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Report on
Detailed Site Investigation (Contamination)

Surface & Civil Alignment Works (SCAW) Package for
Sydney Metro - Western Sydney Airport (SMWSA)
Area of Environmental Concern (AEC) 40,
Luddenham Road, Orchard Hills

Prepared for
CPB Contractors Pty Limited &
United Infrastructure Pty Limited
Joint Venture (CPBUI JV)

Project 204814.01
June 2023

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Document History

Document details

Project No.	204814.01	Document No.	DSI.006.Rev2
Document title	Report on Detailed Site Investigation (Contamination) Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA)		
Site address	Area of Environmental Concern (AEC) 40, Luddenham Road, Orchard Hills43 Luddenham Road, Orchard Hills		
Report prepared for	CPB Contractors Pty Limited & United Infrastructure Pty Limited Joint Venture (CPBUI JV)		
File name	204814.01.DSI.006.Rev2 AEC40		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Draft A			21 November 2022
Revision 0			19 December 2022
Revision 1			14 March 2023
Revision 2			29 June 2023

Distribution of copies

Status	Electronic	Paper	Issued to
Draft A	1	-	
Revision 0	1	-	
Revision 1	1	-	
Revision 2	1	-	

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		29 June 2023
Reviewer		29 June 2023

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

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Executive Summary

Douglas Partners Pty Ltd (DP) has been engaged by CPB Contractors Pty Limited & United Infrastructure Pty Limited Joint Venture (CPBUI JV) to complete this Detailed Site Investigation (Contamination) (DSI) for the Sydney Metro - Western Sydney Airport (SMWSA) Surface and Civil Alignment Works (SCAW) package at Area of Environmental Concern (AEC) 40.

Technical Paper 8: Contamination, prepared as part of Sydney Metro - Western Sydney Airport, Environmental Impact Statement (EIS), documents areas of environmental concern identified for the Sydney Metro - Western Sydney Airport project. The objective of the DSI is to assess the suitability of the part of AEC 40 which will be disturbed for SCAW activities, and to determine whether further investigation and / or management is required. The site is shown on Drawing AEC40-1, Appendix A. The site does not cover the entire AEC 40 area.

It is understood that the site will be subject to a Site Audit by Melissa Porter, a NSW Environment Protection Authority (EPA) Site Auditor accredited under the *Contaminated Land Management Act 1997*.

Field work for the DSI included the collection of soil samples from 26 test pits using an excavator; and the installation, development and sampling of three groundwater wells.

At test pits, the soil profile was observed to comprise a surface layer of sandy silt fill, 0.2 m to 0.4 m thick; and fill underlain by silty clay to test pit termination depths of 0.9 m to 1.2 m. No signs of gross contamination (e.g., odours, staining or potential asbestos-containing materials) were observed during sampling. Trace plastic was observed in the fill at AEC40TP21, depth 0-0.2 m.

Boreholes for groundwater monitoring wells were drilled through a surface layer of silty clay topsoil which was underlain by silty clay to depths ranging between 2.0 m and 3.0 m and sandstone then siltstone to termination depths of between 6.0 m and 8.5 m. Groundwater levels were measured between depths of 2.79 m and 4.84 m, prior to sampling. Groundwater levels indicate that groundwater flows generally to the southeast. No phase separated hydrocarbons were identified in any of the wells from use of the interface dipmeter prior to sampling.

For soil samples for the current investigation, concentrations of chemicals for all analysed soil samples were within the site assessment criteria (SAC). Asbestos was not detected in any analysed sample.

For groundwater samples, concentrations of contaminants are within the SAC except for copper in samples from AEC40BH01 and AEC40BH03. The copper concentrations are low and are considered to be at typical background levels.

