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Report on
Detailed Site Investigation (Contamination)

Meadowbank Public School Repurpose to Open Space
Meadowbank Public School, Ryde

Prepared for
School Infrastructure New South Wales (SINSW)

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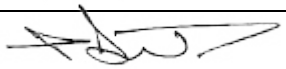
Reviewer		25 February 2021

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1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by School Infrastructure New South Wales (SINSW) to complete this Detailed Site Investigation (Contamination) (DSI) for the repurposing of Meadowbank Public School (the site) to an open space. The investigation was undertaken in accordance with DP's proposal SYD201095 dated 8/10/2020. The site is shown on Drawing 1, Appendix A.

It is understood that the Meadowbank Public School will be relocated to a nearby campus as part of wider education upgrades in the Ryde Local Government area. The existing school grounds are proposed to be developed to a new community outdoor space once the school has relocated. Specific details of the development have not been confirmed at this early stage.

The objective of the DSI is to assess the suitability of the site for the proposed development and whether further investigation and / or management is required. It is understood that the report will be used to support the initial master planning phase and concept / schematic design process of the project. Therefore, a limited sampling programme was adopted for the DSI.

DP previously completed a report titled Preliminary Site (Contamination) Investigation (DP, 2020) for SINSW to assess the potential for contamination at the site based on past and present land uses. The PSI recommended an intrusive soil and groundwater investigation comprising of a limited sampling program prior to building demolition and additional sampling post demolition. A preliminary waste classification was also recommended depending on the proposed development design and whether any excavation and removal of spoil from site was required. This current DSI addresses the recommended limited sampling program prior to demolition and the preliminary waste classification.

This report must be read in conjunction with all appendices including the notes provided in Appendix A.

The following key guidelines were consulted in the preparation of this report:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013); and
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

The PSI was undertaken concurrently with an intrusive geotechnical investigation[1] reported separately.

[1] Douglas Partners Pty Ltd, *'Report on Geotechnical Assessment, Meadowbank Public School Repurposed to Open Space, Meadowbank Public School, Ryde*, dated February 2021, reference: 99856.00.R.002 (DP, 2021).

2. Scope of Work

The scope of works for the intrusive investigation comprised the following:

- Review of the results of the PSI report (DP, 2020), including the preliminary conceptual site model;
- Review of the proposed development details;
- Preparation of the field work and safety plans;
- Review of service plans, scanning of test locations for buried services and surveying of test locations using a dGPS;
- Drilling of nine boreholes for geotechnical purposes to the top of bedrock (BH01 to BH08 and BH11B) and an additional four boreholes for contamination purposes (BH09 to BH12) to a depth of 0.5 m into natural soil, 3 m or prior refusal;
- Supervision of the drill rig, logging of the sub surface profile and sampling;
- Installation of one groundwater well at borehole BH05 to a depth of 2.8 m;
- Collection of soil samples for contamination testing from all boreholes at regular intervals and where signs of contamination were observed;
- Laboratory testing of selected soil samples at a NATA accredited laboratory for various combinations of the following potential contaminants / analytes:
  - Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn) (HM);
  - Total recoverable hydrocarbons (TRH);
  - Benzene, toluene, ethylbenzene and xylenes (BTEX);
  - Polycyclic aromatic hydrocarbons (PAH);
  - Organochlorine pesticides (OCP);
  - Organophosphorus pesticides (OPP);
  - Polychlorinated biphenyls (PCB);
  - Phenols;
  - Asbestos (~40 g samples);
  - pH; and,
  - Cation exchange capacity (CEC).
- Development of the groundwater well by removing a minimum of three well volumes or until the well was dry;
- After allowing the well to recharge, collection of a groundwater sample from the well using low-flow sampling techniques. Groundwater depths were recorded prior to sampling;
- The recovered water sample was analysed for metals, TRH, BTEX, PAH, OCP, OPP, PCB and phenols. Given the limited volume of water available for sampling, only routines levels of PAH, OCP, OPP and PCB were analysed for by the laboratory;
- Field sampling and laboratory analysis generally consistent with standard environmental protocols, including a quality assurance and quality control (QA / QC) plan consisting of 10% replicate sampling, trip spikes, trip blanks, appropriate chain-of-custody procedures and laboratory QA / QC testing;
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);

- Data Quality Assessment;
- Update of the conceptual site model (CSM); and,
- Preparation of this DSI report outlining the methods and results of the investigation, including an assessment of the risk from contamination, advice on the type and potential extent of contaminated soils (if identified) and matters which need to be addressed in future stages of the design and delivery of the project. The report also outlines recommendations for further assessment.

3. Site Information

A summary of site information is presented in Table 1 below.

Table 1: Site Information

Site Address	Meadowbank Public School 4-6 Thistle Street, Ryde
Legal Description	Lot 1, DP135062 Lot 1, DP437180 Lot 1, DP120850
Approximate Area	1.0 ha
Zoning	Zone SP2- Educational Establishment
Local Council Area	City of Ryde
Current Use	Primary School
Surrounding Uses	North - Low density residential East - Medium density residential South - City of Ryde Operational Centre and medium density residential West - Low density residential

The site location and layout are shown on Drawing 1, Appendix A.

4. Environmental Setting

Table 2: Environmental Setting of the Site

Regional Topography	The site is located in an area of sloping hills and valleys. The area generally slopes to the south-west towards Parramatta River. The local high point is located approximately 550 m to the north east, at 70 m AHD (Australian height datum). The site is located in a shallow gully between two gently sloping ridge lines extending down towards the river from the local high point.
Site Topography	The site slopes generally down to the south west, with the north eastern side of the site at approximately 20 m AHD, sloping gently down to the south western side at approximately 16 m AHD.
Soil Landscape	Based on the Sydney 1:100 000 Soil Landscape sheet, the site is underlain by two erosional landscape groups, the Gymea group on the north western half of the site and the Glenorie group on the south eastern half of the site. The Gymea group is typically within an undulating landscape with low rolling hills on Hawkesbury Sandstone. Similarly, the Glenorie group is also typically within an undulating landscape but is underlain by Wianamatta Shales.
Geology	Based on the Sydney 1:100 000 Geology Sheet the site is mostly underlain by Triassic aged Hawkesbury Sandstone. A small portion of the northern boundary of the site, along Thistle Street is underlain by Triassic aged Ashfield Shale of the Wianamatta Group. In some areas, there is a transitional geological unit between the Hawkesbury Sandstone and Ashfield Shale known as the Mittagong Formation. The Mittagong Formation generally comprises interbedded shale, laminite and fine-grained sandstone.
Acid Sulfate Soils (ASS)	A review of the NSW ASS risk map and local environmental plan indicates the site is located in a Class 5 area. ASS are not typically found in Class 5 areas, but are generally located within 500 m of Class 1, 2, 3 or 4 areas.
Surface Water	Parramatta River is the closest surface water receptor, located approximately 500 m south and down gradient of the site.
Groundwater	A search of the publicly available registered groundwater bore database on 29 October 2020 indicated that there were no registered groundwater bores within 500 m of the site. The nearest groundwater bores down gradient of the site were approximately 550 m south west of the site, adjacent to Parramatta River. These wells were in a cluster of four wells and were recorded as monitoring bores. Given their use and proximity to the river, the bores are not considered to be a significant receptor. Based on the regional topography the anticipated flow direction of groundwater beneath the site is to the south, towards Parramatta River, the likely receiving surface water body for the groundwater flow path.

5. Previous Reports and Site History

The following previous reports are relevant to the current investigation:

- DP (2009), '*Building the Education Revolution, Meadowbank Primary School- DET No. 3863, Contamination Assessment'*, Project ref: 71182.27-2, dated 10 July 2009 (DP, 2009); and
- DP (2020), '*Report on Preliminary Site (Contamination) Investigation for Meadowbank Public School Repurpose to Open Space, Meadowbank Public School, Prepared for School Infrastructure New South Wales (SINSW)*', DP ref: 99856.01.R.001.Rev0, dated 8 December 2020 (DP, 2020).

5.1 Contamination Assessment - DP (2009)

DP has previously undertaken a contamination assessment for a portion of the site as part of the '*Building the Education Revolution'* Project in 2009[2].

The investigation was undertaken for the proposed covered outdoor learning area and library which involved the removal of the existing library (demountable building) and was limited to the area of the proposed development.

DP (2009) involved an intrusive investigation comprising four boreholes (1 to 4) and three dynamic cone penetration (DCP) tests (DCP tests undertaken for geotechnical purposes). Selected samples of fill underwent laboratory analysis and the reported analyte concentrations were below the previously adopted site assessment criteria. The fill material was preliminarily classified as general solid waste and the natural material was classified as virgin excavated natural material (VENM).

No asbestos was observed on the ground surface during the site walkover and no visible asbestos (or potential asbestos) was noted in the borehole logs.

5.2 Preliminary Site (Contamination) Investigation - DP (2020)

DP undertook a preliminary site (contamination) investigation (PSI) for the site in December 2020 and reported the findings in DP (2020). The PSI comprised a desktop study to assess the potential for contamination based on past and present land uses of the site. Additionally, the investigation was used to inform and refine the proposed intrusive investigation and / or management with regard to the proposed development. The PSI was to be used to support the initial master planning phase and concept / schematic design process of the project.

The results of the desktop study and site history information searches suggested that the site has been owned by the NSW Government and used as a school since at least the 1950s. Information on historical aerial photographs suggested that the site had continued to be developed since the 1950's into the school as it was observed during the site walkover. A chicken coop located at the southern boundary of the site was also observed during the site walkover. Prior to becoming a school, the site appeared to have been vacant since at least the 1930s and it is unknown what the site may have been used for prior to this.

[2] DP (2009), *Building the Education Revolution, Meadowbank Primary School- DET No. 3863, Contamination Assessment,* Project ref: 71182.27-2, dated 10 July 2009.

Therefore, based on the findings of the PSI it was considered that the risk of significant or widespread contamination at the site was low to moderate, given the risk of asbestos on the ground or in the fill, the potential for other contaminants in the fill and some possible low level application of herbicides and pesticides around the site.

As a result, DP (2020) recommended that in order to achieve an outcome of stating that the site is suitable or can be made suitable for the proposed development (as required under SEPP 55), an intrusive investigation be undertaken. This was to include the following:

- An assessment of the contaminant risk in the soil and groundwater relative to the proposed land use. Given an intrusive investigation was proposed to be undertaken prior to demolition of the buildings on site, a limited sampling program was recommended with additional sampling following demolition to assess the areas within the footprints of the buildings; and
- A preliminary waste classification (depending on whether the proposed development design involves any excavation and spoil removal from site).

Additionally, DP (2020) also recommended that as the buildings on the site were considered likely to contain hazardous building materials given their age, an updated hazardous material building survey and subsequent appropriate removal or management of any identified hazardous materials (such as lead paint, synthetic mineral fibres (SMF) and PCB) in accordance with relevant legislation and guidelines should be undertaken prior to renovation or demolition works.

Minimal change has occurred on site since the DP (2020) investigation was undertaken.

6. Preliminary Conceptual Site Model

A Conceptual Site Model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e., it enables an assessment of the potential source - pathway - receptor linkages (complete pathways).

Potential Sources and Areas of Environmental Concern

Based on the current investigation, the following potential sources of contamination and associated contaminants of potential concern (COPC) have been identified.

- S1: Fill: Associated with levelling and forming the site;
  - COPC include metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organophosphorus pesticides (OPP), phenols and asbestos.
- S2: Previous and current general site maintenance (including low level application of pesticides and herbicides and upkeep of chicken coop);
  - COPC include OPP, OCP, metals (arsenic, lead, mercury) and herbicides.

- S3: Former buildings and renovations of current buildings on-site;
  - o COPC include asbestos, synthetic mineral fibres (SMF), lead (in paint) and PCB.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current users [primary school];
- R2: Construction and maintenance workers;
- R3: End users [public (open space)]; and
- R4: Adjacent site users [residential and council workers].

The following potential environmental receptors have been identified:

- R5: Surface water [Parramatta River];
- R6: Groundwater; and
- R7: Terrestrial ecology.

Potential Pathways

The following potential pathways have been identified:

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust and / or vapours;
- P3: Surface water run-off;
- P4: Lateral migration of groundwater providing base flow to water bodies (Parramatta River);
- P5: Leaching of contaminants and vertical migration into groundwater; and,
- P6: Contact with terrestrial ecology.

Summary of Potentially Complete Exposure Pathways

A ‘source - pathway - receptor’ approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S3) and receptors (R1 to R7) are provided in below Table 3.

Table 3: Summary of Potentially Complete Exposure Pathways

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Fill COPC: Metals, TRH, BTEX, PAH, OPP, OCP, PCB and asbestos. **S2: Previous and current general site maintenance** COPC: OPPs, OCPs, metals and herbicides*.	P1: Ingestion and dermal contact	R1: Current users [primary school] R2: Construction and maintenance workers R3: End users [public (open space)]	An intrusive investigation was recommended by DP (2020) to assess possible contamination including testing of the soil and groundwater. This could be undertaken in a staged manner whereby the soil results may inform the need for a groundwater assessment.
	P2: Inhalation of dust and/or vapours	R4: Adjacent site users [residential and council workers]	
	P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies	R5: Surface water [Parramatta River]	
	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater	
	P6: Contact with terrestrial ecology	R7: Terrestrial ecology	
S3: Former buildings and renovations of current buildings on site COPC: Asbestos, SMF, lead (in paint) and PCB	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours	R1: Current users [primary school] R2: Construction and maintenance workers R3: End users [public (open space)] R4: Adjacent site users [residential and council workers]	To complement the asbestos register previously generated, a hazardous building materials survey, DP (2020) recommended to update the current register and identify any SMF, lead paint and PCB in the buildings.
	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater	As mentioned above, an intrusive investigation was recommended by DP (2020) to assess the potential impact on the soil and, if impacted, asses the risk to groundwater.

*Herbicide contamination is most likely to occur via spills where they are stored and mixed / diluted. Therefore, contamination would most likely have occurred in maintenance related buildings and not the grounds and fields. As the school is currently operating, sampling of areas where herbicides may have been stored / mixed was not possible and therefore samples collected during the assessment were not analysed for herbicides.

7. Sampling and Analysis Quality Plan

7.1 Data Quality Objectives

The DSI was devised with reference to the seven-step data quality objective process which is provided in Appendix B Schedule B2, NEPC (2013). The DQO process is outlined in Appendix B.

7.2 Soil Sampling Rationale

Based on the CSM and DQO the following sampling rationale was adopted.

A systematic sampling strategy based on NSW EPA *Contaminated Sites, Sampling Design Guidelines* (NSW EPA, 1995) was utilised to determine borehole locations which was based on areas of access.

Table A of NSW EPA (1995) recommends a minimum of 21 sampling points for a site of 1 ha for site characterisation based on the detection of circular hot spots using a systemic grid sampling pattern. A limited sampling program was adopted for the investigation due to the preliminary nature of the investigation comprising of a total of 12 test locations (in addition to the tests undertaken as part of DP (2009). The locations were selected based on geotechnical requirements, site access and to maximise coverage across the site.

The rationale for the borehole locations are outlined in Table 4 below.

Table 4: Borehole Location Rationale

Borehole	Rationale
BH1 to BH8	Undertaken for geotechnical purposes
BH9 to BH12	Environmental boreholes undertaken for additional site coverage
BH11B	Undertaken adjacent to BH11 to collect an additional bulk sample for geotechnical purposes
BH5	Combined environmental and geotechnical borehole converted into a groundwater monitoring well. Located on the down gradient boundary of the site.

Borehole locations are shown on Drawing 1, in Appendix A.

Soil samples were collected from each borehole at the surface and at depths of approximately 0.2 m, 0.5 m, 1.0 m and every 0.5 m thereafter, and changes in lithology or signs of contamination.

The general sampling methods are described in the field work methodology, included in Appendix C.

7.3 Groundwater Sampling Rationale

In order to assess the current groundwater contamination status at the site and evaluate whether historical and current land uses have impacted on groundwater, sampling from the groundwater monitoring well was undertaken. As outlined in Table 4 above, the rationale for the location of the well was due to the borehole being on the hydraulically down gradient boundary of the site. The results from BH05 will be used to evaluate whether the historical land uses of the site have impacted on groundwater quality as well as provide data on the concentrations of contaminants in groundwater exiting the site.

The general sampling methods are described in the field work methodology, included in Appendix C.

8. Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in the current investigation are informed by the CSM (Section 6) which identified human and environmental receptors to potential contamination at the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic recreational land use scenario. The derivation of the SAC is included in Appendix D and the adopted SAC are listed on the summary analytical results tables in Appendix E.

9. Results

9.1 Field Work Results

The borehole logs for this assessment are included in Appendix F. Table 5 below outlines the general sub surface profile as recorded in the borehole logs. It is noted that the subsurface profile is similar to the conditions encountered in the DP (2009).

Table 5: Summary of the Subsurface Ground Profile

Material	General Description
Asphaltic Concrete	Asphaltic concrete overlying road base was observed at BH01, BH03, BH04 and BH10 from surface to depths of between 0.03 m bgl and 0.2 m bgl
Mulch	Mulch comprising woodchips was observed at BH02, BH05, BH07 and BH12 from surface to depths of between 0.05 m bgl and 0.1 m bgl.
Fill	Fill was observed at the remaining boreholes (BH06, BH09, BH11 and BH11B) to depths of between 0.2 m bgl and 1.3 m bgl Fill was typically silty clay and clay topsoil with some areas covered in wood chip mulch. Sandy clay fill was observed at borehole 11 and 11B with inclusions of concrete and tile fragments, and sandstone gravel.

Material	General Description
Residual Soil, Clay or Sandy Clay	Medium to high plasticity, firm to stiff / stiff to very stiff residual clays to depths of between 1.0 m bgl and 4.9 m bgl. It was noted that sandy clay overlying sandstone bedrock was observed beneath clay layers in boreholes terminating in sandstone bedrock.
Bedrock	Shale and sandstone from depths of between 2.0 m bgl and 4.9 m bgl to depths of between 3.1 m bgl and 4.95 m bgl (extent of investigation).

There were no other apparent records of visual or olfactory evidence (e.g., staining, odours, free phase product) to suggest the presence of contamination within the soils or groundwater observed in the investigation.

No free groundwater was observed during drilling of the boreholes, however groundwater seepage was observed in BH06 during auger drilling at 4.5 m bgl. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

Groundwater levels were gauged on 28 January 2021 using an electronic oil / water interface meter prior to developing the wells and again on 2 February 2021 prior to sampling. The measured standing water level in BH05 prior to sampling was 2.33 m bgl (13.77 m AHD).

Given the limited volume of groundwater available in the well, the stabilised groundwater field parameters were unable to be recorded prior to sampling. No light non-aqueous phase liquid (LNAPL) was observed whilst sampling.

9.2 Laboratory Analytical Results

The results of laboratory analysis are summarised in the following tables in Appendix E:

- Table E1: Summary of Results of Soil Analysis;
- Table E2: Summary of Waste Classification Assessment; and,
- Table E3: Summary of Results of Water Analysis.

The laboratory certificates of analysis together with the chain of custody and sample receipt information are provided in Appendix G.

10. Discussion

10.1 Soils

10.1.1 Site Suitability

A summary of the soil results and assessment against the SAC are shown in Table E1, Appendix E.

The analytical results for BTEX, phenols, OCP, OPP and PCB in all samples were below the practical quantification limit (PQL). Additionally, no asbestos was detected in the samples analysed.

The analytical results for metals in the samples were below the PQL and / or the SAC.

