	640	215	170	1700	3300	75	135	165	180	72
BH604	0.3-0.5	F: Silty clay	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	640	215	170	1700	3300	75	135	165	180	72
BH604	1.3-1.5	Silty clay	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	--	215	170	1700	3300	75	135	165	180	72
SDUP1	-	F: Sandy silty clay	Coarse	7.35	21.5	41.5	160	670	350	2000	600	1600	370	--	215	170	1700	3300	75	135	165	180	72

TABLE S7
SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES
All data in mg/kg unless stated otherwise

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled	PCBs	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	25	50	100	100	50	0.2	0.5	1	1	100
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	650		NSL		10,000	10	288	600	1,000	-
General Solid Waste SCC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650		NSL		10,000	18	518	1,080	1,800	-
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600		NSL		40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600		NSL		40,000	72	2,073	4,320	7,200	-
Sample Reference	**Sample Depth**	**Sample Description**																									
BH601	1.6-1.8	Fill: Gravelly clay	**5**	<0.4	**12**	**31**	**13**	**0.2**	**13**	**50**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH601 - [LAB_DUP]	1.6-1.8	Fill: Gravelly clay	**5**	<0.4	**11**	**35**	**12**	**0.1**	**14**	**49**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH601	2.4-2.6	Claystone	<4	<0.4	**12**	**36**	**11**	<0.1	**37**	**82**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH602	0.3-0.4	F: Silty clay	**5**	<0.4	**15**	**24**	**12**	<0.1	**10**	**48**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH602	0.3-0.5	F: Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH602	1.0-1.2	Silty clay	<4	<0.4	**11**	**26**	**10**	<0.1	**8**	**45**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH603	0-0.1	F: Sandy silty clay	**5**	<0.4	**12**	**23**	**15**	<0.1	**9**	**75**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH603 - [LAB_DUP]	0-0.1	F: Sandy silty clay	**5**	<0.4	**12**	**20**	**14**	<0.1	**9**	**68**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH603	0.5-0.6	Silty clay	<4	<0.4	**10**	**78**	**14**	<0.1	**8**	**54**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH603	0.7-0.8	Silty clay	<4	<0.4	**10**	**28**	**11**	<0.1	**5**	**29**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
BH604	0.15-0.3	Fill; Gravelly sand	**4**	<0.4	**13**	**38**	**19**	<0.1	**9**	**44**	**20**	**2.6**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	**200**	**470**	**670**	<0.2	<0.5	<1	<3	NA
BH604	0.3-0.5	F: Silty clay	<4	<0.4	**13**	**18**	**14**	<0.1	**15**	**47**	**2.9**	**0.3**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	Not Detected
BH604	1.3-1.5	Silty clay	**12**	<0.4	**11**	**24**	**12**	<0.1	**8**	**47**	**0.71**	**0.1**	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
SDUP1	-	F: Sandy silty clay	**6**	<0.4	**20**	**27**	**17**	<0.1	**14**	**100**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<3	NA
Total Number of Samples			13	13	13	13	13	13	13	13	13	13	8	8	8	8	8	13	13	13	13	13	13	13	13	13	7
Maximum Value			12	<PQL	20	78	19	0.2	37	100	20	2.6	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	200	470	670	<PQL	<PQL	<PQL	<PQL	Not Detected

Concentration above the CT1 — **VALUE**
Concentration above SCC1 — **VALUE**
Concentration above the SCC2 — **VALUE**
Concentration above PQL — **Bold**

TABLE Q1
SOIL QA/QC SUMMARY

			TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene
	PQL Envirolab SYD		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1*	*2*	*1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.05*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1.0*	*2.0*	*1.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*
Intra laboratory duplicate	BH603	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
	SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field Blank	TB-S1 10/04/21	-	NA	NA	NA	NA	<0.2	<0.5	<1	<2	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TS-S1 11/04/21		-	-	-	-	117%	124%	108%	109%	109%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	TS-S2 10/04/21		-	-	-	-	95%	95%	92%	92%	92%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Rinsate	FR1 10/04/21	µg/L	120	NA	NA	NA	<1	<1	<1	<2	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Rinsate	FR2 11/04/21	µg/L	130	NA	NA	NA	<1	<1	<1	<2	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