Although it is understood that excavated soil it to be reused for the SCAW project, preliminary waste classification comments are provided below for the case that spoil is to be disposed to landfill or is not to be reused for the SCAW project. With respect to fill, concentrations of chemical contaminants were within the CT1 criteria for general solid waste. With respect to PFAS, concentrations for the fill samples from previous investigations were within the SCC1 criteria, however, it is noted that it appears that TCLP (toxicity characteristic leaching procedure) has not been reported for comparison with TCLP1 criteria. TCLP analysis for PFAS may need to be undertaken to provide waste classification (if required). Results for metals, TRH, BTEX, PAH and pH were within the associated criteria for excavated natural material (ENM) except for:

- Zinc (310 mg/kg) in the sample from AEC40TP11, depth 0.1 m. The zinc concentration exceeded the absolute maximum concentration for ENM;
- TRH C_{10}-C_{36} (371 mg/kg) in the sample from SMGW-BH-B32, depth 0.1 m. The TRH concentration exceeded the maximum average concentration for ENM;
- Copper (140 mg/kg) in the sample from SMGW-TP-B364, depth 0.1 m. The copper concentration exceeded the maximum average concentration for ENM;
- Zinc (410 mg/kg) in the sample from SMGW-TP-B364, depth 0.1 m. The zinc concentration exceeded the absolute maximum concentration for ENM; and
- TRH C_{10}-C_{36} (266 mg/kg) in the sample from SMGW-TP-B364, depth 0.1 m. The TRH concentration exceeded the maximum average concentration for ENM.

With respect to natural soil samples, it is noted that:

- EPN was detected in the sample from SMGW-TP-B362, depth 0.5 m; and
- PFAS was detected in a number of samples.

According to the definition of virgin excavated natural material (VENM), as defined in *Protection of the Environment Operations Act 1997,* the presence of these manufactured chemicals in the natural soil may precludes the natural soil (impacted by these chemicals) as being classifiable as VENM. Concentrations of other chemicals in natural soil samples were within typical background ranges and were considered to be consistent with the definition of VENM.

Based on the results reported herein, it is considered, from a contamination perspective, that the site (at AEC 40) is suitable for the final intended land use. Tested soils are considered suitable to remain on-site.

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Report on Detailed Site Investigation (Contamination)

Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA)

Area of Environmental Concern (AEC) 40, Luddenham Road, Orchard Hills

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by CPB Contractors Pty Limited & United Infrastructure Pty Limited Joint Venture (CPBUI JV) to complete this Detailed Site Investigation (Contamination) (DSI) for the Sydney Metro - Western Sydney Airport (SMWSA) Surface and Civil Alignment Works (SCAW) package at Area of Environmental Concern (AEC) 40.

Technical Paper 8: Contamination, prepared as part of *Sydney Metro - Western Sydney Airport, Environmental Impact Statement* (EIS), documents areas of environmental concern identified for the Sydney Metro - Western Sydney Airport project. The objective of the DSI is to assess the suitability of the part of AEC 40 which will be disturbed for SCAW activities, and to determine whether further investigation and / or management is required. The site is shown on Drawing AEC40-1, Appendix A. The site does not cover the entire AEC 40 area.

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

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,* 2020 (NSW EPA, 2020).

It is understood that the site will be subject to a Site Audit by Melissa Porter, a NSW Environment Protection Authority (EPA) Site Auditor accredited under the *Contaminated Land Management Act 1997*.

2. Site Identification and Proposed Development

Table 1 provides a summary of information for site identification. The site covers an area within AEC 40 as shown in Drawing AEC40-1, Appendix A.

Table 1: Site Identification Information

Item	Details
Site Address (from SIX Maps)	Luddenham Road, Orchard Hills, NSW
Legal Description (from SIX Maps)	(Part of) Lot 24, Deposited Plan 1277418
Approximate area of AEC 40	2.5 ha
Approximate site area (within AEC 40)	0.95 ha
Zone (from ePlanning Spatial Viewer)	ENT: Enterprise Not Zoned along proposed rail line.
Local Government Area	Penrith City Council

The SCAW package relates to the proposed construction of approximately 10 km of rail alignment between Orchard Hills and the Western Sydney International (future) Airport consisting of a combination of viaducts and surface rail. Areas alongside the proposed rail alignment will be used by contractors or for staging and maintenance for the Metro. A viaduct rail line will be constructed at the eastern part of the at the site. Some filling of the land will occur at the western part of the site.