The analytical results for TRH and PAH in the samples were below the PQL and/or the SAC with the exception of the following:

- TRH >C10-C16 in sample BH02/ 0.4-0.5 m at 150 mg/kg, exceeded the ESL of 120 mg/kg.
  - The breakdown of the TRH detected was provided in a chromatogram by Envirolab Services (ELS) and indicated that the fractions identified at BH02 were likely to be an oil but not a light petroleum oil. Given the presence of tree roots in the strata layer and a root identified from 0.5 m bgl to 0.8 m bgl, it is possible the TRH detections are associated with natural oils in the tree roots and surrounding soil. A copy of the chromatogram and advice from ELS are included in Appendix H; and
  - Furthermore, DP notes that the vegetation, fauna and insect activity in the area around BH02 did not display significant signs of stress, and as such, it is considered unlikely that the exceedance is causing an adverse effect to the ecology present.
- B(a)P in samples BH07/0.1-0.2 (5.1 mg/kg and 6.0 mg/kg in the laboratory duplicate) and BH11/0.9-1.0 (1.3 mg/kg) exceeded the ESL of 0.7 mg/kg;
  - It is noted however, that the B(a)P ESL is a low reliability value. Higher reliability screening levels have been published in CRC CARE *Risk-based Management and Remediation Guidance for Benzo(a)pyrene* (CRC CARE, 2017). The high reliability value of 33 mg/kg (or ranging from 21 mg/kg to 135 mg/kg) for fresh B(a)P suggests that the concentrations of B(a)P detected at the site are unlikely to pose an unacceptable risk to terrestrial ecology and therefore the exceedances are not considered to be of concern as the concentrations are well below the high reliability value of 33 mg/kg.
- B(a)P TEQ in samples BH07/0.1-0.2 (7.5 mg/kg and 9.1 mg/kg in the laboratory duplicate) which exceeded the HIL-C of 3 mg/kg. As the exceedance is 2.5 times the SAC, it is considered a hotspot requiring further investigation. DP notes that leachability testing was undertaken for PAH and were all <PQL, indicating that the concentration of B(a)P TEQ is not leachable and based on the borehole, is likely to be associated with the fill layer (0.1 m to 0.3 m bgl).

10.1.2 Preliminary Waste Classification

EPA (2014) contains a six-step procedure for determining the type of waste and the waste classification. Part of the procedure, for materials not classified as special waste or pre-classified waste, is a comparison of analytical data initially against contaminant threshold (CT) values specific to a waste category. Alternatively, the data can be assessed against specific contaminant concentration (SCC) thresholds when used in conjunction with toxicity characteristic leaching procedure (TCLP) thresholds.

The CT, SCC, and TCLP values relevant to this waste classification are shown in Table E2 (Appendix E).

The following Table 6 presents the results of the six-step procedure outlined in EPA (2014) for determining the type of waste and the waste classification. This process applies to the fill at the site.

Table 6: Six Step Classification Procedure

Step	Comments	Rationale
1. Is the waste special waste?	No	No asbestos-containing materials (ACM), clinical or related waste, or waste tyres were observed in the boreholes; Asbestos was not detected by the analytical laboratory.
2. Is the waste liquid waste?	No	The fill comprised a soil matrix.
3. Is the waste "pre-classified"?	No	The fill is not pre-classified with reference to NSW EPA (2014). The natural material, if classified as VENM, is pre-classified as General Solid Waste (non-putrescible).
4. Does the waste possess hazardous waste characteristics?	No	The fill was not observed to contain or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances, corrosive substances, coal tar, batteries, lead paint or dangerous goods containers.
5. Determining a wastes classification using chemical assessment	Conducted	Refer to Table E2 in Appendix E.
6. Is the waste putrescible or non-putrescible?	Non-putrescible	The fill does not contain materials considered to be putrescible [a].

Note: a wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forest and crop materials, and natural fibrous organic and vegetative materials.

As shown in Table E2 (Appendix E) the contaminant concentrations for the analysed fill samples were within the contaminant thresholds (CT1s) for General Solid Waste (GSW), with the exception of the following:

- Nickel in sample BH04/ 0.1-0.2 (41 mg/kg) which exceeded the CT1 criteria for nickel (40 mg/kg);
- B(a)P in sample BH11/ 0.9- 1.0 (1.3 mg/kg) which exceeded the CT1 criteria for B(a)P (0.8 mg/kg); and
- B(a)P in sample BH07/ 0.1-0.2 (5.1 mg/kg and 6.0mg/kg in the laboratory duplicate) which exceeded the CT2 criteria for B(a)P (3.2 mg/kg).

Additional toxicity characteristic leaching procedure (TCLP) analysis was conducted on the above samples to gain an understanding of the leachable characteristics and hence the potential to impact the groundwater. The results were within the contaminant thresholds SCC1 and TCLP1 for GSW.

Consequently, the preliminary classification for the fill material encountered in the boreholes is General Solid Waste (non-putrescible).

Additionally, building materials such as concrete and tile fragments were observed in the fill which are considered indicative of the possible presence of HBM, including asbestos. If asbestos is encountered during excavation the waste classification of the material will need to be updated to be disposed of as special waste (asbestos).

The above classifications of the fill is preliminary in nature and will need to be confirmed with a visual inspection and additional sampling (where required) prior to offsite disposal.

The reported concentrations of the natural soils sampled from across the site were generally within the ANZECC (1992) background levels with the exception of the following: BH02/0.4-0.5 (detected TRH C10-C14), BH06/0.4-0.5 (detected B(a)P, fluoranthene and pyrene) and BH07/1-1.1 (detected benzo(a)anthracene, chrysene, fluoranthene and pyrene). It is noted that the total PAH concentrations were within published background levels although individual species as listed above were detected.

As such, it is possible that some of the natural soils in and around these locations are not able to be classified as VENM and would be classified as general solid waste (CT1) with the potential for classification as excavated natural material (ENM) following further testing.

Additionally, TRH C29-C36, fluoranthene and pyrene was detected in BH10/0.1-0.2. However, based on the chromatogram and comments from ELS, the TRH fraction is likely due to the presence of asphalt in the sample. Based on these results and the borehole logs, the asphalt is likely from the overlying asphaltic concrete. Given this, the natural soils in BH10 may be classified as VENM subject to appropriate segregation of the overlying asphalt.

Similarly the detection of TRH at BH02 should be confirmed as it may be associated with naturally occurring oils surrounding the tree roots and mulch in the area and a VENM classification should be confirmed following investigation, otherwise a formal classification provided.

Nonetheless, with the above possible exceptions, the natural soils comprising of red brown, orange brown and grey clays encountered in the remaining boreholes are considered likely to be classified as VENM.

10.2 Groundwater

A summary of the groundwater results and assessment against the SAC is shown in Table E3, Appendix E.

The analytical results for TRH, PAH, OCP, OPP, PCB, phenol and BTEX. were below the PQL in the sample analysed. The results suggest that groundwater beneath the site has not been significantly impacted by organic contaminants.

The analytical results for metals were general below the PQL and/or SAC with the exception of zinc at 80 µg/L in the sample (BH05), exceeding the ANZG (2018) marine water guideline for the protection of slightly to moderately disturbed marine water aquatic ecosystems of 15 µg/L.

Based on our experience in the area, the concentrations of metals in groundwater are considered likely to be attributed to the background concentrations that would be associated with the mineralogy of the clay / fractured rock shale.

10.3 Data Quality Assurance and Quality Control

The data quality assurance and quality control (QA / QC) results are included in Appendix I. Based on the results of the field QA and field and laboratory QC, and evaluation against the data quality indicators (DQI) it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

11. Conclusions and Recommendations

Based on the site observations in this investigation the subsurface profile encountered at the site comprised of topsoil and / or fill to depths of between 0.2 m bgl to 1.3 m bgl, underlain by natural clay.

The laboratory analytical results for the limited soil and groundwater sampling undertaken, indicated generally low levels of contamination at the site.

The groundwater results across the site indicate the contaminated fill is not impacting upon the groundwater at the site.

Based on the results of this DSI combined with the results of DP (2020), the risk of widespread gross chemical contamination is considered to be low and therefore the site can be made suitable (from a contamination perspective) for the proposed open space, subject to the following:

- As the buildings on the site are considered likely to contain hazardous building materials given their age, an updated hazardous material building survey and subsequent appropriate removal or management of any identified hazardous materials (such as lead paint, SMF and PCB) in accordance with relevant legislation and guidelines should be undertaken prior to renovation or demolition works;
- Following demolition, in the areas within the building footprints (including both the permanent and demountable buildings):
    - Inspection of the building footprints by an Environmental Consultant, for any signs of contamination;
    - Additional testing around BH07; and
    - Additional sampling and testing in the demolished building footprint areas to assess the suitability of the material to remain on site (or as a confirmation of the waste classification prior to excavation and off-site disposal, if required). This testing should include analysis of COPC as identified in the CSM including herbicides within the footprint of the groundskeeping area of the school buildings. The results of this additional investigation will inform whether management and/or remediation for the material is required.

The current results indicate that the fill is likely to be classified as general solid waste (non-putrescible) and the natural soils which underlie the site are mainly likely to be classified as VENM. These classifications are preliminary and subject to confirmation (visual and / or analytical) prior to removal of soils from the site.

If removal of natural soils around BH02, BH06, BH07 and BH10 is required, further investigation should be undertaken to either confirm whether the soils can be classified as VENM or the extent of the soils which cannot be classified as VENM and provide a formal waste classification of the material (noting that an ENM classification could also be explored).

12. References

ANZECC. (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australia and New Zealand Environment and Conservation Council.

ANZG. (2018). Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.

CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene.* Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (1995). *Contaminated Sites, Sampling Design Guidelines.* NSW Environment Protection Authority.

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

13. Limitations

Douglas Partners (DP) has prepared this report (or services) for this project at Meadowbank Public School in accordance with DP's proposal SYD201095 dated 8 October 2020 and acceptance received from SINSW dated 28 October 2020. The work was carried out under the Standard Form Agreement SINSW01423/20 dated 28 October 2020. This report is provided for the exclusive use of SINSW for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the (environmental / groundwater) components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Asbestos has not been detected by observation or by laboratory analysis, either on the surface of the site, or in filling materials at the test locations sampled and analysed. Building demolition materials, such as concrete and tile were, however, located in previous below-ground filling and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

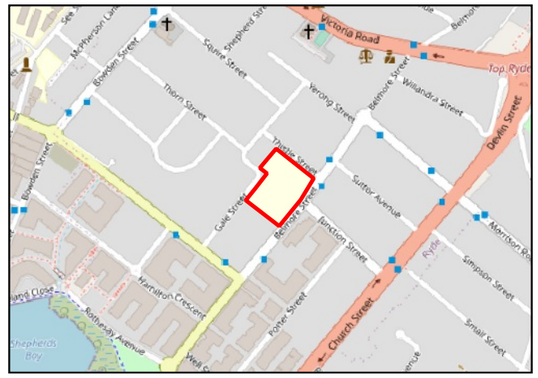
Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints, or to parts of the site being inaccessible and not available for inspection/sampling, or to vegetation preventing visual inspection and reasonable access. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that asbestos is not present.

Douglas Partners Pty Ltd

Appendix A

Drawing

Notes About This Report



LOCALITY MAP

Notes:
1. Basemap from Metromap (dated 4/12/2020).
2. Test locations are approximate only.

Legend

- Approximate site boundary

Current Investigation

- Combined environmental and geoechnical boreholes
- Environmental boreholes
- Groundwater monitoring well

Previous Investigation (DP 2009)

- Geotechnical/environmental Borehole
- DCP

0 20 40 60 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Schools Infrastructure NSW		
OFFICE:	Sydney	DRAWN BY:	LT
SCALE:	1:800 @ A3	DATE:	24.02.2021

TITLE: **Site and Borehole Location Plan**
Meadowbank Public School Repurpose to Open Space
Meadowbank Public School, Ryde

N

PROJECT No:	99856.01
DRAWING No:	1
REVISION:	0

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

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

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

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

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole 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. They may not be the same at the time of construction as are indicated in the report; and
- 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 first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or 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 a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Data Quality Objectives

Appendix B
Data Quality Objectives
Meadowbank Public School, Ryde

B1.0 Data Quality Objectives

The DSI has been devised broadly in accordance with the seven-step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).

Step	Summary
1: State the problem	The objective of the investigation is to confirm the contamination status of the site with respect to the proposed land use. The report is being undertaken as the land is to be repurposed into public open space. A preliminary conceptual site model (CSM) has been prepared (Section 6) for the proposed development. The project team consisted of experienced environmental engineers and scientists working in the roles of Project Principal, Project Reviewer, Project Manager, field staff.
2: Identify the decisions / goal of the study	The site history has identified possible contaminating previous uses which are identified in the CSM (Section 6). The CSM identifies the associated contaminants of potential concern (COPC) and the likely impacted media. The site assessment criteria (SAC) for each of the COPC are detailed in Section 8. The decision is to establish whether or not the 95% upper confidence limit of the sample population falls below the SAC. On this basis, an assessment of the site's suitability from a contamination perspective and whether (or not) further assessment and / or remediation will be derived.
3: Identify the information inputs	Inputs to the investigation will be the results of analysis of samples to measure the concentration of COPC identified in the CSM (Section 6) at the site using NATA accredited laboratories and methods, where possible. The SAC for each of the COPC are detailed in Appendix D.
4: Define the study boundaries	The lateral boundaries of the investigation area are shown on Drawing 1, Appendix A. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment and site observations. The assessment is limited to the timeframe over which the field investigation was undertaken. Constraints to the assessment are identified and discussed in the conclusions of the report, Section 11.
5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with SAC (Appendix D, based on NEPC (2013)). Where guideline values are absent, other sources of guideline values accepted by NEPC (2013) shall be adopted where possible. Where a sample result exceeds the adopted criterion, a further site-specific assessment will be made as to the risk posed by the presence of that contaminant(s). Initial comparisons will be with individual results then, where required, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic

Step	Summary
	mean (95% UCL)) to assess potential risks posed by the site contamination. Quality control results are to be assessed according to their relative percent difference (RPD) values. For field duplicates, triplicates and laboratory results, RPDs should generally be below 30%; for field blanks and rinsates, results should be at or less than the limits of reporting (NEPC, 2013). The field and laboratory quality assurance assessment is included in Appendix I.
6: Specify the performance or acceptance criteria	Baseline condition: Contaminants at the site and/or statistical analysis of data (in line with NEPC (2013)) exceed human health and environmental SAC and poses a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Contaminants at the site and statistical analysis of data (in line with NEPC (2013)) complies with human health and environmental SAC and as such, does not pose a potentially unacceptable risk to receptors (alternative hypothesis). Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it is assumed that the baseline condition is true. Uncertainty that may exist due to the above potential decision errors shall be mitigated as follows: • As well as a primary screening exercise, the use of the 95% UCL as per NEPC (2013) may be applied, i.e.,95% is the defined confidence level associated with the UCL on the geometric mean for contaminant data. The resultant 95%UCL shall subsequently be screened against the corresponding SAC. • The statistical assessment will only be able to be applied to certain datasets, such as those obtained via systematic sampling. Identification of areas for targeted sampling will be via professional judgement and errors will not be able to have a probability assigned to them.
7: Optimise the design for obtaining data	As the purpose of the sampling program is to assess for potential contamination across the site, the sampling program is reliant on professional judgement to identify and sample the potentially affected areas. Further details regarding the proposed sampling plan are presented in Section 7.2.

Appendix C

Field Work Methodology

Appendix C
Field Work Methodology
Meadowbank Public School, Ryde

C1.0 Guidelines

The following key guidelines were consulted for the field work methodology:

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013).

C2.0 Soil Sampling

Soil sampling is carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprise:

- Collect soil samples directly from the auger at regular intervals within the soil profile and where signs of contamination were observed;
- Transfer samples in laboratory-prepared glass jars with Teflon lined lids by hand, capping immediately and minimising headspace within the sample jar;
- Collect replicate samples in zip-lock bags for PID screening;
- Collect ~40 g to 50 g samples in zip-lock bags for asbestos (presence / absence) analysis;
- Wear a new disposable nitrile glove for each sample point thereby minimising potential for cross-contamination;
- Collect 10% replicate samples for QC purposes;
- Label sample containers with individual and unique identification details, including project number, sample location and sample depth (where applicable);
- Place samples into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain-of-custody documentation.

C3.0 Groundwater Sampling

C3.1 Monitoring Well Installation

Monitoring wells are constructed using class 18 uPVC machine slotted screen and blank sections with screw threaded joints. The screened section of each well is backfilled with a washed sand filter pack to approximately 0.5 m above the screened interval. Each well is completed with a hydrated bentonite plug of at least 0.5 m thick and then compacted drill cuttings to the surface, finished with cast iron gatic cover set in concrete.

C3.2 Monitoring Well Development

Groundwater monitoring wells are developed as soon as practicable following well installation. The purpose of well development is to remove sediments and/or drilling fluid introduced to the well during drilling and to facilitate connection of the monitoring well to the aquifer. The wells are developed by bailing to remove a minimum of five well volumes, or until dry.

C3.3 Groundwater Sampling

Peristaltic Pump

Groundwater sampling is carried out in accordance with DP standard operating procedures. Groundwater samples are collected using a low flow peristaltic pump via the micro-purge (minimal drawdown) method. The sampling method is described as follows:

- Measure the static water level using an electronic interface probe and record the thickness of any LNAPL (if encountered);
- Decontaminate the interface probe and cable between monitoring wells by rinsing in a diluted Decon-90 solution and then rinsing in demineralised water;
- Lower the well-dedicated tubing into the well then clamped at a level estimated to be 1 m below the top of the water column (provided the depth of the pump is within the screened section) or to the approximate mid-point of the well screen;
- Set the pump at the lowest rate possible to minimise drawdown of the water column;
- Measure physical parameters by continuously passing the purged water through a flow cell; and
- Following stabilisation of the field parameters, collect samples in laboratory-prepared bottles minimising headspace within the sample bottle and cap immediately.

Decontaminate the interface probe and pump between monitoring wells by rinsing in a diluted Decon-90 solution and then rinsing in demineralised water.

Sample Handling

The general groundwater sample handling and management procedures comprise:

- Label sample containers with individual and unique identification details, including project number and sample location;
- Place the sample jars into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain-of-custody documentation.

Appendix D

Site Assessment Criteria

Appendix D
Site Assessment Criteria
Meadowbank Public School, Ryde

D1.0 Introduction

D1.1 Guidelines

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013);
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011);
- ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018); and
- ANZECC *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000).

D1.2 General

The SAC applied in the current investigation are informed by the CSM which identified human and environmental receptors to potential contamination at the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The following inputs are relevant to the selection and/or derivation of the SAC:

- Land use: recreational.
  - Corresponding to land use category 'C', defined as public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths.
- Soil type: sand.

D2.0 Soils

D2.1 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table D1 and Table D2.

Table D1: Health Investigation Levels (mg/kg)

Contaminant	HIL-C
Metals	
Arsenic	300
Cadmium	90
Chromium (VI)	300
Copper	17 000
Lead	600
Mercury (inorganic)	80
Nickel	1200
Zinc	30 000
PAH	
B(a)P TEQ	3
Total PAH	300
Phenols	
Phenol	40 000
Pentachlorophenol	120
OCP	
DDT+DDE+DDD	400
Aldrin and dieldrin	10
Chlordane	70
Endosulfan	340
Endrin	20
Heptachlor	10
HCB	10
Methoxychlor	400
OPP	
Chlorpyrifos	250
PCB	
PCB	1

Table D2: Health Screening Levels (mg/kg)

Contaminant	HSL-C
SAND	**0 m to <1 m**
Benzene	NL
Toluene	NL
Ethylbenzene	NL
Xylenes	NL
Naphthalene	NL
TRH F1	NL
TRH F2	NL

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

The HSL for direct contact derived from CRC CARE (2011) are in Table D3.

Table D3: Health Screening Levels for Direct Contact (mg/kg)

Contaminant	DC HSL-C	DC HSL-IMW
Benzene	120	1100
Toluene	18 000	120 000
Ethylbenzene	5300	85 000
Xylenes	15 000	130 000
Naphthalene	1900	29 000
TRH F1	5100	82 000
TRH F2	3800	62 000
TRH F3	5300	85 000
TRH F4	7400	12 000

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

IMW intrusive maintenance worker

D2.2 Asbestos in Soil

Based on the CSM and / or current site access limitations, a detailed asbestos assessment was not considered to be warranted at this stage. However, due to the history of widespread use of ACM products across Australia, ACM can be encountered unexpectedly and sporadically at a site. Therefore, the presence or absence of asbestos at a limit of reporting of 0.1 g/kg (AS:4964) has been adopted for this investigation / assessment as an initial screen.

D2.3 Ecological Investigation Levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table D5, with inputs into their derivation shown in Table D4.