			HCB	alpha- BHC	gamma- BHC	beta- BHC	Heptachlor	delta- BHC	Aldrin	Heptachlor Epoxide	Gamma- Chlordane	alpha- chlordane	Endosulfan I	pp- DDE	Dieldrin	Endrin	pp- DDD	Endosulfan II	pp- DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Intra laboratory duplicate	BH603	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	SDUP1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field Blank	TB-S1 10/04/21	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TS-S1 11/04/21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	TS-S2 10/04/21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Rinsate	FR1 10/04/21	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Rinsate	FR2 11/04/21	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

			Azinphos-methyl (Guthion)	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*4*	*0.4*	*1*	*1*	*1*	*0.1*	*1*	*1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*4.0*	*0.4*	*1.0*	*1.0*	*1.0*	*0.1*	*1.0*	*1.0*
Intra laboratory duplicate	BH603	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5	<0.4	12	23	15	<0.1	9	75
	SDUP1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6	<0.4	20	27	17	<0.1	14	100
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	5.5	nc	16	25	16	nc	11.5	87.5
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	18%	nc	50%	16%	13%	nc	43%	29%
Field Blank	TB-S1 10/04/21	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TS-S1 11/04/21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	TS-S2 10/04/21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Rinsate	FR1 10/04/21	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Rinsate	FR2 11/04/21	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Result outside of QA/QC acceptance criteria (highlighted: FR1 TRH C6 - C10 120; FR2 TRH C6 - C10 130; RPD % Chromium 50%; RPD % Nickel 43%)

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BOREHOLE LOG

Borehole No. 601 1 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: 33780LT **Method:** SPIRAL AUGER **R.L. Surface:** ~55.4 m

Date: 10/4/21 **Datum:** AHD

Plant Type: JK305 **Logged/Checked By:** B.Z./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						55	0			POTHOLED SECTION: MATERIAL REMOVED BY VACUUM EXCAVATION DOWN TO 1.2m DEPTH				CONCRETE AT SURFACE
ON COMPLETION OF CORING	■			■	N = 5 1,2,3	54	1		-	FILL: Gravelly clay, medium to high plasticity, brown mottled dark grey and red brown, fine to medium grained sub-angular and angular ironstone and siltstone gravel.	w>PL			APPEARS POORLY COMPACTED
	■			■		53	2		-	CLAYSTONE: dark brown, with iron indurated bands.	HW	VL		BRINGELLY SHALE
											DW	VL - L		VERY LOW 'TC' BIT RESISTANCE
										as above, but dark brown and grey, with fine to medium grained sandstone bands.		L - M		LOW TO MODERATE RESISTANCE
						52	3			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 9.1m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 9.1m TO 2.6m. CASING 2.6m TO 0.1m. 2mm SAND FILTER PACK 9.1m TO 2.5m. BENTONITE SEAL 2.5m TO 2.0m. BACKFILLED WITH SAND AND CUTTINGS TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						51	4							
						50	5							
						49	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 601

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: 33780LT | **Core Size:** NMLC | **R.L. Surface:** ~55.4 m