Cardno, *Human Health and Ecological Risk Assessment, Spoil Re-use Sydney Metro and Western Sydney Airport*, 29 June 2021 (80021888 SMSWA HHERARev3-Issued.docx) (Cardno, 2021b) (HHERA) provides (simple) conceptual site models (CSMs) for different general future land uses for the overall SMWSA project. The two general future land uses associated with the SCAW component of the project are considered to be:

- The rail corridor which will include the rail line, embankments / noise barriers, a stabling yard and maintenance facility and Luddenham station; and
- Passive open space. These are areas immediately adjacent to the rail corridor that may be used for bike / commuter paths. It is presumed that there is an absence of buildings in areas of passive open space.

Although the viaduct is a rail corridor use, it is assumed that areas adjacent to the viaduct construction will be used for passive open space.

Development of the site will likely include stripping of topsoil across the site area (to a depth of approximately 0.1 m to 0.2 m depending on the geotechnical suitability of underlying soil). Footings for the viaduct will comprise 2.1 m diameter piles to approximately 15 m and 25 m. Stripped topsoil and excavated soil from the site will be subject to reuse elsewhere within the greater SCAW area. Soil may be imported from off-site.

3. Scope of Work

The scope of work for the DSI was generally based on DP, *Sampling and Analysis Quality Plan (SAQP), Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA) Area of Environmental Concern (AEC) 40, Luddenham Road, Luddenham,* August 2022, (204814.01.SAQP.007.DftA), however, the site boundary was adjusted during the investigation programme which resulted in the excavation of additional test pits to provide site coverage. The scope of works for the investigation included:

- Collection of soil samples from test pits at 26 locations using an excavator;
- Installation and development of three groundwater monitoring wells;
- Collection of a groundwater sample from each monitoring well;
- Analysis of selected soil samples for potential contaminants and soil parameters;
- Analysis of groundwater water samples for potential contaminants and water parameters; and
- Preparation of this DSI including an assessment of analytical and field results.

4. Site Condition and Environment Information

Table 2 provides a summary of information relating to the site condition and environment. It is understood that Sydney Metro are in ownership of the site (as part of land acquired for operation of the Metro line).

Table 2: Site Condition and Environment Information

Item	Details
Geology	Bringelly Shale: comprising shale, carbonaceous claystone, claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff. (Penrith 1:100 000 Geology Sheet)
Soil landscape	Blacktown soil landscape which comprises residual soils. (Penrith 1:100 000 Soils Landscape Sheet).
Topography	The site is at approximately 58 m Australia Height Datum (AHD). Slopes at and around the site are generally down to the east.
Salinity	The site is at an area of moderate salinity potential. (Department of Infrastructure Planning and Natural Resources, *Salinity Potential in Western Sydney Map*).
Acid sulfate soils	The site is not within an area or close to an area associated with a risk of acid sulfate soils (NSW Acid Sulfate Soil Risk map).
Surface water and surface water bodies	There are no surface water bodies at the site. Small farm dams are on nearby land. Cosgroves Creek is located approximately 300 m to the south-east of the site.