Table D4: Inputs to the Derivation of the Ecological Investigation Levels

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years)	
pH	5.47	Calculated average obtained from site specific testing
CEC	7.47 $cmol_c/kg$	Calculated average obtained from site specific testing
Clay content	1%	A conservative clay content in the absence of site specific test results
Organic carbon content	0.1%	A conservative organic carbon content in the absence of site specific test results
Iron	0	A conservative iron content in the absence of site specific test results
Traffic volumes	high	
State / Territory	NSW	

Table D5: Ecological Investigation Levels (mg/kg)

Contaminant	EIL- Urban Residential and Open Space (A-B-C)
Metals	
Arsenic	100
Copper	150
Nickel	90
Chromium III	200
Lead	1100
Zinc	360
PAH	
Naphthalene	170
OCP	
DDT	180

D2.4 Ecological Screening Levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table D7.

Table D6: Ecological Screening Levels (mg/kg)

Contaminant	Soil Type	ESL- Urban Residential and Open Space (A-B-C)
Benzene	Coarse	50
Toluene	Coarse	85
Ethylbenzene	Coarse	70
Xylenes	Coarse	105
TRH F1	Coarse/ Fine	180*
TRH F2	Coarse/ Fine	120*
TRH F3	Coarse	300
TRH F4	Coarse	2800
B(a)P	Coarse	0.7

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

D2.5 Management Limits

In addition to appropriate consideration and application of the HSL and ESL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards; and
- Effects on buried infrastructure e.g., penetration of, or damage to, in-ground services.

The adopted management limits are in Table D7.

Table D7: Management Limits (mg/kg)

Contaminant	Soil Type	ML- Residential, Parkland and Public Open Space (A-B-C)
TRH F1	Coarse	700
TRH F2	Coarse	1000
TRH F3	Coarse	2500
TRH F4	Coarse	10 000

Notes: TRH F1 is TRH C_6-C_{10} including BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

D3.0 Groundwater

D3.1 Introduction

The groundwater investigation levels (GIL) used for interpretation of the groundwater data (as a Tier 1 assessment) have been selected based on the potential risks posed from contamination sourced from the site to receptors at or down-gradient of the site, as identified by the conceptual site model (CSM). The receptors, exposure points and pathways are summarised in Table D8.

Table D8: Summary of Potential Receptors and Potential Risks

Receptor	Location	Exposure Point	Exposure Pathway
Surface water aquatic ecosystem	Parramatta River-down-gradient from site.	Receiving surface water body at the groundwater discharge point.	Exposure to contaminants.
Occupants of buildings	On site and down-gradient from site.	Enclosed buildings (including if there are any proposed for the development e.g. an amenities block).	Inhalation of VOC (including TRH and BTEX) overlying VOC impacted groundwater via the vapour intrusion pathway.

The rationale for the selection of GIL is in Table D9.

Table D9: Groundwater Investigation Level Rationale

Receptor / Beneficial Use	GIL	Source	Comments / Rationale
Aquatic ecosystem	DGV	ANZG (2018)	Marine water 99% LOP for bioaccumulative contaminants 95% LOP for non-bioaccumulative contaminants
Building occupants (vapour intrusion)	HSL	NEPC (2013)	2 m to <4 m

Notes: DGV default guideline value
% LOP percentage level of protection of species
HSL health screening level

D3.2 Groundwater Investigation Levels for Aquatic Ecosystems

The DGV for the protection of aquatic ecosystems derived from ANZG (2018) are in Table D10.

Table D10: Groundwater Investigation Levels for Protection of Aquatic Ecosystems (µg/L)

Analyte		ANZG (2018) Trigger Values for Marine water
Metals	Arsenic (V)	24
	Cadmium	5.5
	Chromium (VI)	4.4
	Copper	1.3
	Lead	4.4
	Mercury (total)	0.40
	Nickel	70
	Zinc	15
PAH and Phenols	Naphthalene	70
	Anthracene	0.4
	Phenanthrene	2.0
	Fluoranthene	1.4
	Benzo(a)pyrene	0.2
	Total Phenolics	400
BTEX	Benzene	700
	Toluene	180
	Ethylbenzene	80
	Xylenes (Total)	75
OCP	Chlordane	0.001
	DDT	0.0004
	Endosulfan	0.01
	Endrin	0.008

Analyte		ANZG (2018) Trigger Values for Marine water
	Heptachlor	0.0004
	Aldrin	0.003
	Dieldrin	0.01
	Methoxychlor	0.004
OPP	Chlorpyrifos	0.009
	Diazinon	0.01
	Dimethoate	0.15
	Fenitrothion	0.001
PCB	Aroclor 1242	0.6
	Aroclor 1254	0.03

Notes: Where the contaminant does not have a % LOP, the 'unknown' LOP has been adopted

D3.3 Health Screening Levels for Vapour Intrusion

The HSL to evaluate potential vapour intrusion risks derived from NEPC (2013) are in Table D11.

Table D11: Groundwater Health Screening Levels for Vapour Intrusion (µg/L)

Contaminant	HSL-C	Solubility Limit
SAND	**2 m to <4 m**	**-**
Benzene	NL	59 000
Toluene	NL	61 000
Ethylbenzene	NL	3900
Xylenes	NL	21 000
Naphthalene	NL	170
TRH F1	NL	9000
TRH F2	NL	3000

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour that is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

Appendix E

Summary of Results

Table E1: Summary of Results of Soil Analysis

Table E2: Summary of Waste Classification Assessment

Table E3: Summary of Results of Water Analysis

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Table E1: Summary of Laboratory Results of Soil Analysis

			Metals								TRH						BTEX				PAH			Phenol
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Phenol [c]
Sample ID	Depth	PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	5
		Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Site Assessment Criteria - Recreational / Open Space																								
HIL C			300	90	300	17,000	600	80	1,200	30,000													3	120
HSL C	0- <1m	(sand)											NL	NL			NL	NL	NL	NL	NL			
EIL/ ESL UR/POS		(coarse)	100		200	150	1,100		90	360		120	180		300	2,800	50	85	70	105	170	0.7		
Management Limit R/P/POS		(coarse)											700	1,000	2,500	10,000								
DC HSL C													5,100	3,800	5,300	7,400	120	18,000	5,300	15,000	1,900			
Previously Adopted SAC (Residential A) for DP 2009			100	20	12,000	1,000	300	15	600	14,000	65		1,000				1	1	3	14		1		8,500
Previous Investigation (DP 2009)																								
2	0-0.1	7/03/2009	4	<0.5	9	27	40	<0.1	6	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
3	0-0.1	7/03/2009	5	<0.5	15	35	45	<0.1	11	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
Current Investigation																								
BH1	0.4 - 0.5 m	21/01/2021	<4	<0.4	7	8	27	<0.1	4	46	<25	<50	<25	<50	100	<100	<0.2	<0.5	<1	<1	<1	0.4	0.6	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH1	1 - 1.1 m	21/01/2021	<4	<0.4	5	15	11	<0.1	2	18	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH2	0.4 - 0.5 m	21/01/2021	<4	<0.4	11	9	10	<0.1	3	8	<25	150	<25	150	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH3	1 - 1.1 m	21/01/2021	4	<0.4	28	16	18	0.2	10	15	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BD5/20200121	1 - 1.1 m	21/01/2021	<4	<0.4	14	9	17	<0.1	6	8	-	-	-	-	-	-	-	-	-	-	<0.1	<0.05	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH3	2 - 2.1 m	21/01/2021	4	<0.4	9	6	10	<0.1	1	2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH4	0.1 - 0.2 m	20/01/2021	<4	<0.4	7	54	2	<0.1	41	15	<25	<50	<25	<50	<100	100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH5	0.4 - 0.5 m	20/01/2021	5	<0.4	12	7	27	<0.1	2	18	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.08	<0.5	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH5	1.4 - 1.5 m	20/01/2021	5	<0.4	12	4	11	<0.1	1	5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH6	0.4 - 0.5 m	21/01/2021	<4	<0.4	9	9	17	<0.1	5	13	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.05	<0.5	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BD3/20210121	0.4 - 0.5 m	21/01/2021	9	<1	16	15	27	<0.1	8	22	<10	<50	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<1	<0.5	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH6	1 - 1.1 m	21/01/2021	<4	<0.4	8	13	15	<0.1	1	13	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH7	0.1 - 0.2 m	21/01/2021	<4	<0.4	9	35	35	<0.1	5	83	<25	<50	<25	<50	160	<100	<0.2	<0.5	<1	<1	<1	5.1	7.5	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH7	1 - 1.1 m	21/01/2021	<4	<0.4	9	5	8	<0.1	2	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.1	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH8	0 - 0.1 m	20/01/2021	5	0.8	14	45	90	<0.1	5	150	<25	<50	<25	<50	100	<100	<0.2	<0.5	<1	<1	<1	0.1	<0.5	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH9	0.4 - 0.5 m	21/01/2021	<4	<0.4	8	6	13	<0.1	4	10	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH9	1.4 - 1.5 m	21/01/2021	<4	<0.4	8	9	11	<0.1	1	7	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH10	0.1 - 0.2 m	21/01/2021	<4	<0.4	15	9	13	<0.1	5	12	<25	<50	<25	<50	280	340	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH11	0 - 0.1 m	20/01/2021	4	<0.4	10	21	34	<0.1	7	79	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.4	<0.5	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH11	0.9 - 1 m	20/01/2021	<4	<0.4	7	5	61	<0.1	1	53	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	1.3	1.8	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH11	1.9 - 2 m	20/01/2021	6	<0.4	14	9	13	<0.1	2	9	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH12	0 - 0.1 m	20/01/2021	5	<0.4	11	10	76	<0.1	3	19	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.2	<0.5	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH12 - [TRIPLICATE]	0 - 0.1 m	20/01/2021	5	<0.4	10	6	24	<0.1	3	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH12	0.4 - 0.5 m	20/01/2021	7	<0.4	20	8	17	<0.1	3	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<5
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -
BH12	1.4 - 1.5 m	20/01/2021	5	<0.4	8	10	11	<0.1	<1	5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	-
			300 100	90 -	300 200	17000 150	600 1100	80 -	1200 90	30000 360	- -	- 120	NL 180	NL -	- 300	- 2800	NL 50	NL 85	NL 70	NL 105	NL 170	- 0.7	3 -	120 -

Lab result	
HIL/HSL value	EIL/ESL value

HIL/HSL exceedance | EIL/ESL exceedance | HIL/HSL and EIL/ESL exceedance | ML exceedance | ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab, refer to the lab report **Blue** = DC exceedance | HSL 0-<1 Exceedance

- = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Non limiting AD = Asbestos detected NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Reported naphthalene laboratory result obtained from BTEXN suite

c Criteria for pentachlorophenol used as an initial screen

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for Recreational C including public open space

HIL C Recreational / Open Space (NEPC, 2013)

HSL C Recreational / Open Space (vapour intrusion) (NEPC, 2013)

DC HSL C Direct contact HSL C Recreational /Open space (direct contact) (CRC CARE, 2011)

EIL/ESL UR/POS Urban Residential and Public Open Space (NEPC, 2013)

ML R/P/POS Residential, Parkland and Public Open Space (NEPC, 2013)

Table E1: Summary of Laboratory Results of Soil Analysis

			OCP											OPP	PCB	Asbestos		
			DDD	DDT+DDE+DDD	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (50 g)
Sample ID	Depth	PQL	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			
		Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
Site Assessment Criteria - Recreational / Open Space																		
HIL C				400			10	70	20	340	10	10	400	250	1			
HSL C	0- <1m	(sand)				180												
EIL/ ESL UR/POS		(coarse)																
Management Limit R/P/POS		(coarse)																
DC HSL C																		
Previously Adopted SAC (Residential A) for DP 2009				200			10	50			10				10	0	0	NAD
Previous Investigation (DP 2009)																		
2	0-0.1	7/03/2009						<0.1						-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
3	0-0.1	7/03/2009						<0.1						-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
Current Investigation																		
BH1	0.4 - 0.5 m	21/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH1	1 - 1.1 m	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH2	0.4 - 0.5 m	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH3	1 - 1.1 m	21/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BD5/20200121	1 - 1.1 m	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH3	2 - 2.1 m	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH4	0.1 - 0.2 m	20/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH5	0.4 - 0.5 m	20/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH5	1.4 - 1.5 m	20/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH6	0.4 - 0.5 m	21/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BD3/20210121	0.4 - 0.5 m	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH6	1 - 1.1 m	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH7	0.1 - 0.2 m	21/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH7	1 - 1.1 m	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH8	0 - 0.1 m	20/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH9	0.4 - 0.5 m	21/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH9	1.4 - 1.5 m	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH10	0.1 - 0.2 m	21/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH11	0 - 0.1 m	20/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH11	0.9 - 1 m	20/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH11	1.9 - 2 m	20/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH12	0 - 0.1 m	20/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH12 - [TRIPLICATE]	0 - 0.1 m	20/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH12	0.4 - 0.5 m	20/01/2021	<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	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			
BH12	1.4 - 1.5 m	20/01/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	250 -	1 -			

Lab result

HIL/HSL value EIL/ESL value

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Reported naphthalene laboratory result obtained from BTEXN suite

c Criteria for pentachlorophenol used as an initial screen

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for Recreational C including public open space

HIL C Recreational / Open Space (NEPC, 2013)

HSL C Recreational / Open Space (vapour intrusion) (NEPC, 2013)

DC HSL C Direct contact HSL C Recreational /Open space (direct contact) (CRC CARE, 2011)

EIL/ESL UR/POS Urban Residential and Public Open Space (NEPC, 2013)

ML R/P/POS Residential, Parkland and Public Open Space (NEPC, 2013)

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Table E2: Summary of Waste Classification Assessment

				Metals									TRH					BTEX					
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Nickel TCLP	Zinc	TRH C6 - C9	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	C10-C36 recoverable hydrocarbons	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)
Sample ID	Depth	Sample Date	PQL	4	0.4	1	1	1	0.1	1	0.01	1	25	50	100	100	50	0.2	0.5	1	2	1	3
			Material Type	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Waste Classification Criteria [f]																							
CT1				100	20	100	NC	100	4	40		NC	650	NC	NC	NC	10000	10	288	600	NC	NC	1000
SCC1				500	100	1900	NC	1500	50	1050		NC	650	NC	NC	NC	10000	18	518	1080	NC	NC	1800
TCLP1				5	1	5	NC	5	0.2	2		NC	N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A
CT2				400	80	400	NC	400	16	160		NC	2600	NC	NC	NC	40000	40	1152	2400	NC	NC	4000
SCC2				2000	400	7600	NC	6000	200	4200		NC	2600	NC	NC	NC	40000	72	2073	4320	NC	NC	7200
TCLP2				20	4	20	NC	20	0.8	8		NC	N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A
Published Background Levels																							
ANZECC (1992)				0.2-30	0.04-2	0.5-110	1-190	<2-200	0.001-0.1	2-400	-	2-180	-	-	-	-	-	0.05 - 1	0.1 - 1	-	-	-	-
ANZECC (2000)				1-53	0.016-0.78	2.5-673	0.4-412	2-81	-	1-517	-	1-263	-	-	-	-	-	-	-	-	-	-	-
Previous Investigation (DP 2009)																							
2	0-0.1 m	7/03/2009	Fill	4	<0.5	9	27	40	<0.1	6	-	72	-	-	-	-	-	-	-	-	-	-	-
3	0-0.1 m	7/03/2009	Fill	5	<0.5	15	35	45	<0.1	11	-	110	-	-	-	-	-	-	-	-	-	-	-
Current Investigation																							
BH1	0.4 - 0.5 m	21/01/2021	Fill	<4	<0.4	7	8	27	<0.1	4	-	46	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH1	1 - 1.1 m	21/01/2021	Natural	<4	<0.4	5	15	11	<0.1	2	-	18	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH2	0.4 - 0.5 m	21/01/2021	Natural	<4	<0.4	11	9	10	<0.1	3	-	8	<25	**110**	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH3	1 - 1.1 m	21/01/2021	Fill	4	<0.4	28	16	18	0.2	10	-	15	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BD5/20200121	1 - 1.1 m	21/01/2021	Fill	<4	<0.4	14	9	17	<0.1	6	-	8	-	-	-	-	-	-	-	-	-	-	-
BH3	2 - 2.1 m	21/01/2021	Natural	4	<0.4	9	6	10	<0.1	1	-	2	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH4	0.1 - 0.2 m	20/01/2021	Fill	<4	<0.4	7	54	2	<0.1	41	0.03	15	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH5	0.4 - 0.5 m	20/01/2021	Fill	5	<0.4	12	7	27	<0.1	2	-	18	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH5	1.4 - 1.5 m	20/01/2021	Natural	5	<0.4	12	4	11	<0.1	1	-	5	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH6	0.4 - 0.5 m	21/01/2021	Natural	<4	<0.4	9	9	17	<0.1	5	-	13	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BD3/20210121	0.4 - 0.5 m	21/01/2021	Natural	9	<1	16	15	27	<0.1	8	-	22	<10	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
BH6	1 - 1.1 m	21/01/2021	Natural	<4	<0.4	8	13	15	<0.1	1	-	13	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH7	0.1 - 0.2 m	21/01/2021	Fill	<4	<0.4	9	35	35	<0.1	5	-	83	<25	<50	<100	120	-	<0.2	<0.5	<1	<2	<1	<3
BH7	1 - 1.1 m	21/01/2021	Natural	<4	<0.4	9	5	8	<0.1	2	-	6	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH8	0 - 0.1 m	20/01/2021	Fill	5	0.8	14	45	90	<0.1	5	-	150	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH9	0.4 - 0.5 m	21/01/2021	Fill	<4	<0.4	8	6	13	<0.1	4	-	10	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH9	1.4 - 1.5 m	21/01/2021	Natural	<4	<0.4	8	9	11	<0.1	1	-	7	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH10	0.1 - 0.2 m	21/01/2021	Natural	<4	<0.4	15	9	13	<0.1	5	-	12	<25	<50	<100	**290**	-	<0.2	<0.5	<1	<2	<1	<3
BH11	0 - 0.1 m	20/01/2021	Fill	4	<0.4	10	21	34	<0.1	7	-	79	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH11	0.9 - 1 m	20/01/2021	Fill	<4	<0.4	7	5	61	<0.1	1	-	53	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH11	1.9 - 2 m	20/01/2021	Natural	6	<0.4	14	9	13	<0.1	2	-	9	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH12	0 - 0.1 m	20/01/2021	Fill	5	<0.4	11	10	76	<0.1	3	-	19	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH12 - [TRIPLICATE]	0 - 0.1 m	20/01/2021	Fill	5	<0.4	10	6	24	<0.1	3	-	19	-	-	-	-	-	-	-	-	-	-	-
BH12	0.4 - 0.5 m	20/01/2021	Fill	7	<0.4	20	8	17	<0.1	3	-	8	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3
BH12	1.4 - 1.5 m	20/01/2021	Fill	5	<0.4	8	10	11	<0.1	<1	-	5	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<3

CT1 exceedance TCLP1 and/or SCC1 exceedance CT2 exceedance TCLP2 and/or SCC2 exceedance Asbestos detection

BOLD= Exceedance in a natural sample of the published background levels NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable

Notes:

a	QA/QC replicate of sample listed directly below the primary sample
b	Total chromium used as initial screen for chromium(VI).
c	Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)
d	Criteria for scheduled chemicals used as an initial screen
e	Criteria for Chlorpyrifos used as initial screen
f	All criteria are in the same units as the reported results
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

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Table E2: Summary of Waste Classification A