Date: 10/4/21 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK305 | **Bearing:** N/A | **Logged/Checked By:** B.Z./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness)	Formation
		53			START CORING AT 2.82m						
			3		SANDSTONE: fine to medium grained, grey and brown, bedded sub-horizontally.	MW	L - M	0.30		(2.87m) Be, 0°, P, R, Fe Sn (2.92m) Be, 0°, P, R, Fe Sn	
						XW	(Hd)				
		52			Extremely Weathered claystone: silty CLAY, high plasticity, brown, with fine to medium grained angular claystone gravel.	MW	L - M	0.20		(3.15-3.50m) Numerous Be and XWS, typically 0°, P, R to S, Fe or Clay, Sn or FILLED up to 2mm.t	
					LAMINITE: fine to medium grained, grey sandstone (50%), sub-horizontally laminated with dark grey and brown claystone (50%).	XW	(Hd)			(3.55m) J, 73°, P, R, Fe Sn (3.59m) CS, 0°, 12 mm.t (3.62-3.66m) CS x 3, 0°, 2 mm.t	
			4			MW	L - M	0.30		(3.90m) J, 87°, Un, R, Fe Sn	
ON 22/4/21					Extremely Weathered claystone: silty CLAY, high plasticity, dark brown.			0.30		(4.12m) Be, 0°, P, R, Fe Sn (4.16m) Be, 0°, P, R, Fe Sn	
		51			LAMINITE: fine to medium grained, grey sandstone (50%), sub-horizontally laminated with dark grey and brown claystone (50%).					(4.43m) Be, 3°, Un, R, Fe Vn (4.55m) XWS, 0°, 20 mm.t	
								0.30		(4.65m) J, 72°, Un, R, Fe Vn (4.68m) Be, 0°, P, R, Fe Sn (4.77m) Be, 4°, P, R, Fe Sn (4.85m) Be, 0°, P, R, Fe Sn	
			5		Extremely Weathered claystone: silty CLAY, high plasticity, dark brown, with highly weathered claystone bands.	XW	Hd	0.030			
						HW	VL			(5.24m) J, 90°, Un, S, Cn	
		50			CLAYSTONE: dark grey and brown, sub-horizontally laminated.	MW	L - M	0.20	200	(5.38m) J, 23°, Un, R, Fe Sn (5.45m) J, 24°, Un, R, Fe Sn (5.50m) Be, 0°, Un, S, Fe Vn (5.54m) Ji, 90°, P (5.62m) J, 30°, Un, R, Fe Vn (5.67m) J, 20°, Un, R, Fe Sn (5.70m) J, 23°, Un, R, Fe Sn	
100% RETURN			6		Extremely Weathered claystone: silty CLAY, high plasticity, dark brown.	XW	(Hd)			(5.80m) J, 70°, P, R, Fe Sn	
					CLAYSTONE: dark grey, bedded sub-horizontally, carbonaceous.	HW	VL	0.070			
		49			Extremely Weathered claystone: silty CLAY, high plasticity, dark grey and red brown.	XW	(Hd)				
						SW	M - H			(6.83m) CS, 0°, 28 mm.t	
			7		SANDSTONE: fine to medium grained, grey mottled light brown, bedded at 0-5°, with dark grey claystone laminae.			1.0			
		48						1.1		(7.19m) Be, 4°, Un, R, Fe Vn	
					CLAYSTONE: dark grey mottled brown, bedded sub-horizontally.	FR	L - M	0.20		(7.69m) CS, 9°, 32 mm.t (7.74m) XWS, 9°, 20 mm.t (7.80m) CS, 0°, 4 mm.t (7.83m) CS, 0°, 10 mm.t	
			8					0.30		(8.19m) Be, 2°, Un, S, Clay Vn	
		47								(8.37m) Be, 2°, Un, S, Clay Vn	
								0.20	200		Bringelly Shale

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 601

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: 33780LT | **Core Size:** NMLC | **R.L. Surface:** ~55.4 m

Date: 10/4/21 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK305 | **Bearing:** N/A | **Logged/Checked By:** B.Z./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
					CLAYSTONE: as above	FR	L - M	0.30			
					END OF BOREHOLE AT 9.10 m						
		46									
			10								
		45									
			11								
		44									
			12								
		43									
			13								
		42									
			14								
		41									
			15								
		40									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

BOREHOLE LOG

Borehole No. 602

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: 33780LT **Method:** SPIRAL AUGER **R.L. Surface:** ~53.6 m