Item	Details
	The majority of rainfall at the site is expected to infiltrate permeable ground surfaces. Surface water is expected to flow generally towards east in the direction of off-site dams and Cosgroves Creek.
Groundwater flow direction and discharge	Based on topography, shallow groundwater (if any) is expected to flow generally to the east and discharge Cosgroves Creek.
Registered groundwater bores	There are no registered groundwater bores within 500 m of the site (WaterNSW).
Site use and features	Rural use. Land at the site appears to be used for paddocks (SIX Maps). During field work for this DSI (August 2022), small stockpiles of soil were observed to be adjacent to the southern site boundary. A pile of waste items (such as concrete, bricks, tyres, plastic containers and other plastic items, timber, metal mesh, car parts, tin sheeting, potential asbestos-containing materials, and metal cans) covered in weeds and grass was also present adjacent to the site boundary near the central part of the site. No stockpiles were observed within the site boundary.
Surrounding land use	Nearby surrounding land is used for rural purposes (EIS).
Information from historical aerial photographs	The land at and surrounding the site appears to have been pastoral land since 1955. In 1980, 1994 and 2005, AEC 40 appeared to have stockpiles of unknown waste items (EIS). The EIS indicates that the entirety of AEC 40 was a 'stockpile area since 1980s'.
NSW EPA records	There were no NSW EPA regulated sites (under the *Contaminated Land Management Act 1997*) within 1 km of the site (EIS). There were no sites notified to the NSW EPA (under the *Contaminated Land Management Act 1997*) within 1 km of the site (EIS). There were no properties licensed under the *Protection of Environment Operations Act 1997* within 1 km of the site (EIS). There were no NSW EPA PFAS investigation sites within 2 km of the site (EIS).

5. Previous Investigation Data

The following reports included contamination data for sample points at or near the site:

- Cardno, *Contamination Assessment Report - Sydney Metro Western Sydney Airport*, 1 September 2021 (Cardno, 2021a); and
- Cardno, *Contamination Assessment Report - Phase D/E, Sydney Metro Western Sydney Airport*, 26 November 2021 (Cardno, 2021b).

Table 3 summarises the sample points and the associated soil and rock profile encountered for sample points at or near the site. Sample locations are indicated on Drawing AEC40-01, Appendix A. Table 4 lists the laboratory tests undertaken for contaminants and (relevant) soil parameters for soil samples.

Table 3: Sample Location and Profile

Sample Location	Test Pit / Borehole	Date	Soil / Rock Profile	Groundwater Depth (m)
SMGW-BH-B321 (adjacent to site)	Borehole	22/2/2021	Sandy silt fill to 0.2 m; underlain by gravelly sand to 0.5 m; then silty clay to 1.2 m; and sandy silt with gravel to 2.05 m. Soil was underlain by sandstone and siltstone to 20.33 m.	Not encountered
SMGW-TP-B362 (adjacent to site)	Test pit	4/8/2021	Silty sand fill to 0.2 m; underlain by clayey sand to 0.5 m; and silty clay to 2 m.	Not encountered
SMGW-TP-B363 (adjacent to site)	Test pit	4/8/2021	Silty sand fill to 0.2 m; underlain by silty clay to 2 m.	Not encountered
SMGW-TP-B364 (at site)	Test pit	4/8/2021	Silty sand fill to 0.2 m; underlain by sandy clay to 0.5 m; then silty clay to 1.4 m; then clay to 1.7 m; and silty clay to 2 m.	Not encountered

Table 4: Soil Sample Testing

Sample Location	Sample Depth (m) (Replicate Identification)	Fill / Natural Soil	Laboratory Testing Suite
SMGW-BH-B321	0.1	Fill	Asbestos; total recoverable hydrocarbons (TRH); benzene, toluene, ethylbenzene, xylenes, naphthalene (BTEXN); polycyclic aromatic hydrocarbons (PAH); organochlorine pesticides (OCP); organophosphorus pesticides (OPP); polychlorinated biphenyls (PCB); pH; metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc); per- and poly-fluoroalkyl substances (PFAS); PFAS in US leachate.
	0.25	Natural	Asbestos; TRH; BTEXN; PAH; (8) metals; volatile organics.
	0.25 (QA129)	Natural	TRH; BTEXN; PAH; (8) metals; PFAS; PFAS in US leachate; PAFS in AUS leachate.
	0.25 (QA229)	Natural	(8) metals; PAH; TRH; BTEXN; PFAS.
	0.45	Natural	pH; PFAS; PFAS in US leachate.
	0.95	Natural	TRH; BTEXN; PAH; pH; PFAS; PFAS in US leachate; PFAS in AUS leachate.
	2	Natural	PFAS.