				PAH																	
				Benzo(a)pyrene (BaP)	Benzo(a)pyrene (BaP) TCLP	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(k)fluoranthene	Benzo(b+k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs
Sample ID	Depth	Sample Date	PQL	0.05	0.001	0.1	0.1	0.1	0.1	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.05
			Material Type	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Waste Classification Criteria [f]																					
CT1				0.8		NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	200
SCC1				10		NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	200
TCLP1				0.04		NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	N/A
CT2				3.2		NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	800
SCC2				23		NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	800
TCLP2				0.16		NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	N/A
Published Background Levels																					
ANZECC (1992)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.95-5
ANZECC (2000)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Previous Investigation (DP 2009)																					
2	0-0.1 m	7/03/2009	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	0-0.1 m	7/03/2009	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Current Investigation																					
BH1	0.4 - 0.5 m	21/01/2021	Fill	0.4	-	<0.1	<0.1	<0.1	0.4	-	0.7	0.3	0.4	<0.1	0.6	<0.1	0.2	<1	0.2	0.7	4
BH1	1 - 1.1 m	21/01/2021	Natural	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05
BH2	0.4 - 0.5 m	21/01/2021	Natural	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05
BH3	1 - 1.1 m	21/01/2021	Fill	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05
BD5/20200121	1 - 1.1 m	21/01/2021	Fill	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
BH3	2 - 2.1 m	21/01/2021	Natural	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05
BH4	0.1 - 0.2 m	20/01/2021	Fill	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05
BH5	0.4 - 0.5 m	20/01/2021	Fill	0.08	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<1	<0.1	0.1	0.3
BH5	1.4 - 1.5 m	20/01/2021	Natural	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05
BH6	0.4 - 0.5 m	21/01/2021	Natural	**0.05**	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	**0.1**	<0.1	<0.1	<1	<0.1	**0.1**	0.3
BD3/20210121	0.4 - 0.5 m	21/01/2021	Natural	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
BH6	1 - 1.1 m	21/01/2021	Natural	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05
BH7	0.1 - 0.2 m	21/01/2021	Fill	5.1	<0.001	<0.1	0.4	0.7	4.5	-	7.8	3.5	4	0.8	9.4	<0.1	2.8	<1	2.8	8.8	51
BH7	1 - 1.1 m	21/01/2021	Natural	**0.1**	-	<0.1	<0.1	<0.1	**0.1**	-	<0.2	<0.1	**0.1**	<0.1	**0.2**	<0.1	<0.1	<1	<0.1	**0.2**	0.69
BH8	0 - 0.1 m	20/01/2021	Fill	0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<1	<0.1	0.2	0.52
BH9	0.4 - 0.5 m	21/01/2021	Fill	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05
BH9	1.4 - 1.5 m	21/01/2021	Natural	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05
BH10	0.1 - 0.2 m	21/01/2021	Natural	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	**0.1**	<0.1	<0.1	<1	<0.1	**0.1**	0.3
BH11	0 - 0.1 m	20/01/2021	Fill	0.4	-	<0.1	<0.1	0.1	0.4	-	0.6	0.2	0.4	<0.1	0.7	<0.1	0.2	<1	0.4	0.6	3.9
BH11	0.9 - 1 m	20/01/2021	Fill	1.3	<0.001	<0.1	<0.1	0.1	0.5	-	2	1.2	0.6	0.2	0.4	<0.1	0.8	<1	0.2	0.5	7.4
BH11	1.9 - 2 m	20/01/2021	Natural	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05
BH12	0 - 0.1 m	20/01/2021	Fill	0.2	-	<0.1	<0.1	<0.1	0.1	-	0.2	0.1	0.2	<0.1	0.2	<0.1	<0.1	<1	<0.1	0.2	1.2
BH12 - [TRIPLICATE]	0 - 0.1 m	20/01/2021	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12	0.4 - 0.5 m	20/01/2021	Fill	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05
BH12	1.4 - 1.5 m	20/01/2021	Fill	<0.05	-	<0.1	<0.1	<0.1	<0.1	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05

Notes:

a	QA/QC replicate of sample listed directly below the prima
b	Total chromium used as initial screen for chromium(VI).
c	Total recoverable hydrocarbons (TRH) used as an initial
d	Criteria for scheduled chemicals used as an initial screer
e	Criteria for Chlorpyrifos used as initial screen
f	All criteria are in the same units as the reported results
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1;
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1;
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1;
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1;
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1;
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1;

Table E2: Summary of Waste Classification A

				Phenol	OCP		OPP	PCB	Asbestos		
				Phenol	Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Total Asbestos
Sample ID	Depth	Sample Date	PQL	5	0.1	0.1	0.1	0.1			
			Material Type	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
Waste Classification Criteria [f]											
CT1				288	60	<50	4	<50	NC	NC	NC
SCC1				518	108	<50	7.5	<50	NC	NC	NC
TCLP1				N/A	N/A	N/A	N/A	N/A	NC	NC	NC
CT2				1152	240	<50	16	<50	NC	NC	NC
SCC2				2073	432	<50	30	<50	NC	NC	NC
TCLP2				N/A	N/A	N/A	N/A	N/A	NC	NC	NC
Published Background Levels											
ANZECC (1992)				0.03 – 0.5	<0.001 - <0.97	<PQL	<PQL	0.02 – 0.1	NIL	NIL	NIL
ANZECC (2000)				-	-	-	-	-	-	-	-
Previous Investigation (DP 2009)											
2	0-0.1 m	7/03/2009	Fill	-	<0.1	<0.1	-	-	NAD	NAD	NAD
3	0-0.1 m	7/03/2009	Fill	-	<0.1	<0.1	-	-	NAD	NAD	NAD
Current Investigation											
BH1	0.4 - 0.5 m	21/01/2021	Fill	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH1	1 - 1.1 m	21/01/2021	Natural	-	-	-	-	-	NAD	NAD	NAD
BH2	0.4 - 0.5 m	21/01/2021	Natural	-	-	-	-	-	NAD	NAD	NAD
BH3	1 - 1.1 m	21/01/2021	Fill	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BD5/20200121	1 - 1.1 m	21/01/2021	Fill	-	-	-	-	-	-	-	-
BH3	2 - 2.1 m	21/01/2021	Natural	-	-	-	-	-	NAD	NAD	NAD
BH4	0.1 - 0.2 m	20/01/2021	Fill	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH5	0.4 - 0.5 m	20/01/2021	Fill	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH5	1.4 - 1.5 m	20/01/2021	Natural	-	-	-	-	-	NAD	NAD	NAD
BH6	0.4 - 0.5 m	21/01/2021	Natural	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BD3/20210121	0.4 - 0.5 m	21/01/2021	Natural	-	-	-	-	-	-	-	-
BH6	1 - 1.1 m	21/01/2021	Natural	-	-	-	-	-	NAD	NAD	NAD
BH7	0.1 - 0.2 m	21/01/2021	Fill	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH7	1 - 1.1 m	21/01/2021	Natural	-	-	-	-	-	NAD	NAD	NAD
BH8	0 - 0.1 m	20/01/2021	Fill	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH9	0.4 - 0.5 m	21/01/2021	Fill	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH9	1.4 - 1.5 m	21/01/2021	Natural	-	-	-	-	-	NAD	NAD	NAD
BH10	0.1 - 0.2 m	21/01/2021	Natural	-	-	-	-	-	NAD	NAD	NAD
BH11	0 - 0.1 m	20/01/2021	Fill	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH11	0.9 - 1 m	20/01/2021	Fill	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH11	1.9 - 2 m	20/01/2021	Natural	-	-	-	-	-	NAD	NAD	NAD
BH12	0 - 0.1 m	20/01/2021	Fill	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH12 - [TRIPLICATE]	0 - 0.1 m	20/01/2021	Fill	-	-	-	-	-	-	-	-
BH12	0.4 - 0.5 m	20/01/2021	Fill	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH12	1.4 - 1.5 m	20/01/2021	Fill	-	-	-	-	-	NAD	NAD	NAD

Notes:

a	QA/QC replicate of sample listed directly below the prima
b	Total chromium used as initial screen for chromium(VI).
c	Total recoverable hydrocarbons (TRH) used as an initial
d	Criteria for scheduled chemicals used as an initial screer
e	Criteria for Chlorpyrifos used as initial screen
f	All criteria are in the same units as the reported results
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1;
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1;
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1;
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1;
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1;
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1;

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Table E3: Summary of Groundwater Analytical Results (All results in **µg/L unless otherwise stated)**

		Heavy Metals (Dissolved)										PAH and Phenols							TRH (TPH)							BTEX					OCP												
Sample ID	Sample Date	As	Cd	Cr [1]	Cu	Pb	Hg	Ni	Zn	Ca	Mg	Naphthalene	Anthracene	Phenanthrene	Fluoranthene	Benzo(a)pyrene	All other PAHs	Total Phenolics (mg/L)	C6-C10	C10-C14	C15-C28	C29-C36	C10-C16	C16-C34	C34-C40	Benzene	Toulene	Ethyl-benzene	m+p xylene	o-xylene	All OCPs	Aldrin	Chlordane (cis)	Chlordane (trans)	DDT	Dieldrin	Endosulfan I	Endosulfan II	Endrin	Heptachlor	Methoxychlor	All PCBs	All OPPs
MW5 (BH5)	2/02/2021	<1	0.2	<1	1	<1	<0.05	3	**80**	49	17	<1	<1	<1	<1	<1	<PQL	<50	<10	<50	<100	<100	<50	<100	<100	<1	<1	<1	<2	<1	<PQL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<PQL	<PQL
Groundwater Investigation Levels (GIL) [3]																																											
NEPC (2013) HSL-A/B (sand, groundwater 2-4m)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,000	NL	NL	NL	1,000	NL	NL	800	NL	NL	NL		-	-	-	-	-	-	-	-	-	-	-	-	-
Marine water [4]		-	5.5	4.4	1.3	4.4	0.40	70	15	-	-	70	0.4*	2.0*	1.4*	0.2*	-	400	-	-	-	-	-	-	-	700	180*	80*	75*		-	0.003	0.001		0.0004	0.01	0.01		0.008	0.0004	0.004	-	-

Notes:

1	Assumed as Cr(VI) oxidation state, default guideline value for 95% species protection used
2	Only those compounds for which GILs have been determined are included in the list
3	ANZG (2019) Australian and New Zealand Guidelines for Fresh & Marine Water Quality
4	Marine water trigger values for slightly to moderately disturbed ecosystems - 95% species protection
*	Insufficient data for reliable trigger value. Interim working value or low reliability value used for screening purposes
-	Not defined/ not analysed/ not applicable
Bold	Exceeds GIL
NL	Not limiting
PQL	Practical Quantification Limit of Laboratory

Appendix F

Borehole Logs

BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 18.5 AHD
EASTING: 323927.2
NORTHING: 6256490.4
DIP/AZIMUTH: 90°/--

BORE No: BH01
PROJECT No: 99856.00
DATE: 21/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
18	0.03	ASPHALTIC CONCRETE		A/E*	0.0				
	0.13	FILL/ROADBASE/Gravelly SAND: fine to medium sand, grey, fine to medium subangular igneous gravel, dry			0.1				
		FILL/Clayey SILT: low plasticity, brown, trace rootlets, w<PL, possibly relic topsoil		A/E	0.4				
	0.6	CLAY CI-CH: medium to high plasticity, red-brown mottled yellow-brown, trace fine to medium ironstone gravel, w<PL, stiff, residual			0.5				
				S			4,5,7 N = 12		
17	1.5	CLAY CI-CH: medium to high plasticity, pale grey with yellow-brown, w<PL, very stiff, grading to extremely weathered shale with relict rock texture below 2.5m depth			0.95				
				A/E	1.0				
					1.1				
					1.5				
				S			6,6,11 N = 17		
					1.95				
16	3.0	SHALE: dark grey, very low strength, Ashfield Shale			3.0				
				S			16,18,25 N = 43		
15	3.45	Bore discontinued at 3.45m Target strata reached			3.45				
14									

RIG: Comacchio 205 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC bit) to 3.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate BD6/20210121 taken from 0-0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 16.3 AHD
EASTING: 323908.9
NORTHING: 6256439.7
DIP/AZIMUTH: 90°/--

BORE No: BH02
PROJECT No: 99856.00
DATE: 21/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
16	0.1	MULCH: wood chips							
	0.2	FILL/ Silty SAND: fine to medium, grey-brown, moist, generally in a loose condition							
		CLAY CI-CH: medium plasticity, with tree roots, w<PL, stiff, residual		A/E	0.4				
		Between 0.5-0.8m: tree root		A/E	0.5				
					0.8				
15	1			S			8,5,6 N = 11		1
	1.3	CLAY CI-CH: medium to high plasticity, red-brown mottled yellow-brown, trace fine to medium ironstone gravel, w<PL, very stiff, residual			1.25				
				A/E	1.4				
				A/E	1.5				
14	2			S			8,8,8 N = 16		2
					1.95				
13	3				3.0				3
				S			8,12,11 N = 23		
					3.45				
	3.7	Sandy CLAY CL: low plasticity, pale grey, fine to medium, w<PL, very stiff, residual							
12	4								4
		Below 4.5m: with relict rock texture, grading to extremely weathered sandstone			4.5				
				S			8,11,14/130 refusal		
	4.9								
11	5 4.93	SANDSTONE: yellow-brown, low strength, possibly Mittagong Formation or Hawkesbury Sandstone			4.93				5
		Bore discontinued at 4.93m SPT refusal on low strength sandstone							

RIG: Comacchio 205 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC bit) to 4.5m

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 18.0 AHD
EASTING: 323955.7
NORTHING: 6256416.2
DIP/AZIMUTH: 90°/--

BORE No: BH03
PROJECT No: 99856.00
DATE: 21/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
18	0.08	ASPHALTIC CONCRETE		A/E	0.0				
	0.11	FILL/ROADBASE/Sandy GRAVEL: fine to medium gravel, dark grey, sub-rounded igneous gravel, fine to medium sand, dry, apparently well compacted			0.1				
		FILL/ CLAY: medium plasticity, brown, trace fine to medium sand, w<PL, generally, in a stiff condition		A/E	0.4				
					0.5				
				S			4,5,7 N = 12		
17	1				0.95				1
				A/E*	1.0				
	1.2				1.1				
		CLAY CI-CH: medium to high plasticity, orange-brown mottled red, w<PL, stiff, residual							
				A/E	1.4				
					1.5				
		Below 1.6m: red-brown mottled pale grey, trace fine to medium ironstone gravel		S			6,6,9 N = 15		
16	2				1.95				2
15	3				3.0				3
		Below 3.0m: pale grey with some yellow-brown		S			3,8,7 N = 15		
					3.45				
14	4								4
	4.5				4.5				
		CLAY CL-CI: low to medium plasticity, pale grey with some yellow-brown, trace fine to medium ironstone gravel, relict rock texture, w<PL, hard, extremely weathered Ashfield Shale		S			10,21,25 N = 46		
	4.85								
	4.95	SHALE: dark grey and yellow-brown, very low strength, Ashfield Shale			4.95				
13	5	Bore discontinued at 4.95m SPT refusal on very low strength shale							5

RIG: Comacchio 205 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC bit) to 4.5m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate BD5/20210121 taken from 1.0-1.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 15.4 AHD
EASTING: 323951.3
NORTHING: 6256465.6
DIP/AZIMUTH: 90°/--

BORE No: BH04
PROJECT No: 99856.00
DATE: 20/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.03	ASPHALTIC CONCRETE		A/E	0.0				
	0.2	FILL/ROADBASE/Sandy GRAVEL: fine to medium dark grey-brown igneous gravel, fine to medium sand, dry			0.1				
15		CLAY CH: medium to high plasticity, yellow-brown mottled red, stiff, residual		A/E*	0.4				
					0.5				
				S			7,7,7 N = 14		
	1				0.95				1
				A/E	1.0				
					1.1				
14		Below 1.5m: pale grey mottled red-brown			1.5				
				S			3,4,5 N = 9		
	2				1.95				2
13									
	3	3.0			3.0				3
		CLAY CI: medium plasticity, pale grey with some orange-brown, trace fine to medium ironstone gravel, with relict rock texture, w<PL, very stiff, residual		S			3,8,12 N = 20		
12					3.45				
	3.9								
	4	SHALE: dark grey, very low strength, Ashfield Shale							4
11									
	4.5				4.5				
		SHALE: dark grey, low strength, Ashfield Shale		S			16/150 B refusal		
	4.65				4.65				
		Bore discontinued at 4.65m SPT refusal on low strength shale							

RIG: Hanjin D&B-8D **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC bit) to 4.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: *Field replicate BD4/20210120 taken from 0.4-0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 16.1 AHD
EASTING: 323885.5
NORTHING: 6256393
DIP/AZIMUTH: 90°/--

BORE No: BH05
PROJECT No: 99856.00
DATE: 20/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
16	0.05	MULCH: wood chips		A/E	0.0				Gatic cover and well plug
		FILL/ Clayey SAND: fine to medium, brown, with silt, dry, generally in a loose condition			0.1				Backfill 0.0-0.5m
				A/E	0.4				
	0.55	FILL/ CLAY: medium plasticity, grey-brown, trace fine to medium sand, w<PL, generally in a stiff condition			0.5				
				S			3,7,10 N = 17		Bentonite 0.5-1.0m
	0.85	CLAY CI-CH: medium to high plasticity, red-brown, w<PL, very stiff, residual			0.95				Blank pipe 0.0-1.5m
15	1			A/E	1.0				
					1.1				
				A/E	1.4				
		Below 1.5m: trace fine to medium ironstone gravel			1.5				
				S			4,9,10 N = 19		Gravel 1.0-3.15m
14	2				1.95				Machine slotted PVC screen 1.5-2.8m
								02-02-21	
	2.9								End cap
13	3	Sandy CLAY CI: medium plasticity, pale grey, w<PL, very stiff, residual			3.0				
	3.0			S			16,5/0 refusal		
	3.15	SANDSTONE: pale grey, low strength, possibly Mittagong Formation or Hawkesbury Sandstone			3.15				
		Bore discontinued at 3.15m							
		SPT refusal on low strength sandstone							
12	4								

RIG: Hanjin D&B-8D **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC bit) to 3.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Groundwater well installed to 2.8m depth

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 16.5 AHD
EASTING: 323922.7
NORTHING: 6256399.3
DIP/AZIMUTH: 90°/--

BORE No: BH06
PROJECT No: 99856.00
DATE: 20/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
16	0.0	FILL/TOPSOIL/CLAY: medium plasticity, brown, with silt, trace rootlets, w<PL generally in a firm condition		A/E	0.0 – 0.1				
	0.2	CLAY CI-CH: medium to high plasticity, red-brown mottled yellow-brown, w<PL, very stiff, residual		A/E*	0.4 – 0.5				
				S	0.5 – 0.95		6,7,9 N = 16		
	1			A/E	0.95 – 1.1				1
15		Below 1.5m: trace fine ironstone gravel		S	1.5 – 1.95		7,7,11 N = 18		
	2								2
14				S	3.0 – 3.45		8,7,13 N = 20		
	3	Below 3.2m: trace fine to coarse ironstone gravel							3
13	3.7	Sandy CLAY CL-CI: low to medium plasticity, pale grey and yellow-brown, fine to medium sand, w<PL, very stiff, residual							
	4	Below 4.2m: with relict rock texture, grading to extremely weathered sandstone							4
12	4.5	SANDSTONE: pale grey, low strength, possibly Mittagong Formation or Hawkesbury Sandstone		S	4.5 – 4.6		8/50 refusal	▽	
	4.6	Bore discontinued at 4.6m SPT refusal on low strength sandstone							

RIG: Hanjin D&B-8D **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC bit) to 4.5m

WATER OBSERVATIONS: Groundwater seepage at 4.5m depth during auger drilling

REMARKS: *Field replicate BD3/20210120 taken from 0.4-0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 17.7 AHD
EASTING: 323945.1
NORTHING: 6256378.6
DIP/AZIMUTH: 90°/--

BORE No: BH07
PROJECT No: 99856.00
DATE: 21/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	MULCH: wood chips							
		FILL/CLAY: medium plasticity, dark brown, trace fine to medium sand, w<PL, generally in a firm condition		A/E*	0.1 0.2				
	0.3	CLAY CH: high plasticity, yellow-brown, w<PL, stiff, residual		A/E	0.4 0.5				
17				S			4,5,6 N = 11		
		Below 0.8m: yellow-brown mottled red			0.95				
	1			A/E	1.0 1.1				1
		Below 1.5m: red-brown mottled grey, very stiff			1.5				
16				S			6,8,9 N = 17		
	2				1.95				2
15									
	3	Below 3.0m: trace fine to medium ironstone gravel			3.0				3
				S			7,10,16 N = 26		
					3.45				
14									
	4								4
	4.5	Sandy CLAY CL-CI: low to medium plasticity, pale grey with some orange-brown, w<PL, very stiff, with relict rock texture, extremely weathered sandstone			4.5				
13				S			19,17,14/100 refusal		
	4.85								
	4.9	SANDSTONE: pale grey, very low to low strength, possibly Mittagong Formation or Hawkesbury Sandstone			4.9				
	5	Bore discontinued at 4.9m SPT refusal on very low to low strength sandstone							5