Date: 10/4/21 **Datum:** AHD

Plant Type: JK305 **Logged/Checked By:** B.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING									-	CONCRETE: 100mm.t over ROADBASE: 50mm.t	w~PL			
					N = 8 1,4,4	53	1		CH	FILL: Silty clay, medium to high plasticity, brown mottled dark grey and red brown, trace of fine to medium grained ironstone gravel, ash and slag.	w~PL	VSt	200 280 290	RESIDUAL
										Silty CLAY: high plasticity, grey mottled brown and red brown, trace of fine to medium grained ironstone gravel, and roots.				
									CI	Silty CLAY: medium plasticity, red brown and grey, with ironstone bands grading into extremely weathered bedrock.	w<PL			
					N > 33 12,15,18/ 100mm REFUSAL	52	2					Hd	>600 >600 >600	
						51	3		-	Extremely Weathered claystone: silty CLAY, high plasticity, red brown and grey, with ironstone bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE BANDS
						50	4							
										CLAYSTONE: dark grey and brown, with iron indurated and sandstone bands.	DW	L - M		LOW TO MODERATE RESISTANCE
						49	5			REFER TO CORED BOREHOLE LOG				
						48	6							
						47								

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CORED BOREHOLE LOG

Borehole No. 602 **2 / 2**

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: 33780LT **Core Size:** NMLC **R.L. Surface:** ~53.6 m

Date: 10/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** B.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
					START CORING AT 4.50m						
100% RETURN		49	5		SANDSTONE: fine to medium grained, grey, bedded at 0-5°, with dark grey claystone laminae.	MW	L - M	0.20 0.30 2.6		(4.55m) Be, 0°, P, S, Clay Vn (4.58m) J, 85°, Un, R, Fe Ct (4.76m) J, 84°, Un, R, Fe Ct (5.05m) J, 79°, Un, R, Fe Ct (5.15m) CS, 0°, 20 mm.t (5.25m) Cr, 0°, 50 mm.t	Bringelly Shale
					CLAYSTONE: dark grey, bedded sub-horizontally.						
		48			CLAYSTONE: dark grey, bedded sub-horizontally, with fine grained grey sandstone laminae.		L			(5.57m) XWS, 0°, 8 mm.t	
			6					0.30		(5.79m) J, 90°, Un, S, Cn (5.82m) CS, 0°, 1 mm.t	
							VL			(5.96m) J, 90°, Un, S, Cn	
								0.20			
							L			(6.14m) Be, 0°, P, S, Fe Sn (6.20m) CS, 0°, 1 mm.t (6.28m) CS, 0°, 2 mm.t (6.34m) CS, 0°, 2 mm.t (6.37m) CS, 0°, 1 mm.t (6.49m) CS, 0°, 1 mm.t (6.51m) CS, 0°, 1 mm.t (6.65m) J, 90°, P, S, Clay Vn (6.70m) XWS, 0°, 100 mm.t	
		47						0.30		(6.85m) J, 42°, Un, S, Clay Ct	
			7					0.30		(7.22m) J, 47°, Un, S, Clay Ct	
		46			CLAYSTONE: dark grey, bedded sub-horizontally.	HW	VL	0.030		(7.62m) J, 38°, Un, S, Clay Ct	
			8			MW	L	0.30		(8.10m) J, 42°, Un, S, Clay Ct	
		45								(8.50m) J, 40°, P, S, Clay Ct	
										(8.68m) J, 45°, P, S, Clay Ct (8.76m) J, 67°, Un, R, Clay Vn	
			9		CLAYSTONE: dark grey, bedded sub-horizontally, with fine grained grey sandstone laminae.	FR	L - M	0.20 0.60 0.60			
		44						0.30			
			10					0.60		(9.92m) CS, 0°, 3 mm.t	
		43						0.70		(10.48m) J, 47°, C, S, Clay Vn	
					END OF BOREHOLE AT 10.70 m						

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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BOREHOLE LOG

Borehole No. 603 1 / 2

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: 33780LT **Method:** SPIRAL AUGER **R.L. Surface:** ~52.6 m