Sample Location	Sample Depth (m) (Replicate Identification)	Fill / Natural Soil	Laboratory Testing Suite
SMGW-TP-B362	0.1	Fill	Asbestos; TRH; BTEXN; volatile organics; PAH; OCP; OPP; PCB; halogenated phenols; non-halogenated phenols; pH; (8) metals; PFAS.
	0.5	Natural	Asbestos; TRH; BTEXN; volatile organics; PAH; OCP; OPP; PCB; halogenated phenols; non-halogenated phenols; pH; (8) metals; PFAS.
	1	Natural	pH; (8) metals; PFAS.
	1.5	Natural	pH; (8) metals; PFAS.
	2	Natural	TRH; BTEXN; volatile organics; halogenated phenols; non-halogenated phenols; pH; (8) metals; PFAS.
SMGW-TP-B363	0.1	Fill	Asbestos; TRH; BTEXN; volatile organics; PAH; OCP; OPP; PCB; halogenated phenols; non-halogenated phenols; pH; (8) metals; PFAS.
	0.5	Natural	pH; (8) metals; PFAS.
	1	Natural	TRH; BTEXN; volatile organics; PAH; OCP; OPP; PCB; halogenated phenols; non-halogenated phenols; pH; (8) metals; PFAS.
	1.5	Natural	pH; (8) metals; PFAS.
	2	Natural	TRH; BTEX; volatile organics; BTEXN; volatile organics; PAH; halogenated phenols; non-halogenated phenols; pH; (8) metals; PFAS.
SMGW-TP-B364	0.1	Fill	TRH; BTEXN; volatile organics; PAH; OCP; OPP; PCB; halogenated phenols; non-halogenated phenols; pH; PFAS.
	0.3	Natural	pH; (8) metals; PFAS.
	0.5	Natural	TRH; BTEXN; volatile organics; PAH; OCP; OPP; PCB; halogenated phenols; non-halogenated phenols; pH; (8) metals; PFAS.
	1	Natural	pH; (8) metals; PFAS.
	1.5	Natural	pH; (8) metals; PFAS.
	2	Natural	TRH; BTEXN; volatile organics; PAH; halogenated phenols; non-halogenated phenols; pH; (8) metals; PFAS.

Analytical results are summarised in Tables C1 and C2, Appendix C. The analytical results are discussed in Section 11.

6. Potential Contamination Sources and Preliminary Conceptual Site Model

The potential sources of contamination for AEC 40 were identified in the EIS to be: *Historical unlicensed stockpiling of waste and soil.* Particulars as to the type of 'waste' is not provided in the EIS.

For AEC 40, contaminants of potential concern were identified in the EIS to be: heavy metals, TRH, volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), PCB, and asbestos. It is noted that specific heavy metals, VOC and SVOC were not provided in the EIS.

It is noted that AEC 39 is located approximately 150 m to the northeast of the site, and is not up-gradient of the site.

Table 4 summarises the potential source of contamination and what are considered to be the contaminants of potential concern for the DSI.

Table 4: Potential Source of Contamination and Contaminants of Potential Concern

Potential Source of Contamination	Contaminants of Potential Concern
Contaminated ground from historical stockpiling of waste and soil	• Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) • 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 • Volatile organic compounds (VOC) (for groundwater)

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 may become 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). The preliminary conceptual site model for the proposed development of the site is presented in Table 5.