RIG: Comacchio 205 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC bit) to 4.5m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate BD7/20210121 taken from 0.1-0.2m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 18.6 AHD
EASTING: 323932.8
NORTHING: 6256349.8
DIP/AZIMUTH: 90°/--

BORE No: BH08
PROJECT No: 99856.00
DATE: 20/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
18	0.2	FILL/TOPSOIL/CLAY: medium plasticity, brown, with silt, trace rootlets,w<PL, generally in a firm condition		A/E	0.0 0.1				
		CLAY CI-CH: medium to high plasticity, red-brown, w<PL, very stiff, residual			0.2				
				A/E	0.4 0.5	B	Bulk sample 0.2-1.0m		
		Below 0.7m: pale grey mottled red-brown		S			9,7,13 N = 20		
	1				0.95 1.0				1
				A/E	1.1				
17	1.5	CLAY CL: low plasticity, pale grey and yellow-brown, w<PL, hard, relict rock texture, extremely weathered shale		S	1.5		10,17,22 N = 39		
	2				1.95				2
	2.0	SHALE: dark grey and orange brown, very low strength, Ashfield Shale							
16				A	2.8				
	3								3
	3.0	SHALE: dark grey, low strength, Ashfield Shale		S	3.0		25/100 refusal		
	3.1	Bore discontinued at 3.1m Auger refusal on low strength shale			3.1				
15	4								4
14									

RIG: Hanjin D&B-8D **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC bit) to 3.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 16.5 AHD
EASTING: 323903.3
NORTHING: 6256459.7
DIP/AZIMUTH: 90°/--

BORE No: BH09
PROJECT No: 99856.00
DATE: 21/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
16	0.0	FILL/TOPSOIL/Silty CLAY: medium plasticity, brown, trace rootlets, w<PL, generally in a firm condition		A/E	0.0 - 0.1				
				A/E	0.4 - 0.5				
	0.6	CLAY CI-CH: medium to high plasticity, red-brown, trace fine to medium ironstone gravel, w<PL, apparently stiff, residual		A/E	0.9 - 1.0				
15	1			A/E	1.4 - 1.5				
	1.5	Bore discontinued at 1.5m Target depth reached							
14	2								
13	3								
12	4								

RIG: Comacchio 205 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC bit) to 1.5m

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 18.2 AHD
EASTING: 323956.1
NORTHING: 6256439
DIP/AZIMUTH: 90°/--

BORE No: BH10
PROJECT No: 99856.00
DATE: 20/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
18	0.1	ASPHALTIC CONCRETE			0.1				
		CLAY CH: high plasticity, red-brown, w<PL apparently stiff, residual		A/E	0.2				
				A/E	0.4 0.5				
		Below 0.8m: trace fine to medium ironstone gravel		A/E	0.9				
17	1.0	Bore discontinued at 1.0m Target depth reached			1.0				
16	2								
15	3								
14	4								

RIG: Hanjin D&B-8D **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC bit) to 1.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 16.3 AHD
EASTING: 323902.3
NORTHING: 6256421.6
DIP/AZIMUTH: 90°/--

BORE No: BH11
PROJECT No: 99856.00
DATE: 20/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
16	0.0	FILL/TOPSOIL/Silty CLAY: low to medium plasticity, brown, trace rootlets, w<PL, generally in a firm condition		A/E*	0.0–0.1				
	0.2	FILL/Sandy CLAY: low plasticity, brown, trace fine to medium sandstone gravel and concrete and tile fragments, w<PL, generally in a firm condition		A/E	0.4–0.5				
	1			A/E	0.9–1.0				1
15	1.3	CLAY CI-CH: medium to high plasticity, yellow-brown mottled orange, w<PL, apparently stiff, residual		A/E	1.4–1.5				
	2			A/E	1.9–2.0				2
	2.0	Bore discontinued at 2.0m Target depth reached							
14	3								3
13	4								4
12									

RIG: Hanjin D&B-8D **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC bit) to 2.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: *Field replicate BD1/20210120 taken from 0-0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 16.3 AHD
EASTING: 323902.3
NORTHING: 6256421.6
DIP/AZIMUTH: 90°/--

BORE No: BH11B
PROJECT No: 99856.00
DATE: 21/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
16	0.2	FILL/TOPSOIL/Silty CLAY: low to medium plasticity, brown, trace rootlets, w<PL, generally in a firm condition			0.2				
		FILL/Sandy CLAY: low plasticity, brown, trace fine to medium sandstone gravel and concrete and tile fragments, w<PL, generally in a soft condition		A/E*	0.4 0.5	B	Bulk sample 0.2-1.2m		
	1								1
15	1.2	Bore discontinued at 1.2m Target depth reached			1.2				
	2								2
14									
	3								3
13									
	4								4
12									

RIG: Comacchio 205 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC bit) to 1.2m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate BD8/20210121 taken from 0.4-0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Meadowbank P.S. Repurpose to Open Space
LOCATION: Meadowbank Public School, Ryde

SURFACE LEVEL: 17.3 AHD
EASTING: 323900.6
NORTHING: 6256371.7
DIP/AZIMUTH: 90°/--

BORE No: BH12
PROJECT No: 99856.00
DATE: 20/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
17	0.05	MULCH: wood chips		A/E	0.0 – 0.1				
		FILL/ SILT: low plasticity, dark brown, with clay, trace rootlets, w<PL, generally in a firm condition							
	0.3	CLAY CI: medium plasticity, with tree roots, w<PL, apparently stiff, residual		A/E	0.4 – 0.5				
	0.7	CLAY CI-CH: medium to high plasticity, red-brown, w<PL apparently stiff, residual		A/E	0.9 – 1.0				
16	1			A/E*	1.4 – 1.5				1
	1.5	Bore discontinued at 1.5m Target depth reached							
	2								2
15									
	3								3
14									
	4								4
13									

RIG: Hanjin D&B-8D **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC bit) to 1.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: *Field replicate BD2/20210120 taken from 1.4-1.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Sampling Methods

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Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm 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 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

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

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with ‘Mix of Soil and Cobbles/Boulders’ with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- ‘Moist, dry of plastic limit’ or ‘w <PL’ (i.e. hard and friable or powdery).
- ‘Moist, near plastic limit’ or ‘w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- ‘Moist, wet of plastic limit’ or ‘w >PL’ (i.e. soils usually weakened and free water forms on the hands when handling).
- ‘Wet’ or ‘w ≈LL’ (i.e. near the liquid limit).
- ‘Wet’ or ‘w >LL’ (i.e. wet of the liquid limit).

Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $Is_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $Is_{(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
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	HW	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	No signs of decomposition or staining.
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	DW	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 weathered products in pores.

Rock Descriptions

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

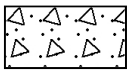
Symbols & Abbreviations

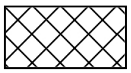
Graphic Symbols for Soil and Rock

General

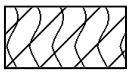

Asphalt

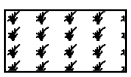

Road base

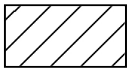

Concrete

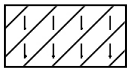

Filling

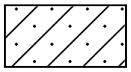
Soils


Topsoil

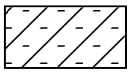

Peat

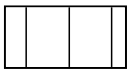

Clay

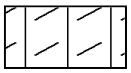

Silty clay

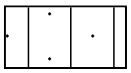

Sandy clay

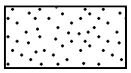

Gravelly clay

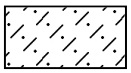

Shaly clay

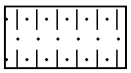

Silt


Clayey silt


Sandy silt

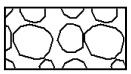

Sand

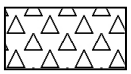

Clayey sand


Silty sand


Gravel

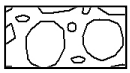

Sandy gravel


Cobbles, boulders

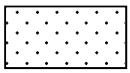

Talus

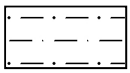
Sedimentary Rocks

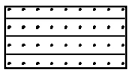

Boulder conglomerate

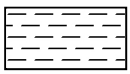

Conglomerate


Conglomeratic sandstone

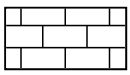

Sandstone


Siltstone

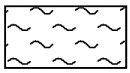

Laminite

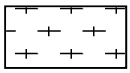

Mudstone, claystone, shale

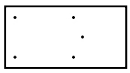

Coal


Limestone

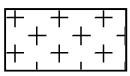
Metamorphic Rocks

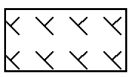

Slate, phyllite, schist

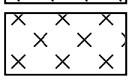

Gneiss

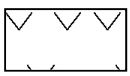

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

Appendix G

Laboratory Certificates of Analysis, Chain of Custodies

and Sample Receipt Advices

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

CERTIFICATE OF ANALYSIS 260797

Client Details

Client	Douglas Partners Pty Ltd
Attention	Lisa Teng
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**99856.01, Meadowbank Public School**
Number of Samples	4 water
Date samples received	02/02/2021
Date completed instructions received	03/02/2021

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	09/02/2021
Date of Issue	09/02/2021

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

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

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Hannah Nguyen, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water		
Our Reference		260797-1
Your Reference	UNITS	MW5
Date Sampled		02/02/2021
Type of sample		water
Date extracted	-	03/02/2021
Date analysed	-	03/02/2021
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
Surrogate Dibromofluoromethane	%	103
Surrogate toluene-d8	%	101
Surrogate 4-BFB	%	100

svTRH (C10-C40) in Water		
Our Reference		260797-1
Your Reference	UNITS	MW5
Date Sampled		02/02/2021
Type of sample		water
Date extracted	-	04/02/2021
Date analysed	-	05/02/2021
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
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
Surrogate o-Terphenyl	%	100

PAHs in Water		
Our Reference	UNITS	260797-1
Your Reference		MW5
Date Sampled		02/02/2021
Type of sample		water
Date extracted	-	04/02/2021
Date analysed	-	05/02/2021
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	%	93

Organochlorine Pesticides in Water		
Our Reference		260797-1
Your Reference	UNITS	MW5
Date Sampled		02/02/2021
Type of sample		water
Date extracted	-	04/02/2021
Date analysed	-	05/02/2021
alpha-BHC	µg/L	<0.2
HCB	µg/L	<0.2
beta-BHC	µg/L	<0.2
gamma-BHC	µg/L	<0.2
Heptachlor	µg/L	<0.2
delta-BHC	µg/L	<0.2
Aldrin	µg/L	<0.2
Heptachlor Epoxide	µg/L	<0.2
gamma-Chlordane	µg/L	<0.2
alpha-Chlordane	µg/L	<0.2
Endosulfan I	µg/L	<0.2
pp-DDE	µg/L	<0.2
Dieldrin	µg/L	<0.2
Endrin	µg/L	<0.2
Endosulfan II	µg/L	<0.2
pp-DDD	µg/L	<0.2
Endrin Aldehyde	µg/L	<0.2
pp-DDT	µg/L	<0.2
Endosulfan Sulphate	µg/L	<0.2
Methoxychlor	µg/L	<0.2
Surrogate TCMX	%	78

OP Pesticides in Water		
Our Reference	UNITS	260797-1
Your Reference		MW5
Date Sampled		02/02/2021
Type of sample		water
Date extracted	-	04/02/2021
Date analysed	-	05/02/2021
Dichlorvos	µg/L	<0.2
Dimethoate	µg/L	<0.2
Diazinon	µg/L	<0.2
Chlorpyriphos-methyl	µg/L	<0.2
Ronnel	µg/L	<0.2
Fenitrothion	µg/L	<0.2
Malathion	µg/L	<0.2
Chlorpyriphos	µg/L	<0.2
Parathion	µg/L	<0.2
Bromophos ethyl	µg/L	<0.2
Ethion	µg/L	<0.2
Azinphos-methyl (Guthion)	µg/L	<0.2
Surrogate TCMX	%	78

PCBs in Water		
Our Reference		260797-1
Your Reference	UNITS	MW5
Date Sampled		02/02/2021
Type of sample		water
Date extracted	-	04/02/2021
Date analysed	-	05/02/2021
Aroclor 1016	µg/L	<2
Aroclor 1221	µg/L	<2
Aroclor 1232	µg/L	<2
Aroclor 1242	µg/L	<2
Aroclor 1248	µg/L	<2
Aroclor 1254	µg/L	<2
Aroclor 1260	µg/L	<2
Surrogate TCMX	%	78

Total Phenolics in Water		
Our Reference		260797-1
Your Reference	UNITS	MW5
Date Sampled		02/02/2021
Type of sample		water
Date extracted	-	04/02/2021
Date analysed	-	04/02/2021
Total Phenolics (as Phenol)	mg/L	<0.05

HM in water - dissolved		
Our Reference		260797-1
Your Reference	UNITS	MW5
Date Sampled		02/02/2021
Type of sample		water
Date prepared	-	04/02/2021
Date analysed	-	04/02/2021
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	0.2
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	1
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	3
Zinc-Dissolved	µg/L	80

Cations in water Dissolved		
Our Reference	UNITS	260797-1
Your Reference		MW5
Date Sampled		02/02/2021
Type of sample		water
Date digested	-	09/02/2021
Date analysed	-	09/02/2021
Calcium - Dissolved	mg/L	49
Magnesium - Dissolved	mg/L	17
Hardness	mgCaCO 3 /L	190

Method ID	Methodology Summary
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
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-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
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. 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: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			03/02/2021	[NT]	[NT]	[NT]	[NT]	03/02/2021	[NT]
Date analysed	-			03/02/2021	[NT]	[NT]	[NT]	[NT]	03/02/2021	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	106	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	102	[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]	101	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	103	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate toluene-d8	%		Org-023	103	[NT]	[NT]	[NT]	[NT]	97	[NT]
Surrogate 4-BFB	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	88	[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	-			04/02/2021	1	04/02/2021	04/02/2021		04/02/2021	[NT]
Date analysed	-			05/02/2021	1	05/02/2021	05/02/2021		05/02/2021	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	<50	<50	0	88	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	<100	<100	0	84	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	<100	<100	0	77	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	<50	<50	0	88	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	<100	<100	0	84	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	77	[NT]
Surrogate o-Terphenyl	%		Org-020	97	1	100	94	6	91	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			04/02/2021	1	04/02/2021	04/02/2021		04/02/2021	[NT]
Date analysed	-			05/02/2021	1	05/02/2021	05/02/2021		05/02/2021	[NT]
Naphthalene	µg/L	1	Org-022/025	<1	1	<1	<1	0	83	[NT]
Acenaphthylene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	1	<1	<1	0	77	[NT]
Fluorene	µg/L	1	Org-022/025	<1	1	<1	<1	0	95	[NT]
Phenanthrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	102	[NT]
Anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	1	<1	<1	0	105	[NT]
Pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	98	[NT]
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	1	<1	<1	0	88	[NT]
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	1	<2	<2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	87	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	93	1	93	136	38	120	[NT]

QUALITY CONTROL: Organochlorine Pesticides in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			04/02/2021	1	04/02/2021	04/02/2021		04/02/2021	[NT]
Date analysed	-			05/02/2021	1	05/02/2021	05/02/2021		05/02/2021	[NT]
alpha-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	86	[NT]
HCB	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
beta-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	87	[NT]
gamma-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Heptachlor	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	102	[NT]
delta-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Aldrin	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	105	[NT]
Heptachlor Epoxide	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	108	[NT]
gamma-Chlordane	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
alpha-Chlordane	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endosulfan I	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDE	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	122	[NT]
Dieldrin	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	124	[NT]
Endrin	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	114	[NT]
Endosulfan II	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDD	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	96	[NT]
Endrin Aldehyde	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDT	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	113	[NT]
Methoxychlor	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	79	1	78	92	16	92	[NT]

QUALITY CONTROL: OP Pesticides in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			04/02/2021	1	04/02/2021	04/02/2021		04/02/2021	[NT]
Date analysed	-			05/02/2021	1	05/02/2021	05/02/2021		05/02/2021	[NT]
Dichlorvos	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	90	[NT]
Dimethoate	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Diazinon	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Chlorpyriphos-methyl	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Ronnel	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	107	[NT]
Fenitrothion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	82	[NT]
Malathion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	73	[NT]
Chlorpyriphos	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	96	[NT]
Parathion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	79	[NT]
Bromophos ethyl	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Ethion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	94	[NT]
Azinphos-methyl (Guthion)	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	79	1	78	92	16	92	[NT]

QUALITY CONTROL: PCBs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			04/02/2021	1	04/02/2021	04/02/2021		04/02/2021	[NT]
Date analysed	-			05/02/2021	1	05/02/2021	05/02/2021		05/02/2021	[NT]
Aroclor 1016	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1221	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1232	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1242	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1248	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1254	µg/L	2	Org-021	<2	1	<2	<2	0	120	[NT]
Aroclor 1260	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	79	1	78	92	16	92	[NT]

QUALITY CONTROL: Total Phenolics in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			04/02/2021	[NT]	[NT]	[NT]	[NT]	04/02/2021	[NT]
Date analysed	-			04/02/2021	[NT]	[NT]	[NT]	[NT]	04/02/2021	[NT]
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date prepared	-			04/02/2021	[NT]	[NT]	[NT]	[NT]	04/02/2021	[NT]
Date analysed	-			04/02/2021	[NT]	[NT]	[NT]	[NT]	04/02/2021	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	114	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	120	[NT]

QUALITY CONTROL: Cations in water Dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			09/02/2021	[NT]	[NT]	[NT]	[NT]	09/02/2021	[NT]
Date analysed	-			09/02/2021	[NT]	[NT]	[NT]	[NT]	09/02/2021	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	98	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	102	[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.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99856.01	**Suburb:**	Meadowbank	**To:**	Envirolab Services
Project Name:	Meadowbank Public School	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	Lisa Teng	**Sampler:**	LT	**Attn:**	Ailen Hie
Emails:	lisa.teng@douglaspartners.com.au			**Phone:**	99106200
Date Required:	Standard ☐			**Email:**	Ahie@envirolab.com.au

Prior Storage: ☐ Esky ☐ Fridge ☐ Shelved Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 8	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml	Hold			Notes/preservation
MW5	1	02/02/21	W	G/P	x									
TS	2	02/02/21	W	G							x			
TB	3	02/02/21	W	G							x			
extra BD1/20210202	4	02/02/21	W	P										
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

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

Job No: 260797 02.02.2021
Date Received:
Time Received: 17:16
Received By: EQ
Temp: Cool/Ambient 11.8°C.
Cooling: Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 260797

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** ELS Syd K. Clark. **Date & Time:** 02.02.2021 1916.