Date: 17/2/21 **Datum:** AHD

Plant Type: JK308 **Logged/Checked By:** B.S./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING										FILL: Sandy silty clay, low plasticity, dark brown and brown, fine to medium grained sand, with fine to medium grained igneous gravel, trace of roots.	w~PL			
					N = 16 4,6,10	52	1		CI-CH	Silty CLAY: medium to high plasticity, orange brown, trace of fine to medium grained ironstone gravel and roots.	w~PL	Hd	590 600 >600	RESIDUAL
									CH	Silty CLAY: high plasticity, light grey and red brown, trace of fine to coarse grained ironstone gravel and roots.	w<PL			
					N = 9 3,4,5	51	2						410 450 550	
					N=SPT 14/ 150mm REFUSAL	50	3		-	Extremely Weathered claystone: silty CLAY, medium to high plasticity, grey, with iron indurated bands.	XW	Hd	>600 >600 >600	BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE BANDS
ON 22/4/21						49	4			as above, but with very low strength bands.				
						48	5			CLAYSTONE: dark grey and brown, with sandstone and iron indurated bands.	DW	VL - L		VERY LOW TO LOW BANDED RESISTANCE
						47						L		
						46	6			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 11.55m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 11.55m TO 2.55m. CASING 2.55m TO 0m. 2mm SAND FILTER PACK 11.55m TO 2.0m. BENTONITE SEAL 2.0m TO 1.0m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.

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CORED BOREHOLE LOG

Borehole No. 603 **2 / 2**

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: 33780LT **Core Size:** NMLC **R.L. Surface:** ~52.6 m

Date: 17/2/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** B.S./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS SPACING (mm)	DEFECT DETAILS DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
		47			START CORING AT 5.80m						
75% RETURN		46	6		CLAYSTONE: grey and brown, bedded sub-horizontally.	MW	L	0.20 0.10		(6.38m) Ji, 90°, Un	Bringelly Shale
		45	7		CLAYSTONE: grey, bedded sub-horizontally.	HW	VL	0.20		(6.74m) CS, 0°, 4 mm.t (6.90m) XWS, 0°, 50 mm.t (6.95m) J, 60°, P, S, Fe Sn (6.99m) J, 30°, P, S, Fe Sn (7.09m) XWS, 0°, 70 mm.t (7.29m) XWS, 0°, 100 mm.t	
						MW	L	0.30 0.20			
			8		Extremely Weathered claystone: silty CLAY, medium plasticity, grey, with very low strength bands.	HW	VL			(7.76m) XWS, 0°, 25 mm.t (7.85m) J, 80°, P, S, Cn (7.94m) XWS, 0°, 120 mm.t	
		44			CLAYSTONE: grey, bedded at 0-5°.			0.050 0.090		(8.70m) XWS, 0°, 15 mm.t (8.90m) J, 90°, P, S, Cn	
		43	9		as above, but with fine grained sandstone laminae.	FR	L	0.30 0.20		(9.70m) XWS, 0°, 40 mm.t	
		42	10				M	0.10 0.70 0.50			
			11		SANDSTONE: fine grained, grey, with dark grey claystone laminae.		M - H	0.50 1.5		(11.02m) Be, 0°, P, R, Clay Ct (11.43m) XWS, 0°, 20 mm.t	
		41			END OF BOREHOLE AT 11.55 m						

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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BOREHOLE LOG

Borehole No. 604

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: 33780LT **Method:** SPIRAL AUGER **R.L. Surface:** ~52.8 m

Date: 11/4/21 **Datum:** AHD

Plant Type: JK305 **Logged/Checked By:** B.Z./A.B.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING									-	CONCRETE: 90mm.t over ROADBASE: 210mm.t	w~PL			
					N = 8 3,4,4	52	1		CH	FILL: Silty clay, medium to high plasticity, brown mottled dark grey, trace of fine to medium grained sub-angular ironstone gravel, glass fragments, ash and slag.	w~PL	VSt	300 330 320	RESIDUAL
										Silty CLAY: high plasticity, brown mottled yellow brown, trace of fine to medium grained sub-angular ironstone gravel.	w<PL	Hd		
					N = 38 7,11,27	51	2		CI	as above, but medium plasticity, brown and grey, with ironstone bands grading into extremely weathered bedrock.			450 550 >600	
						50			-	Extremely Weathered claystone: silty CLAY, high plasticity, grey and brown.	XW	Hd		BRINGELLY SHALE
										CLAYSTONE: grey and dark brown.	DW	L		VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE WITH VERY LOW BANDS
							3			REFER TO CORED BOREHOLE LOG				
						49	4							
						48	5							
						47	6							
						46								