Table 5: Preliminary CSM

Potential Contamination Source	Potential Exposure Pathway	Potential Receptors
Contaminated ground from historical stockpiling of waste and soil	– Ingestion and direct contact – Inhalation of dust – Inhalation of vapours	– Construction workers (for the proposed development) – Future site workers including maintenance workers (post-development) – Pedestrians and commuters
	– Inhalation of dust – Inhalation of vapours	– Adjacent site users
	– Surface run-off – Leaching of contaminants into groundwater and lateral migration of groundwater	– Surface water bodies
	– Leaching of contaminants into groundwater	– Groundwater
	– Ingestion, inhalation and direct contact	– Terrestrial ecosystems
	– Direct contact	– In ground structures

Although *Table B2: Activities associated with PFAS contamination more broadly* of Appendix B of HEPA, *PFAS National Environmental Management Plan* (NEMP) (HEPA, 2020) lists '*Agriculture: Potentially used as an adjuvant or active ingredient in fertilisers and pesticides*….', it is considered that investigation for PFAS is not warranted given that crops did not appear to be established at the site, and, thus, there is a low probability that substantial fertiliser application has occurred. In addition, detected PFAS concentrations in soil samples from SMGW-BH-B321, SMGW-TP-B362, SMGW-TP-B363 and SMGW-TP-B364 were very low and considered indicative of general background conditions for soil in urban and rural areas (see Section 11).

7. Fieldwork

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 data quality objective process is outlined in Appendix D.

7.2 Soil Sampling

Based on the CSM and data quality objectives (DQO), a broad grid sampling strategy was adopted to provide data across the site. A sample density of 26 soil sample points (AEC40TP01 to AEC40TP26) was adopted to provide site coverage. According to NSW EPA, *Contaminated Land Guidelines Sampling design part 1 - application*, 2022 in August 2022, a minimum of 21 sample points is required for site characterisation. The adopted sample density exceeds this recommended sample density. It is noted that AEC40TP25 is slightly (less than 1 m) outside the site boundary, but given its close proximity to the site, the data for this sample location is considered to have relevance for site assessment. It is noted that the site for the DSI covers a larger area within AEC 40 than that for the SAQP and so the adopted number of soil sampling points is greater than that in the SAQP.

Soil sampling from test pits was carried out on 24 August 2022 and 20 September 2022.

Soil sampling was carried out in accordance with DP standard operating procedures. The general soil sampling and sample management procedure adopted (as per the SAQP) is as follows:

- Collect soil samples from excavator bucket returns including at the surface / near surface and regular depth intervals (approximately every 0.5 m) and / or at changes of strata;
- 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 screening using a photo-ionisation detector (PID);
- For fill/topsoil samples, collect ~500 ml samples in zip-lock bags (for asbestos analysis);
- Wear a new disposable nitrile glove for each sample point thereby minimising potential for cross-contamination;
- 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.

It is noted that as potential ACM or copious quantities of building rubble were not observed in fill, 10 L bulk samples were not collected for sieving / screening for asbestos assessment.

7.3 Groundwater Well Installation and Development

Boreholes for groundwater monitoring wells (AEC40BH01 to AEC40BH03) were drilled to depths of between 6.0 m and 8.5 m using a track-mounted drilling rig with solid flight auger and tc-bit on 5 to 8 September 2022.

Groundwater monitoring wells were positioned to provide site coverage, with AEC40BH03 positioned at an (hydrogeological) up-gradient location and AEC40BH01 and AEC40BH02 positioned at down-gradient locations. As the site area was greater than that for preparation of the SAQP, the groundwater monitoring wells were positioned differently to that shown in the SAQP.

Monitoring wells were constructed using class 18 uPVC machine slotted screen and blank sections with screw threaded joints. The screened section of each well was backfilled with a washed sand filter pack to approximately 0.5 m above the screened interval. Each well was completed with a hydrated bentonite plug of at least 0.5 m thick and then backfilled to the surface.

The three groundwater monitoring wells were developed on 28 September 2022 using a Twister (plastic) pump.