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

CERTIFICATE OF ANALYSIS 260173

Client Details

Client	Douglas Partners Pty Ltd
Attention	Lisa Teng, Nicola Warton
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**99856.00, Meadowbank Public School**
Number of Samples	29 soil
Date samples received	22/01/2021
Date completed instructions received	22/01/2021

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	01/02/2021
Date of Issue	01/02/2021

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Nyovan Moonean
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Ken Nguyen, Reporting Supervisor
Lucy Zhu, Asbestos Supervisor
Priya Samarawickrama, Senior Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260173-1	260173-2	260173-3	260173-4	260173-5
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.4-0.5	1.0-1.1	0.4-0.5	1.0-1.1	2.0-2.1
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
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	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	106	98	104	100	107

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260173-6	260173-7	260173-8	260173-9	260173-10
Your Reference	UNITS	BH4	BH5	BH5	BH6	BH6
Depth		0.1-0.2	0.4-0.5	1.4-1.5	0.4-0.5	1.0-1.1
Date Sampled		20/01/2021	20/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
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	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	100	97	104	97	91

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260173-11	260173-12	260173-13	260173-14	260173-15
Your Reference	UNITS	BH7	BH7	BH8	BH9	BH9
Depth		0.1-0.2	1.0-1.1	0-0.1	0.4-0.5	1.4-1.5
Date Sampled		21/01/2021	21/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
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	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	94	107	107	103	107

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260173-16	260173-17	260173-18	260173-19	260173-20
Your Reference	UNITS	BH10	BH11	BH11	BH11	BH12
Depth		0.1-0.2	0-0.1	0.9-1.0	1.9-2.0	0-0.1
Date Sampled		21/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
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	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	105	107	107	104	103

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		260173-21	260173-22	260173-24	260173-25
Your Reference	UNITS	BH12	BH12	TS1	TB1
Depth		0.4-0.5	1.4-1.5	.	.
Date Sampled		20/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	<25	<25	[NA]	[NA]
TRH C_6 - C_{10}	mg/kg	<25	<25	[NA]	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	[NA]	[NA]
Benzene	mg/kg	<0.2	<0.2	102%	<0.2
Toluene	mg/kg	<0.5	<0.5	103%	<0.5
Ethylbenzene	mg/kg	<1	<1	104%	<1
m+p-xylene	mg/kg	<2	<2	103%	<2
o-Xylene	mg/kg	<1	<1	102%	<1
naphthalene	mg/kg	<1	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<3	<3	[NA]	<3
Surrogate aaa-Trifluorotoluene	%	106	81	104	116

svTRH (C10-C40) in Soil						
Our Reference		260173-1	260173-2	260173-3	260173-4	260173-5
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.4-0.5	1.0-1.1	0.4-0.5	1.0-1.1	2.0-2.1
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	110	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	150	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	150	<50	<50
TRH >C_{16} -C_{34}	mg/kg	100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	100	<50	150	<50	<50
Surrogate o-Terphenyl	%	100	96	95	96	95

svTRH (C10-C40) in Soil						
Our Reference		260173-6	260173-7	260173-8	260173-9	260173-10
Your Reference	UNITS	BH4	BH5	BH5	BH6	BH6
Depth		0.1-0.2	0.4-0.5	1.4-1.5	0.4-0.5	1.0-1.1
Date Sampled		20/01/2021	20/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	<100	<100
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	<100	<100
TRH >C_{34} -C_{40}	mg/kg	100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	100	<50	<50	<50	<50
Surrogate o-Terphenyl	%	99	96	95	95	101

svTRH (C10-C40) in Soil						
Our Reference		260173-11	260173-12	260173-13	260173-14	260173-15
Your Reference	UNITS	BH7	BH7	BH8	BH9	BH9
Depth		0.1-0.2	1.0-1.1	0-0.1	0.4-0.5	1.4-1.5
Date Sampled		21/01/2021	21/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	120	<100	<100	<100	<100
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	160	<100	100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	160	<50	100	<50	<50
Surrogate o-Terphenyl	%	97	95	95	102	101

svTRH (C10-C40) in Soil						
Our Reference		260173-16	260173-17	260173-18	260173-19	260173-20
Your Reference	UNITS	BH10	BH11	BH11	BH11	BH12
Depth		0.1-0.2	0-0.1	0.9-1.0	1.9-2.0	0-0.1
Date Sampled		21/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	290	<100	<100	<100	<100
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	280	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	340	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	620	<50	<50	<50	<50
Surrogate o-Terphenyl	%	96	95	93	95	93

svTRH (C10-C40) in Soil			
Our Reference		260173-21	260173-22
Your Reference	UNITS	BH12	BH12
Depth		0.4-0.5	1.4-1.5
Date Sampled		20/01/2021	20/01/2021
Type of sample		soil	soil
Date extracted	-	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	94	93

PAHs in Soil						
Our Reference		260173-1	260173-2	260173-3	260173-4	260173-5
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.4-0.5	1.0-1.1	0.4-0.5	1.0-1.1	2.0-2.1
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	0.2	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.6	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.7	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.4	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.4	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.7	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.4	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	<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	0.3	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	4.0	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.6	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.6	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.7	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	89	84	85	86	84

PAHs in Soil						
Our Reference		260173-6	260173-7	260173-8	260173-9	260173-10
Your Reference	UNITS	BH4	BH5	BH5	BH6	BH6
Depth		0.1-0.2	0.4-0.5	1.4-1.5	0.4-0.5	1.0-1.1
Date Sampled		20/01/2021	20/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	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	<0.05	0.08	<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	<0.05	0.3	<0.05	0.3	<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	%	78	82	86	93	85

PAHs in Soil						
Our Reference		260173-11	260173-12	260173-13	260173-14	260173-15
Your Reference	UNITS	BH7	BH7	BH8	BH9	BH9
Depth		0.1-0.2	1.0-1.1	0-0.1	0.4-0.5	1.4-1.5
Date Sampled		21/01/2021	21/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.4	<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	2.8	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.7	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	9.4	0.2	0.2	<0.1	<0.1
Pyrene	mg/kg	8.8	0.2	0.2	<0.1	<0.1
Benzo(a)anthracene	mg/kg	4.5	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	4.0	0.1	0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	7.8	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	5.1	0.1	0.1	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	2.8	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.8	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	3.5	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	51	0.69	0.52	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	7.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	7.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	7.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	96	93	87	90	94

PAHs in Soil						
Our Reference		260173-16	260173-17	260173-18	260173-19	260173-20
Your Reference	UNITS	BH10	BH11	BH11	BH11	BH12
Depth		0.1-0.2	0-0.1	0.9-1.0	1.9-2.0	0-0.1
Date Sampled		21/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	0.4	0.2	<0.1	<0.1
Anthracene	mg/kg	<0.1	0.1	0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.7	0.4	<0.1	0.2
Pyrene	mg/kg	0.1	0.6	0.5	<0.1	0.2
Benzo(a)anthracene	mg/kg	<0.1	0.4	0.5	<0.1	0.1
Chrysene	mg/kg	<0.1	0.4	0.6	<0.1	0.2
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.6	2	<0.2	0.2
Benzo(a)pyrene	mg/kg	<0.05	0.4	1.3	<0.05	0.2
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.2	0.8	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	1.2	<0.1	0.1
Total +ve PAH's	mg/kg	0.3	3.9	7.4	<0.05	1.2
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	1.8	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	0.5	1.8	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	0.6	1.8	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	85	99	106	100	106

PAHs in Soil				
Our Reference		260173-21	260173-22	260173-23
Your Reference	UNITS	BH12	BH12	BD5/20200121
Depth		0.4-0.5	1.4-1.5	.
Date Sampled		20/01/2021	20/01/2021	21/01/2021
Type of sample		soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	107	101	99

Organochlorine Pesticides in soil						
Our Reference		260173-1	260173-4	260173-6	260173-7	260173-9
Your Reference	UNITS	BH1	BH3	BH4	BH5	BH6
Depth		0.4-0.5	1.0-1.1	0.1-0.2	0.4-0.5	0.4-0.5
Date Sampled		21/01/2021	21/01/2021	20/01/2021	20/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	%	95	100	97	95	93

Organochlorine Pesticides in soil						
Our Reference		260173-11	260173-13	260173-14	260173-17	260173-18
Your Reference	UNITS	BH7	BH8	BH9	BH11	BH11
Depth		0.1-0.2	0-0.1	0.4-0.5	0-0.1	0.9-1.0
Date Sampled		21/01/2021	20/01/2021	21/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	%	94	96	98	104	110

Organochlorine Pesticides in soil			
Our Reference		260173-20	260173-21
Your Reference	UNITS	BH12	BH12
Depth		0-0.1	0.4-0.5
Date Sampled		20/01/2021	20/01/2021
Type of sample		soil	soil
Date extracted	-	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021
alpha-BHC	mg/kg	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	107	110

Organophosphorus Pesticides in Soil						
Our Reference		260173-1	260173-4	260173-6	260173-7	260173-9
Your Reference	UNITS	BH1	BH3	BH4	BH5	BH6
Depth		0.4-0.5	1.0-1.1	0.1-0.2	0.4-0.5	0.4-0.5
Date Sampled		21/01/2021	21/01/2021	20/01/2021	20/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	%	95	100	97	95	93

Organophosphorus Pesticides in Soil						
Our Reference		260173-11	260173-13	260173-14	260173-17	260173-18
Your Reference	UNITS	BH7	BH8	BH9	BH11	BH11
Depth		0.1-0.2	0-0.1	0.4-0.5	0-0.1	0.9-1.0
Date Sampled		21/01/2021	20/01/2021	21/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	%	94	96	98	104	110

Organophosphorus Pesticides in Soil			
Our Reference		260173-20	260173-21
Your Reference	UNITS	BH12	BH12
Depth		0-0.1	0.4-0.5
Date Sampled		20/01/2021	20/01/2021
Type of sample		soil	soil
Date extracted	-	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021
Dichlorvos	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1
Surrogate TCMX	%	107	110

PCBs in Soil						
Our Reference		260173-1	260173-4	260173-6	260173-7	260173-9
Your Reference	UNITS	BH1	BH3	BH4	BH5	BH6
Depth		0.4-0.5	1.0-1.1	0.1-0.2	0.4-0.5	0.4-0.5
Date Sampled		21/01/2021	21/01/2021	20/01/2021	20/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	%	95	100	97	95	93

PCBs in Soil						
Our Reference		260173-11	260173-13	260173-14	260173-17	260173-18
Your Reference	UNITS	BH7	BH8	BH9	BH11	BH11
Depth		0.1-0.2	0-0.1	0.4-0.5	0-0.1	0.9-1.0
Date Sampled		21/01/2021	20/01/2021	21/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021	30/01/2021	30/01/2021	30/01/2021
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	%	94	96	98	104	110

PCBs in Soil			
Our Reference		260173-20	260173-21
Your Reference	UNITS	BH12	BH12
Depth		0-0.1	0.4-0.5
Date Sampled		20/01/2021	20/01/2021
Type of sample		soil	soil
Date extracted	-	28/01/2021	28/01/2021
Date analysed	-	30/01/2021	30/01/2021
Aroclor 1016	mg/kg	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1
Surrogate TCMX	%	107	110

Acid Extractable metals in soil						
Our Reference		260173-1	260173-2	260173-3	260173-4	260173-5
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.4-0.5	1.0-1.1	0.4-0.5	1.0-1.1	2.0-2.1
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	31/01/2021	31/01/2021	31/01/2021	31/01/2021	31/01/2021
Arsenic	mg/kg	<4	<4	<4	4	4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	5	11	28	9
Copper	mg/kg	8	15	9	16	6
Lead	mg/kg	27	11	10	18	10
Mercury	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Nickel	mg/kg	4	2	3	10	1
Zinc	mg/kg	46	18	8	15	2

Acid Extractable metals in soil						
Our Reference		260173-6	260173-7	260173-8	260173-9	260173-10
Your Reference	UNITS	BH4	BH5	BH5	BH6	BH6
Depth		0.1-0.2	0.4-0.5	1.4-1.5	0.4-0.5	1.0-1.1
Date Sampled		20/01/2021	20/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	31/01/2021	31/01/2021	31/01/2021	31/01/2021	31/01/2021
Arsenic	mg/kg	<4	5	5	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	12	12	9	8
Copper	mg/kg	54	7	4	9	13
Lead	mg/kg	2	27	11	17	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	41	2	1	5	1
Zinc	mg/kg	15	18	5	13	13

Acid Extractable metals in soil						
Our Reference		260173-11	260173-12	260173-13	260173-14	260173-15
Your Reference	UNITS	BH7	BH7	BH8	BH9	BH9
Depth		0.1-0.2	1.0-1.1	0-0.1	0.4-0.5	1.4-1.5
Date Sampled		21/01/2021	21/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	31/01/2021	31/01/2021	31/01/2021	31/01/2021	31/01/2021
Arsenic	mg/kg	<4	<4	5	<4	<4
Cadmium	mg/kg	<0.4	<0.4	0.8	<0.4	<0.4
Chromium	mg/kg	9	9	14	8	8
Copper	mg/kg	35	5	45	6	9
Lead	mg/kg	35	8	90	13	11
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	2	5	4	1
Zinc	mg/kg	83	6	150	10	7

Acid Extractable metals in soil						
Our Reference		260173-16	260173-17	260173-18	260173-19	260173-20
Your Reference	UNITS	BH10	BH11	BH11	BH11	BH12
Depth		0.1-0.2	0-0.1	0.9-1.0	1.9-2.0	0-0.1
Date Sampled		21/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	31/01/2021	31/01/2021	31/01/2021	31/01/2021	31/01/2021
Arsenic	mg/kg	<4	4	<4	6	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	15	10	7	14	11
Copper	mg/kg	9	21	5	9	10
Lead	mg/kg	13	34	61	13	76
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	7	1	2	3
Zinc	mg/kg	12	79	53	9	19

Acid Extractable metals in soil					
Our Reference		260173-21	260173-22	260173-23	260173-30
Your Reference	UNITS	BH12	BH12	BD5/20200121	BH12 - [TRIPLICATE]
Depth		0.4-0.5	1.4-1.5	.	0-0.1
Date Sampled		20/01/2021	20/01/2021	21/01/2021	20/01/2021
Type of sample		soil	soil	soil	soil
Date prepared	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	31/01/2021	31/01/2021	31/01/2021	31/01/2021
Arsenic	mg/kg	7	5	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	20	8	14	10
Copper	mg/kg	8	10	9	6
Lead	mg/kg	17	11	17	24
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	<1	6	3
Zinc	mg/kg	8	5	8	19

Misc Soil - Inorg						
Our Reference		260173-1	260173-4	260173-6	260173-7	260173-9
Your Reference	UNITS	BH1	BH3	BH4	BH5	BH6
Depth		0.4-0.5	1.0-1.1	0.1-0.2	0.4-0.5	0.4-0.5
Date Sampled		21/01/2021	21/01/2021	20/01/2021	20/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		260173-11	260173-13	260173-14	260173-17	260173-18
Your Reference	UNITS	BH7	BH8	BH9	BH11	BH11
Depth		0.1-0.2	0-0.1	0.4-0.5	0-0.1	0.9-1.0
Date Sampled		21/01/2021	20/01/2021	21/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg			
Our Reference		260173-20	260173-21
Your Reference	UNITS	BH12	BH12
Depth		0-0.1	0.4-0.5
Date Sampled		20/01/2021	20/01/2021
Type of sample		soil	soil
Date prepared	-	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5

Moisture						
Our Reference		260173-1	260173-2	260173-3	260173-4	260173-5
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.4-0.5	1.0-1.1	0.4-0.5	1.0-1.1	2.0-2.1
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Moisture	%	10	15	16	21	24

Moisture						
Our Reference		260173-6	260173-7	260173-8	260173-9	260173-10
Your Reference	UNITS	BH4	BH5	BH5	BH6	BH6
Depth		0.1-0.2	0.4-0.5	1.4-1.5	0.4-0.5	1.0-1.1
Date Sampled		20/01/2021	20/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Moisture	%	9.9	12	12	23	18

Moisture						
Our Reference		260173-11	260173-12	260173-13	260173-14	260173-15
Your Reference	UNITS	BH7	BH7	BH8	BH9	BH9
Depth		0.1-0.2	1.0-1.1	0-0.1	0.4-0.5	1.4-1.5
Date Sampled		21/01/2021	21/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Moisture	%	32	18	15	34	14

Moisture						
Our Reference		260173-16	260173-17	260173-18	260173-19	260173-20
Your Reference	UNITS	BH10	BH11	BH11	BH11	BH12
Depth		0.1-0.2	0-0.1	0.9-1.0	1.9-2.0	0-0.1
Date Sampled		21/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Moisture	%	19	15	11	20	15

Moisture				
Our Reference		260173-21	260173-22	260173-23
Your Reference	UNITS	BH12	BH12	BD5/20200121
Depth		0.4-0.5	1.4-1.5	.
Date Sampled		20/01/2021	20/01/2021	21/01/2021
Type of sample		soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021
Moisture	%	13	16	19

Asbestos ID - soils						
Our Reference		260173-1	260173-2	260173-3	260173-4	260173-5
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.4-0.5	1.0-1.1	0.4-0.5	1.0-1.1	2.0-2.1
Date Sampled		21/01/2021	21/01/2021	21/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Sample mass tested	g	Approx. 40g	Approx. 45g	Approx. 15g	Approx. 65g	Approx. 60g
Sample Description	-	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	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	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	No asbestos detected

Asbestos ID - soils						
Our Reference		260173-6	260173-7	260173-8	260173-9	260173-10
Your Reference	UNITS	BH4	BH5	BH5	BH6	BH6
Depth		0.1-0.2	0.4-0.5	1.4-1.5	0.4-0.5	1.0-1.1
Date Sampled		20/01/2021	20/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Sample mass tested	g	Approx. 45g	Approx. 45g	Approx. 45g	Approx. 50g	Approx. 55g
Sample Description	-	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	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	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	No asbestos detected

Asbestos ID - soils						
Our Reference		260173-11	260173-12	260173-13	260173-14	260173-15
Your Reference	UNITS	BH7	BH7	BH8	BH9	BH9
Depth		0.1-0.2	1.0-1.1	0-0.1	0.4-0.5	1.4-1.5
Date Sampled		21/01/2021	21/01/2021	20/01/2021	21/01/2021	21/01/2021
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Sample mass tested	g	Approx. 15g	Approx. 80g	Approx. 30g	Approx. 40g	Approx. 50g
Sample Description	-	Brown fine-grained soil, rocks & debris	Brown clayey soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	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	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	No asbestos detected

Asbestos ID - soils						
Our Reference		260173-16	260173-17	260173-18	260173-19	260173-20
Your Reference	UNITS	BH10	BH11	BH11	BH11	BH12
Depth		0.1-0.2	0-0.1	0.9-1.0	1.9-2.0	0-0.1
Date Sampled		21/01/2021	20/01/2021	20/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Sample mass tested	g	Approx. 50g	Approx. 40g	Approx. 45g	Approx. 85g	Approx. 30g
Sample Description	-	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown fine-grained soil & rocks	Brown clayey soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	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	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	No asbestos detected

Asbestos ID - soils			
Our Reference		260173-21	260173-22
Your Reference	UNITS	BH12	BH12
Depth		0.4-0.5	1.4-1.5
Date Sampled		20/01/2021	20/01/2021
Type of sample		soil	soil
Date analysed	-	29/01/2021	29/01/2021
Sample mass tested	g	Approx. 40g	Approx. 50g
Sample Description	-	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	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

Misc Inorg - Soil				
Our Reference		260173-2	260173-8	260173-22
Your Reference	UNITS	BH1	BH5	BH12
Depth		1.0-1.1	1.4-1.5	1.4-1.5
Date Sampled		21/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021
pH 1:5 soil:water	pH Units	6.5	5.3	4.6

CEC				
Our Reference		260173-2	260173-8	260173-22
Your Reference	UNITS	BH1	BH5	BH12
Depth		1.0-1.1	1.4-1.5	1.4-1.5
Date Sampled		21/01/2021	20/01/2021	20/01/2021
Type of sample		soil	soil	soil
Date prepared	-	01/02/2021	01/02/2021	01/02/2021
Date analysed	-	01/02/2021	01/02/2021	01/02/2021
Exchangeable Ca	meq/100g	6.7	2.0	1.7
Exchangeable K	meq/100g	0.3	0.5	0.4
Exchangeable Mg	meq/100g	4.7	2.1	2.1
Exchangeable Na	meq/100g	0.98	0.19	0.30
Cation Exchange Capacity	meq/100g	13	4.8	4.6

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.
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-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
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.
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.