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CORED BOREHOLE LOG

Borehole No. 604 **2 / 3**

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: 33780LT **Core Size:** NMLC **R.L. Surface:** ~52.8 m

Date: 11/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** B.Z./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness) Specific / General	Formation
		50			START CORING AT 2.93m						
100% RETURN			3		CLAYSTONE: grey and dark brown, bedded sub-horizontally.	MW	L	0.20, 0.20		(3.05m) J, 36°, P, S, XW Infill (3.15m) Be, 0°, Un, R, Fe Sn (3.23m) J, 47°, Un, R, Fe Sn (3.32m) Cr, 150 mm.t	
					NO CORE 0.25m						
		49	4		CLAYSTONE: grey and dark brown, bedded sub-horizontally.	MW	L	0.10		(3.83m) J, 90°, P, R, Fe Sn (3.90m) J, 90°, P, S, Fe Sn	
						HW	VL	0.040, 0.050		(4.40m) XWS, 0°, 50 mm.t	
		48	5							(4.87m) XWS, 0°, 50 mm.t (5.05m) XWS, 0°, 100 mm.t	
					SANDSTONE: fine to medium grained, grey, bedded sub-horizontally at 0-5°, with sub-horizontally grey claystone laminae.	MW	M	0.60		(5.25m) XWS, 0°, 2 mm.t (5.41m) XWS, 0°, 2 mm.t	
		47	6		LAMINITE: fine grained grey sandstone (50%) sub-horizontally laminated with dark grey claystone (50%).			0.80, 0.40		(5.70m) Jh, Un, Fe Vn (6.12m) J, P, R, Cn (6.18m) Cr, 20 mm.t (6.35m) Be, Un, R, Fe Sn (6.37m) CS, 3 mm.t	Bringelly Shale
					Extremely Weathered claystone: silty CLAY, medium plasticity, dark brown and dark grey.	XW	Hd				
		46	7		CLAYSTONE: dark grey, sub-horizontally bedded with fine to medium grained grey, sandstone laminae.	MW	L	0.40		(7.20m) XWS, 0°, 100 mm.t	
					CLAYSTONE: dark grey, bedded sub-horizontally.	FR	L - M	0.10		(7.70m) CS (7.80m) J, P, R, Cn	
		45	8			HW	VL	0.030			
						FR	L - M	0.10			
		44			as above, but with extremely weathered bands.	HW	VL	0.030			

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 604 3 / 3

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED CAMHS BUILDING

Location: NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Job No.: 33780LT **Core Size:** NMLC **R.L. Surface:** ~52.8 m

Date: 11/4/21 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK305 **Bearing:** N/A **Logged/Checked By:** B.Z./A.B.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$ (VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	DEFECT DETAILS: SPACING (mm) (600, 200, 60, 20)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
					CLAYSTONE: as above	HW	VL				
					CLAYSTONE: dark grey, bedded sub-horizontally.	FR	L - M	0.40		(9.20m) CS, 2 mm.t	
					END OF BOREHOLE AT 9.40 m						
		43	10								
		42	11								
		41	12								
		40	13								
		39	14								
		38	15								
		37									

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

Appendix J: Guidelines and Reference Documents

Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). Acid Sulfate Soils Manual

Australian and New Zealand Environment Conservation Council (ANZECC), (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Canadian Council of Ministers of the Environment, (1999). Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)

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Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map Series

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

National Health and Medical Research Council (NHMRC), (2021). National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011

NSW Department of Environment and Conservation, (2007). Guidelines for the Assessment and Management of Groundwater Contamination

NSW EPA, (1995). Contaminated Sites Sampling Design Guidelines

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NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

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NSW EPA, (2020). Consultants Reporting on Contaminated Land, Contaminated Land Guidelines

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Olszowy, H., Torr, P., and Imray, P., (1995). Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

Protection of the Environment Operations Act 1997 (NSW)

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