Method ID	Methodology Summary
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	260173-4
Date extracted	-			29/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			01/02/2021	1	29/01/2021	29/01/2021		29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	121	109
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	121	109
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	115	104
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	118	104
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	134	121
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	120	109
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	124	112
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	114	1	106	99	7	113	101

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	260173-21
Date extracted	-			[NT]	11	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			[NT]	11	29/01/2021	29/01/2021		29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	11	<25	<25	0	102	121
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	11	<25	<25	0	102	121
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	98	115
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	98	118
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	113	133
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	101	119
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	105	124
naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	94	94	0	96	109

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	20	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	20	29/01/2021	29/01/2021		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	20	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	20	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	20	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	20	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	20	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	20	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	20	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	20	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	20	103	107	4	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	260173-4
Date extracted	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			29/01/2021	1	29/01/2021	30/01/2021		29/01/2021	30/01/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	101	95
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	100	96
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	92	84
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	101	95
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	100	<100	0	100	96
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	92	84
Surrogate o-Terphenyl	%		Org-020	91	1	100	94	6	109	96

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	260173-21
Date extracted	-			[NT]	11	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			[NT]	11	30/01/2021	30/01/2021		29/01/2021	30/01/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	101	95
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	11	<100	140	33	99	93
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	11	120	180	40	122	111
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	101	95
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	11	160	270	51	99	93
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	122	111
Surrogate o-Terphenyl	%		Org-020	[NT]	11	97	97	0	119	114

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	20	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	20	30/01/2021	30/01/2021		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	20	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	20	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	20	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	20	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	20	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	20	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	20	93	96	3	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	260173-4
Date extracted	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			30/01/2021	1	30/01/2021	30/01/2021		30/01/2021	30/01/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	101
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	96	103
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	107
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	111	109
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	0.6	0.6	0	104	109
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.7	0.6	15	109	110
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.4	0.4	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	0.4	0.4	0	127	129
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	0.7	0.8	13	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	0.4	0.5	22	103	117
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.3	40	[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	0.3	0.3	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	105	1	89	85	5	85	83

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	260173-21
Date extracted	-			[NT]	11	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			[NT]	11	30/01/2021	30/01/2021		30/01/2021	30/01/2021
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	94	108
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	0.4	0.5	22	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	108	109
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	109	114
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	2.8	2.9	4	113	105
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	0.7	0.5	33	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	9.4	11	16	109	100
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	8.8	9.9	12	105	96
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	4.5	6.1	30	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	4.0	5.8	37	131	133
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	7.8	10	25	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	5.1	6.0	16	125	125
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	2.8	3.3	16	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	0.8	1.1	32	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	3.5	3.8	8	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	96	97	1	87	87

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	20	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	20	30/01/2021	30/01/2021		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	20	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	20	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	20	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	20	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	20	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	20	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	20	0.2	0.2	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	20	0.2	0.2	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	20	0.1	0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	20	0.2	0.1	67	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	20	0.2	0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	20	0.2	0.1	67	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	20	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	20	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	20	0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	20	106	97	9	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	260173-4
Date extracted	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			30/01/2021	1	30/01/2021	30/01/2021		30/01/2021	30/01/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	111	108
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	100	104
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	107	99
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	114	81
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	126	120
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	113	111
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	115	85
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	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	110	110
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	118	105
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	107	1	95	99	4	91	94

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	11	30/01/2021	30/01/2021		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	94	100	6	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	260173-4
Date extracted	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			30/01/2021	1	30/01/2021	30/01/2021		30/01/2021	30/01/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	100
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	114	104
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	101
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	80	72
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	122	101
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	102
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	111	117
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	107	1	95	99	4	91	94

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	11	30/01/2021	30/01/2021		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	94	100	6	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	260173-4
Date extracted	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			30/01/2021	1	30/01/2021	30/01/2021		30/01/2021	30/01/2021
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	120	120
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	107	1	95	99	4	91	94

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	11	30/01/2021	30/01/2021		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	11	94	100	6	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	260173-4
Date prepared	-			29/01/2021	1	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Date analysed	-			31/01/2021	1	31/01/2021	31/01/2021		31/01/2021	31/01/2021
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	99	73
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	94	71
Chromium	mg/kg	1	Metals-020	<1	1	7	9	25	96	86
Copper	mg/kg	1	Metals-020	<1	1	8	9	12	97	106
Lead	mg/kg	1	Metals-020	<1	1	27	31	14	96	78
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	110	126
Nickel	mg/kg	1	Metals-020	<1	1	4	5	22	98	78
Zinc	mg/kg	1	Metals-020	<1	1	46	47	2	100	73

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	260173-21
Date prepared	-			[NT]	11	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Date analysed	-			[NT]	11	31/01/2021	31/01/2021		31/01/2021	31/01/2021
Arsenic	mg/kg	4	Metals-020	[NT]	11	<4	<4	0	97	#
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	92	73
Chromium	mg/kg	1	Metals-020	[NT]	11	9	8	12	95	70
Copper	mg/kg	1	Metals-020	[NT]	11	35	30	15	95	84
Lead	mg/kg	1	Metals-020	[NT]	11	35	28	22	94	#
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	119	79
Nickel	mg/kg	1	Metals-020	[NT]	11	5	4	22	97	#
Zinc	mg/kg	1	Metals-020	[NT]	11	83	69	18	96	#

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	20	29/01/2021	29/01/2021		[NT]	[NT]
Date analysed	-			[NT]	20	31/01/2021	31/01/2021		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	20	5	7	33	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	20	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	20	11	16	37	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	20	10	8	22	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	20	76	31	84	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	20	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	20	3	3	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	20	19	21	10	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	260173-4
Date prepared	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	103	95

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	28/01/2021	28/01/2021		[NT]	[NT]
Date analysed	-			[NT]	11	28/01/2021	28/01/2021		[NT]	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	[NT]	11	<5	<5	0	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			29/01/2021	[NT]	[NT]	[NT]	[NT]	29/01/2021	[NT]
Date analysed	-			29/01/2021	[NT]	[NT]	[NT]	[NT]	29/01/2021	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	260173-8
Date prepared	-			01/02/2021	2	01/02/2021	01/02/2021		01/02/2021	01/02/2021
Date analysed	-			01/02/2021	2	01/02/2021	01/02/2021		01/02/2021	01/02/2021
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	2	6.7	5.8	14	111	96
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	2	0.3	0.3	0	122	97
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	2	4.7	4.6	2	112	98
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	2	0.98	0.98	0	126	105

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: A portion of the supplied sample was sub-sampled for asbestos
analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample.
Envirolab recommends supplying 40-50g of sample in its own container.
Note: Sample 260173-3 was sub-sampled from a jar provided by the client.

Asbestos: Excessive sample volumes were provided for asbestos analysis.
A portion of the supplied samples were sub-sampled according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g (50mL) of sample in its own
container as per AS4964-2004.
Note: Samples 260173-1-2,4-22 were sub-sampled from bags provided by the client.

Acid Extractable Metals in Soil:
- The laboratory RPD acceptance criteria has been exceeded for 260173-20 for Pb. Therefore a triplicate result has been issued as laboratory sample number 260173-30.
- # 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.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99856.00	**Suburb:**	Meadowbank	**To:**	Envirolabs Services Pty Ltd
Project Name:	Meadowbank Public School	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	LT	**Sampler:**	TM	**Attn:**	Aileen Hie
Emails:	lisa.teng; nicola.warton@douglaspartners.com.au			**Phone:**	
Date Required:	24 hours ☐ 72 hours ☐ Standard ✔			**Email:**	Ahie@envirolab.com.au

Prior Storage: Esky ☐ Fridge ✔ Shelved ☐ Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Depth	Lab ID	Date Sampled	Sample Type (S - soil, M - material)	Container Type (G - glass, P - plastic)	Analytes: Combo 8a	Combo 3a	Metls PAHs	pH CEC	BTEX	Forward to ALS	Hold			Notes/preservation
BH1	0.4-0.5	1	21/01/21	Soil	G+P	X									
BH1	1.0-1.1	2	21/01/21	Soil	G+P		X		X						
BH2	0.4-0.5	3	21/01/21	Soil	G+P		X								
BH3	1.0-1.1	4	21/01/21	Soil	G+P	X									
BH3	2.0-2.1	5	21/01/21	Soil	G+P		X								
BH4	0.1-0.2	6	20/01/21	Soil	G+P	X									
BH5	0.4-0.5	7	20/01/21	Soil	G+P	X									
BH5	1.4-1.5	8	20/01/21	Soil	G+P		X		X						
BH6	0.4-0.5	9	21/01/21	Soil	G+P	X									
BH6	1.0-1.1	10	21/01/21	Soil	G+P		X								
BH7	0.1-0.2	11	21/01/21	Soil	G+P	X									
BH7	1.0-1.1	12	21/01/21	Soil	G+P		X								
BH8	0-0.1	13	20/01/21	Soil	G+P	X									
BH9	0.4-0.5	14	21/01/21	Soil	G+P	X									
BH9	1.4-1.5	15	21/01/21	Soil	G+P		X								
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐	

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

Job No: 260173
Date Received: 22/01/21
Time Received: 1617
Received By:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: 30 **Relinquished by:** JH **Transported to laboratory by:** Courier

Send Results to: Douglas Partners Pty Ltd **Address** 96-98 Hermitage Rd, West Ryde **Phone:** 9809 0666 **Fax:**

Signed: JH **Received by:** **Date & Time:** 22/01/21

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99856.00	**Suburb:**	Meadowbank	**To:**	Envirolabs Services Pty Ltd
Project Name:	Meadowbank Public School	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	LT	**Sampler:**	TM	**Attn:**	Aileen Hie
Emails:	lisa.teng; nicola.warton@douglaspartners.com.au			**Phone:**	
Date Required:	24 hours ☐ 72 hours ☐ Standard ✔			**Email:**	Ahie@envirolab.com.au

Prior Storage: Esky ☐ Fridge ✔ Shelved ☐ Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Depth	Lab ID	Date Sampled	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Combo 8a	Combo 3a	Metls PAHs	pH CEC	BTEX	Forward to ALS	On Hold			Notes/preservation
BH10	0.1-0.2	16	21/01/21	Soil	G+P		X								
BH11	0-0.1	17	20/01/21	Soil	G+P	X									
BH11	0.9-1.0	18	20/01/21	Soil	G+P	X									
BH11	1.9-2.0	19	20/01/21	Soil	G+P		X								
BH12	0-0.1	20	20/01/21	Soil	G+P	X									
BH12	0.4-0.5	21	20/01/21	Soil	G+P	X									
BH12	1.4-1.5	22	20/01/21	Soil	G+P		X		X						
BD5/20200121		23	21/01/21	Soil	G			X							
BD3/20200121		ALS	21/01/21	Soil	G						X				please forward to ALS
TS1		24	21/01/21	Soil	G					X					trip spike
TB1		25	21/01/21	Soil	G					X					trip blank
BH3	0.4-0.5	26	21/01/21	Soil	G+P							X			
BH6	0-0.1	27	21/01/21	Soil	G+P							X			
BH9	0-0.1	28	21/01/21	Soil	G+P							X			
BH11	0.4-0.5	29	21/01/21	Soil	G+P							X			
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐		

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: 30 **Relinquished by:** JH **Transported to laboratory by:** Courier

Send Results to: Douglas Partners Pty Ltd **Address** 96-98 Hermitage Rd, West Ryde **Phone:** 9809 0666 **Fax:**

Signed: JH **Received by:** **Date & Time:**

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	Douglas Partners Pty Ltd
Attention	Lisa Teng, Nicola Warton

Sample Login Details

Your reference	99856.00, Meadowbank Public School
Envirolab Reference	260173
Date Sample Received	22/01/2021
Date Instructions Received	22/01/2021
Date Results Expected to be Reported	01/02/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	29 soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	18
Cooling Method	Ice
Sampling Date Provided	YES

Comments

#10 jar labelled as BH8/1.0-1.1.
#23 labelled as BD5/20210120.

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
customerservice@envirolab.com.au
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	PCBsin Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils	Misc Inorg - Soil	CEC	On Hold
BH1-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH1-1.0-1.1	✓	✓	✓				✓		✓	✓	✓	
BH2-0.4-0.5	✓	✓	✓				✓		✓			
BH3-1.0-1.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH3-2.0-2.1	✓	✓	✓				✓		✓			
BH4-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH5-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH5-1.4-1.5	✓	✓	✓				✓		✓	✓	✓	
BH6-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH6-1.0-1.1	✓	✓	✓				✓		✓			
BH7-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH7-1.0-1.1	✓	✓	✓				✓		✓			
BH8-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH9-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH9-1.4-1.5	✓	✓	✓				✓		✓			
BH10-0.1-0.2	✓	✓	✓				✓		✓			
BH11-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH11-0.9-1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH11-1.9-2.0	✓	✓	✓				✓		✓			
BH12-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH12-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH12-1.4-1.5	✓	✓	✓				✓		✓	✓	✓	
BD5/20200121-.			✓				✓					
TS1-.	✓											
TB1-.	✓											
BH3-0.4-0.5												✓
BH6-0-0.1												✓
BH9-0-0.1												✓
BH11-0.4-0.5												✓

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

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

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.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2102474**	Page	: 1 of 6
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: LISA TENG	Contact	: Sepan Mahamad
Address	: 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 2114	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: 9856.00 Meadowbank Public School	Date Samples Received	: 25-Jan-2021 15:30
Order number	: ----	Date Analysis Commenced	: 27-Jan-2021
C-O-C number	: ----	Issue Date	: 01-Feb-2021 10:27
Sampler	: TM		
Site	: Meadowbank		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BD3/20210121	----	----	----	----
			Sampling date / time	21-Jan-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2102474-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**19.9**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**9**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**16**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**15**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**27**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**8**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**22**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD3/20210121	----	----	----	----
				Sampling date / time	21-Jan-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2102474-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**92.1**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**97.6**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**68.8**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**104**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**107**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**103**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**90.2**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**102**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD3/20210121	----	----	----	----
				Sampling date / time	21-Jan-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2102474-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**96.2**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2102474**	Page	: 1 of 7
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: LISA TENG	Contact	: Sepan Mahamad
Address	: 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 2114	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: 9856.00 Meadowbank Public School	Date Samples Received	: 25-Jan-2021
Order number	: ----	Date Analysis Commenced	: 27-Jan-2021
C-O-C number	: ----	Issue Date	: 01-Feb-2021
Sampler	: TM		
Site	: Meadowbank		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3483018)									
ES2102474-001	BD3/20210121	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	16	14	8.43	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	8	8	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	9	8	16.3	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	15	14	8.35	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	27	25	8.56	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	22	21	7.52	No Limit
ES2102553-002	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	12	12	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	5	5	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	10	11	13.5	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	24	22	7.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	38	34	12.8	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	74	70	5.44	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3483023)									
ES2102510-004	Anonymous	EA055: Moisture Content	----	0.1	%	28.9	28.7	0.550	0% - 20%
ES2102616-002	Anonymous	EA055: Moisture Content	----	0.1	%	3.2	3.4	6.46	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3483019)									
ES2102474-001	BD3/20210121	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES2102553-002	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.2	0.2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3479131)									
ES2102414-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3479131) - continued									
ES2102414-001	Anonymous	EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3479130)									
ES2102414-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3480479)									
ES2102414-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES2102499-004	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3479130)									
ES2102414-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3480479)									
ES2102414-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES2102499-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 3480479)									
ES2102414-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 3480479) - continued									
ES2102499-004	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3483018)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	108	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	105	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	112	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	109	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.1 mg/kg	105	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	102	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	85.4	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3483019)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.073 mg/kg	103	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3479131)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	115	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	111	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	112	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	112	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	116	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	115	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	122	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	119	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	113	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	117	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	107	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	120	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	123	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	106	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	106	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	101	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3479130)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	86.7	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	88.1	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	89.0	71.0	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3480479)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	105	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3479130)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3479130) - continued								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	90.7	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	90.1	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	91.0	63.0	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3480479)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	106	68.4	128
EP080: BTEXN (QCLot: 3480479)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	101	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	100	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	100	65.0	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	101	66.0	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	102	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	94.9	63.0	119

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3483018)							
ES2102474-001	BD3/20210121	EG005T: Arsenic	7440-38-2	50 mg/kg	96.2	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	93.6	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	95.8	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	96.7	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	98.8	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	93.6	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	100	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3483019)							
ES2102474-001	BD3/20210121	EG035T: Mercury	7439-97-6	5 mg/kg	75.8	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3479131)							
ES2102414-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	98.0	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	97.1	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3479130)							
ES2102414-001	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	79.4	73.0	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	71.7	53.0	131

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3479130) - continued							
ES2102414-001	Anonymous	EP071: C29 - C36 Fraction	----	1714 mg/kg	79.0	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3480479)							
ES2102414-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	110	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3479130)							
ES2102414-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	75.4	73.0	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	80.1	53.0	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	84.3	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3480479)							
ES2102414-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	107	70.0	130
EP080: BTEXN (QCLot: 3480479)							
ES2102414-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	102	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	100	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	104	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	102	70.0	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	103	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	89.4	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2102474**	Page	: 1 of 4
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: LISA TENG	Telephone	: +61 2 8784 8555
Project	: 9856.00 Meadowbank Public School	Date Samples Received	: 25-Jan-2021
Site	: Meadowbank	Issue Date	: 01-Feb-2021
Sampler	: TM	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
BD3/20210121	**21-Jan-2021**	**----**	----	----	**28-Jan-2021**	04-Feb-2021	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
BD3/20210121	**21-Jan-2021**	**28-Jan-2021**	20-Jul-2021	✓	**29-Jan-2021**	20-Jul-2021	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
BD3/20210121	**21-Jan-2021**	**28-Jan-2021**	18-Feb-2021	✓	**29-Jan-2021**	18-Feb-2021	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BD3/20210121	**21-Jan-2021**	**28-Jan-2021**	04-Feb-2021	✓	**29-Jan-2021**	09-Mar-2021	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
BD3/20210121	**21-Jan-2021**	**27-Jan-2021**	04-Feb-2021	✓	**28-Jan-2021**	04-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP071)							
BD3/20210121	**21-Jan-2021**	**28-Jan-2021**	04-Feb-2021	✓	**29-Jan-2021**	09-Mar-2021	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
BD3/20210121	**21-Jan-2021**	**27-Jan-2021**	04-Feb-2021	✓	**28-Jan-2021**	04-Feb-2021	✓
Soil Glass Jar - Unpreserved (EP071)							
BD3/20210121	**21-Jan-2021**	**28-Jan-2021**	04-Feb-2021	✓	**29-Jan-2021**	09-Mar-2021	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
BD3/20210121	**21-Jan-2021**	**27-Jan-2021**	04-Feb-2021	✓	**28-Jan-2021**	04-Feb-2021	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99856.00	**Suburb:** Meadowbank	**To:** Envirolabs Services Pty Ltd
Project Name:	Meadowbank Public School	**Order Number**	12 Ashley Street, Chatswood
Project Manager:	LT	**Sampler:** TM	**Attn:** Aileen Hie
Emails:	lisa.teng; nicola.warton@douglaspartners.com.au		**Phone:**
Date Required:	24 hours ☐ 72 hours ☐ Standard ✔		**Email:** Ahie@envirolab.com.au
Prior Storage:	Esky ☐ Fridge ✔ Shelved ☐	Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Depth	Lab ID	Date Sampled	Sample Type (S - soil, M - material)	Container Type (G - glass, P - plastic)	Analytes: Metals	TRH	BTEX	PAH						Notes/preservation
(1) BD3/20210121			21/01/21	S	P	X	X	X	X						
Relinquished by ES Sydney C Mulenga 25/1/21 830 CM															
PQL (S) mg/kg															**ANZECC PQLs req'd for all water analytes** ☐

Environmental Division Sydney
Work Order Reference
ES2102474

Telephone : + 61-2-8784 8555

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	1	**Relinquished by:** JH	**Transported to laboratory by:**	Courier	
Send Results to:	Douglas Partners Pty Ltd	**Address** 96-98 Hermitage Rd, West Ryde		**Phone:** 9809 0666	**Fax:**
Signed: JH		**Received by:**		**Date & Time:**	

Rec: Soffian 25/1/21 1530 14B
260173

Appendix H

Results of Statistical Analysis

and Chromatograms

Lisa Teng

From: Joshua Williams <JWilliams@envirolab.com.au>
Sent: Monday, 8 February 2021 3:14 PM
To: Lisa Teng
Cc: Kyle Gavrily; Nick Sarlamis; Nicola Warton
Subject: RE: Results for Registration 260173 99856.00, Meadowbank Public School

In sample 16 the positive profile at the back end of the chromatogram is due to asphalt
Sample 3 is a bit harder to discern and it isn't a great match for anything within our reference library,
the sample doesn't look like a light petroleum fuel more like an oil but that's about as specific as I can get.

Hope this was of some help,

Kind Regards,

Joshua Williams | Senior Chemist | Envirolab Services

Great Science. Great Service.

E JWilliams@envirolab.com.au | **W** www.envirolab.com.au

Follow us on: LinkedIn | Facebook | Twitter

From: Lisa Teng <Lisa.Teng@douglaspartners.com.au>
Sent: Monday, 8 February 2021 2:38 PM
To: Joshua Williams <JWilliams@envirolab.com.au>
Cc: Kyle Gavrily <KGavrily@envirolab.com.au>; Nick Sarlamis <NSarlamis@envirolab.com.au>; Nicola Warton <Nicola.Warton@douglaspartners.com.au>
Subject: RE: Results for Registration 260173 99856.00, Meadowbank Public School

Thanks Josh,

Do you guys have any ideas what it might be?

Lisa Teng | Environmental Engineer
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | M: 0437 976 196 | E: Lisa.Teng@douglaspartners.com.au

From: Joshua Williams <JWilliams@envirolab.com.au>
Sent: Monday, 8 February 2021 1:50 PM
To: Lisa Teng <Lisa.Teng@douglaspartners.com.au>
Cc: Kyle Gavrily <KGavrily@envirolab.com.au>; Nick Sarlamis <NSarlamis@envirolab.com.au>; Nicola Warton <Nicola.Warton@douglaspartners.com.au>
Subject: RE: Results for Registration 260173 99856.00, Meadowbank Public School

No problem,

Please find both the PDF's attached,
If there's any other way I can be of assistance don't hesitate to let me know.

Kind Regards,

Joshua Williams | Senior Chemist | Envirolab Services

Great Science. Great Service.

E JWilliams@envirolab.com.au | **W** www.envirolab.com.au

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Samples will be analysed per our T&C's.

From: Lisa Teng <Lisa.Teng@douglaspartners.com.au>
Sent: Monday, 8 February 2021 1:45 PM
To: Joshua Williams <JWilliams@envirolab.com.au>
Cc: Kyle Gavrily <KGavrily@envirolab.com.au>; Nick Sarlamis <NSarlamis@envirolab.com.au>; Nicola Warton <Nicola.Warton@douglaspartners.com.au>
Subject: RE: Results for Registration 260173 99856.00, Meadowbank Public School

Apologies BH10/0.1-0.2

Lisa Teng | Environmental Engineer
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | M: 0437 976 196 | E: Lisa.Teng@douglaspartners.com.au

To find information on our COVID-19 measures, please visit douglaspartners.com.au/news/covid-19

From: Joshua Williams <JWilliams@envirolab.com.au>
Sent: Monday, 8 February 2021 1:44 PM

To: Lisa Teng <Lisa.Teng@douglaspartners.com.au>
Cc: Kyle Gavrily <KGavrily@envirolab.com.au>; Nick Sarlamis <NSarlamis@envirolab.com.au>; Nicola Warton <Nicola.Warton@douglaspartners.com.au>
Subject: RE: Results for Registration 260173 99856.00, Meadowbank Public School

Hi Lisa,

Just about to send through those chromatograms can't seem to find sample BH10 / 0.4-0.5,
could you please clarify which sample this corresponds to?
Thanks.

Kind Regards,

Joshua Williams | Senior Chemist | Envirolab Services

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E JWilliams@envirolab.com.au | **W** www.envirolab.com.au

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From: Nick Sarlamis <NSarlamis@envirolab.com.au>
Sent: Monday, 8 February 2021 1:22 PM
To: Lisa Teng <Lisa.Teng@douglaspartners.com.au>; Nicola Warton <Nicola.Warton@douglaspartners.com.au>
Cc: Joshua Williams <JWilliams@envirolab.com.au>; Kyle Gavrily <KGavrily@envirolab.com.au>
Subject: RE: Results for Registration 260173 99856.00, Meadowbank Public School

That should not be a problem

Kind Regards,

Nick Sarlamis | Inorganics Supervisor | Envirolab Services

Great Science. Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200
E NSarlamis@envirolab.com.au | **W** www.envirolab.com.au

Follow us on: LinkedIn | Facebook | Twitter

From: Lisa Teng <Lisa.Teng@douglaspartners.com.au>
Sent: Monday, 8 February 2021 12:23 PM
To: Nick Sarlamis <NSarlamis@envirolab.com.au>; Nicola Warton <Nicola.Warton@douglaspartners.com.au>
Subject: RE: Results for Registration 260173 99856.00, Meadowbank Public School

Hi Nick,

Are we able to get the chromatographs

- BH10 / 0.4-0.5

- BH2/0.4-0.5

Thank you,

Lisa Teng | Environmental Engineer
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | M: 0437 976 196 | E: Lisa.Teng@douglaspartners.com.au

To find information on our COVID-19 measures, please visit douglaspartners.com.au/news/covid-19

From: Nick Sarlamis <NSarlamis@envirolab.com.au>
Sent: Monday, 1 February 2021 6:13 PM
To: Lisa Teng <Lisa.Teng@douglaspartners.com.au>; Nicola Warton <Nicola.Warton@douglaspartners.com.au>
Subject: Results for Registration 260173 99856.00, Meadowbank Public School

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC/paperwork received from you
ESDAT Extracts
an Excel or .csv file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
customerservice@envirolab.com.au

How did we do? Send Feedback

Kind Regards,

Nick Sarlamis | Inorganics Supervisor | Envirolab Services

Great Science. Great Service.

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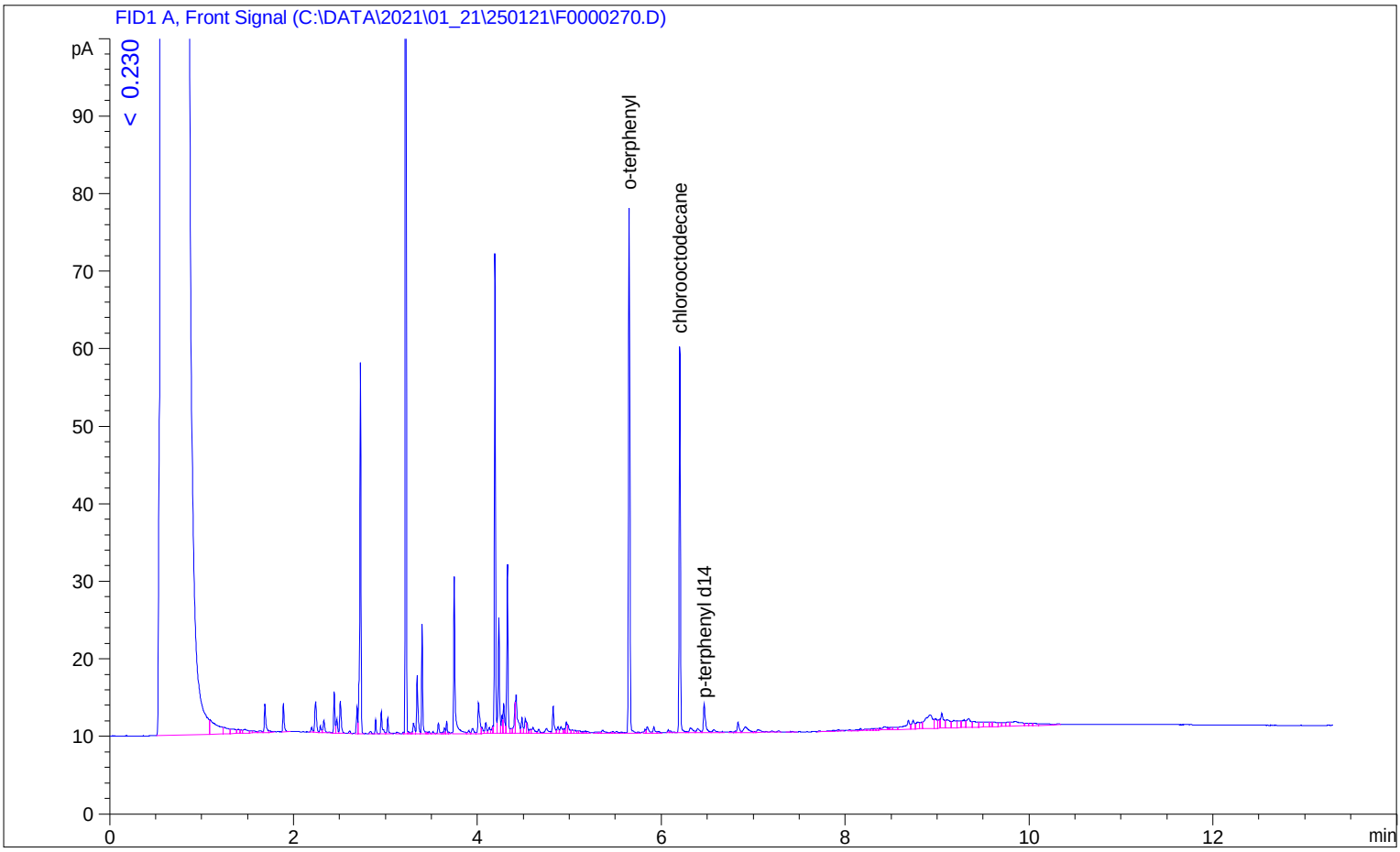
Please consider the environment before printing this email.

Samples will be analysed per our T&C's.

Data File C:\DATA\2021\01_21\250121\F0000270.D
Sample Name: s260173-3

```
==========================================================================
Acq. Operator   :                                  Seq. Line : 270
Acq. Instrument : GC#4                              Location : Vial 45
Injection Date  : 30/01/2021 12:57:11 AM                 Inj :   1
                                                  Inj Volume : 1 µl
Acq. Method     : C:\CHEM32\1\METHODS\NEPM JF.M
Last changed    : 16/01/2020 11:55:46 AM
Analysis Method : C:\METHODS\2021\01_21\250121-F-PROCESSING TAB.M
Last changed    : 01/02/2021 11:31:25 AM
                  (modified after loading)
Method Info     : FAST TPH WITH 15M HP5 COLUMNS
```




```
==========================================================================
                    External Standard Report
==========================================================================

Sorted By             :      Signal
Calib. Data Modified  :      27/01/2021 9:51:18 AM
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A, Front Signal

RetTime  Type     Area     Amt/Area    Amount   Grp   Name
 [min]          [pA*s]                 [mg/L]
-------|------|----------|----------|----------|--|------------------
  5.651 VV    I   65.71650 1.44948e-1    9.52544    o-terphenyl
  6.201 VV        50.29771 1.82903e-1    9.19962    chlorooctodecane
  6.468 VV    I    5.71911 1.58301e-1 9.05343e-1    p-terphenyl d14
```

Data File C:\DATA\2021\01_21\250121\F0000270.D
Sample Name: s260173-3

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [mg/L]	Grp	Name
Totals :				19.63041		

Summed Peaks Report

Signal 1: FID1 A, Front Signal

Name	Start Time [min]	End Time [min]	Total Area [pA*s]	Amount [mg/L]
TRH C10-C14	2.080	4.150	285.28138	46.3565
NEPM >C10-C16	2.600	4.810	384.47554	62.4750
TRH C15-C28	4.150	7.890	153.10936	24.3643
NEPM >C16-C34	4.810	9.020	63.75192	10.1448
TRH C29-C36	7.890	9.380	51.79745	8.2628
NEPM >C34-C40	9.020	10.510	45.42393	7.2461
Totals :				158.8496

Final Summed Peaks Report

Signal 1: FID1 A, Front Signal

Name	Total Area [pA*s]	Amount [mg/L]
TRH C10-C14	285.28138	46.3565
NEPM >C10-C16	384.47554	62.4750
TRH C15-C28	153.10936	24.3643
NEPM >C16-C34	63.75192	10.1448
TRH C29-C36	51.79745	8.2628
NEPM >C34-C40	45.42393	7.2461
o-terphenyl	65.71650	9.5254
chlorooctodecan	50.29771	9.1996
p-terphenyl d14	5.71911	0.9053
Totals :		178.4800

*** End of Report ***

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.124/02/2021 3:14:23 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

B(a)P TEQ

General Statistics

Total Number of Observations	26	Number of Distinct Observations	6
Number of Detects	6	Number of Non-Detects	20
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.6	Minimum Non-Detect	0.5
Maximum Detect	9.1	Maximum Non-Detect	0.5
Variance Detects	14.86	Percent Non-Detects	76.92%
Mean Detects	3.4	SD Detects	3.854
Median Detects	1.25	CV Detects	1.134
Skewness Detects	0.989	Kurtosis Detects	-1.453
Mean of Logged Detects	0.598	SD of Logged Detects	1.237

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.751	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.328	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.169	KM Standard Error of Mean	0.448
KM SD	2.086	95% KM (BCA) UCL	1.831
95% KM (t) UCL	1.935	95% KM (Percentile Bootstrap) UCL	1.877
95% KM (z) UCL	1.906	95% KM Bootstrap t UCL	5.874
90% KM Chebyshev UCL	2.513	95% KM Chebyshev UCL	3.122
97.5% KM Chebyshev UCL	3.967	99% KM Chebyshev UCL	5.627

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.684	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.717	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.298	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.342	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.93	k star (bias corrected MLE)	0.576
Theta hat (MLE)	3.655	Theta star (bias corrected MLE)	5.901
nu hat (MLE)	11.16	nu star (bias corrected)	6.914
Mean (detects)	3.4		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	0.01				Mean	0.792	
59					Maximum	9.1				Median	0.01	
60					SD	2.257				CV	2.848	
61					k hat (MLE)	0.227				k star (bias corrected MLE)	0.227	
62					Theta hat (MLE)	3.485				Theta star (bias corrected MLE)	3.494	
63					nu hat (MLE)	11.82				nu star (bias corrected)	11.79	
64					Adjusted Level of Significance (β)	0.0398						
65					Approximate Chi Square Value (11.79, α)	5.091				Adjusted Chi Square Value (11.79, β)	4.802	
66					95% Gamma Approximate UCL (use when n>=50)	1.835				95% Gamma Adjusted UCL (use when n<50)	1.946	
67												
68	**Estimates of Gamma Parameters using KM Estimates**											
69					Mean (KM)	1.169				SD (KM)	2.086	
70					Variance (KM)	4.35				SE of Mean (KM)	0.448	
71					k hat (KM)	0.314				k star (KM)	0.304	
72					nu hat (KM)	16.34				nu star (KM)	15.79	
73					theta hat (KM)	3.72				theta star (KM)	3.85	
74					80% gamma percentile (KM)	1.798				90% gamma percentile (KM)	3.443	
75					95% gamma percentile (KM)	5.328				99% gamma percentile (KM)	10.22	
76												
77	**Gamma Kaplan-Meier (KM) Statistics**											
78					Approximate Chi Square Value (15.79, α)	7.815				Adjusted Chi Square Value (15.79, β)	7.445	
79					95% Gamma Approximate KM-UCL (use when n>=50)	2.363				95% Gamma Adjusted KM-UCL (use when n<50)	2.48	
80												
81	**Lognormal GOF Test on Detected Observations Only**											
82					Shapiro Wilk Test Statistic	0.815				**Shapiro Wilk GOF Test**		
83					5% Shapiro Wilk Critical Value	0.788				Detected Data appear Lognormal at 5% Significance Level		
84					Lilliefors Test Statistic	0.28				**Lilliefors GOF Test**		
85					5% Lilliefors Critical Value	0.325				Detected Data appear Lognormal at 5% Significance Level		
86	**Detected Data appear Lognormal at 5% Significance Level**											
87												
88	**Lognormal ROS Statistics Using Imputed Non-Detects**											
89					Mean in Original Scale	0.817				Mean in Log Scale	-3.442	
90					SD in Original Scale	2.249				SD in Log Scale	3	
91					95% t UCL (assumes normality of ROS data)	1.57				95% Percentile Bootstrap UCL	1.544	
92					95% BCA Bootstrap UCL	1.843				95% Bootstrap t UCL	4.981	
93					95% H-UCL (Log ROS)	87.81						
94												
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
96					KM Mean (logged)	-0.395				KM Geo Mean	0.674	
97					KM SD (logged)	0.768				95% Critical H Value (KM-Log)	2.228	
98					KM Standard Error of Mean (logged)	0.165				95% H-UCL (KM -Log)	1.274	
99					KM SD (logged)	0.768				95% Critical H Value (KM-Log)	2.228	
100					KM Standard Error of Mean (logged)	0.165						
101												
102	**DL/2 Statistics**											
103	**DL/2 Normal**									**DL/2 Log-Transformed**		
104					Mean in Original Scale	0.977				Mean in Log Scale	-0.928	
105					SD in Original Scale	2.192				SD in Log Scale	1.016	
106					95% t UCL (Assumes normality)	1.711				95% H-Stat UCL	1.107	
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												

	A	B	C	D	E	F	G	H	I	J	K	L
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Detected Data appear Gamma Distributed at 5% Significance Level**											
111												
112	**Suggested UCL to Use**											
113	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)					2.48						
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness.											
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
119												

Appendix I

Data Quality Assessment

Appendix I
Data Quality Assessment
Meadowbank Public School, Ryde

I1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA/QC) procedures and results are summarised in the following Table I1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other filed QC samples are included at the end of this appendix.

Table I1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis	C
Intra-laboratory replicates	5% of primary samples; <30% RPD *Refer to Table I1.1.*	PC
Inter-laboratory replicates	5% of primary samples; <30% RPD *Refer to Table I1.1.*	PC
Trip Spikes	1 per sampling event; 60-140% recovery *Refer to Table I1.2.*	C
Trip Blanks	1 per sampling event; <PQL *Refer to Table I1.2.*	C
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes:
C = compliance; PC = partial compliance; NC = non-compliance

The RPD results were all within the acceptable range, with the exception of those indicated in the summary results tables. The exceedances are not, however, considered to be of concern given that:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred;
- One of the replicate pairs (BH3/BD5) was collected from fill soils which by its nature is heterogeneous;
- Replicates, rather than homogenised duplicates, were used to minimise risk of volatile loss, hence greater variability can be expected;
- The majority of RPDs within a replicate pair being within the acceptable limits; and
- All other QA / QC parameters met the DQIs.

In summary, the QC data is determined to be of sufficient quality to be considered acceptable for the assessment.

I2.0 Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs) as outlined in NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013):

- Completeness: a measure of the amount of usable data from a data collection activity;
- Comparability: the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness: the confidence (qualitative) of data representativeness of media present on-site;
- Precision: a measure of variability or reproducibility of data; and
- Accuracy: a measure of closeness of the data to the 'true' value.

Table I2: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Systematic and selected target locations sampled.
	Preparation of borehole logs, sample location plan and chain of custody records.
	Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody.
	Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM).
	Completion of chain of custody (COC) documentation.
	NATA accredited laboratory results certificates provided by the laboratory.
	Satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section I1.1.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project.
	Experienced samplers used.
	Use of NATA registered laboratories, with test methods the same or similar between laboratories.
	Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled.
	Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs.
	Samples were extracted and analysed within holding times.
	Samples were analysed in accordance with the COC.
Precision	Field staff followed standard operating procedures.
	Acceptable RPD between original samples and replicates.
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been generally complied with.

D3.0 Conclusion

Based on the results of the field QA and field and laboratory QC, and evaluation against the DQIs it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

Douglas Partners Pty Ltd

Table I1.1: Relative Percentage Difference Results

			Metals								TRH						BTEX				PAH		
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Intra-laboratory Replicate																							
BD5/20200121	1 - 1.1 m	21/01/2021	<4	<0.4	14	9	17	<0.1	6	8	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.1	<0.05	<0.5
BH3	1 - 1.1 m	21/01/2021	4	<0.4	28	16	18	0.2	10	15	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5
		Difference	0	0	14	7	1	0.1	4	7	-	-	-	-	-	-	-	-	-	-	0	0	0
		RPD	0%	0%	**67%**	**56%**	6%	**67%**	**50%**	**61%**	-	-	-	-	-	-	-	-	-	-	0%	0%	0%
Inter-laboratory Replicate																							
BD3/20210121	0.4 - 0.5 m	21/01/2021	9	<1	16	15	27	<0.1	8	22	<10	<50	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<1	<0.5	<0.5
BH6	0.4 - 0.5 m	21/01/2021	<4	<0.4	9	9	17	<0.1	5	13	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.05	<0.5
		Difference	5	0	7	6	10	0	3	9	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	**77%**	0%	**56%**	**50%**	**45%**	0%	**46%**	**51%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table I1.2: Trip Spike and Blank Results – Soils

Sample ID	Units	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TS1	% Recovery	102	103	104	102	103
TB1	mg/kg	<0.2	<0.5	<1	<1	<2