7.4 Groundwater Well Sampling

Groundwater sampling of the three groundwater monitoring wells was carried out on 5 October 2022 in accordance with DP standard operating procedures. The sampling method adopted (as per the SAQP) is as follows:

- Measure the static water level using an electronic interface probe;
- Lower the well-dedicated tubing into the well at a depth that is at the screened section of the well;
- Set up the peristatic pump to draw water at a low rate that produces laminar flow;
- Measure physical parameters by continuously passing the purged water through a flow cell;
- Following stabilisation of the field parameters using a water quality meter, collect samples in laboratory-prepared bottles minimising headspace within the sample bottle and cap immediately. Samples for metals analysis are filtered in the field using a 0.45 µm filter (prior to bottling of the sample). [It is noted that, according to laboratory certificate 307376, Appendix E, a filtered, preserved sample for dissolved metals for the sample from AEC40BH02 was not received by the laboratory, so an unpreserved sample was filtered through 0.45 µm filter at the laboratory];
- Place samples into a cooled, insulated and sealed container for transport to the laboratory;
- Wear a new disposable nitrile glove for each sample point thereby minimising potential for cross-contamination; and
- Use chain of custody documentation.

8. Laboratory Analysis

8.1 Soil Samples from Test Pits

A fill (primary) sample from each test pit location was analysed at a NATA accredited laboratory for COPC comprising: metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH, BTEX, PAH, OCP, OPP, PCB, total phenols and asbestos (in 500 mL soil) as fill was considered to have a greater risk of contamination compared to the observed underlying natural soil.

Natural soil samples from six sample locations were analysed to obtain data for the natural soil profile. The natural soil samples were analysed for metals, TRH, BTEX, PAH, OCP, OPP, PCB and total phenols.

Six fill samples were analysed for pH and cation exchange capacity (CEC) for the calculation of ecological investigation levels (EIL).

Laboratory certificates and chain of custody are provided in Appendix E.

8.2 Groundwater Samples

A groundwater sample from each monitoring well was analysed for COPC including metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), PAH, TRH, BTEX, VOC, OCP, OPP, PCB and phenols. Hardness was also analysed for the calculation of hardness adjusted default guideline values (DGV).

Samples from AEC40BH01 and AEC40BH02 were analysed for pH, electrical conductivity, total dissolved solids, Langelier saturation index, major cations and anions, chlorides, sulfates, carbonate, and bicarbonate for geotechnical purposes and results for these are not reported herein.

9. Site Assessment Criteria

Tier 1 Site Assessment Criteria (SAC) for the assessment of soils and groundwater, informed by the CSM, at the site are listed in Appendix F. The site will have both rail corridor and passive open space usage and, therefore, SAC for the rail corridor (land use scenario D) and passive open space (land use scenario C) are applicable to the site.

10. Field Work Results

10.1 Test Pits

The test pit logs for this assessment are included in Appendix G and should be referenced for detailed soil descriptions. In summary:

- A surface layer of sandy silt fill, 0.2 m to 0.4 m thick was encountered at all test pit locations; and
- Fill was underlain by silty clay to test pit termination depths of 0.9 m to 1.2 m.

PID results were less than 5 ppm, indicating a low potential for the presence of volatile contaminants. The PID calibration certificates are provided in Appendix H.

No signs of gross contamination (e.g., odours, staining or potential asbestos-containing materials) were observed during sampling. Trace plastic was observed in the fill at AEC40TP21, depth 0-0.2 m.

Free groundwater was observed at AEC40TP15 at a depth of 0.7 m. No free groundwater was observed in the other test pits.

10.2 Groundwater Monitoring Wells

Borehole logs for groundwater monitoring wells (AEC40BH01 to AEC40BH03) are provided in Appendix G and should be reference for detailed soil descriptions. In summary:

- A surface layer of silty clay topsoil, 0.1 m to 0.15 m thick, was encountered at each location;
- Topsoil was underlain by silty clay to depths ranging between 2.0 m and 3.0 m; and
- Silty clay was underlain by sandstone then siltstone to termination depths of between 6.0 m and 8.5 m.

No signs of contamination were encountered whilst drilling. Free groundwater (slow seepage) was observed whilst drilling at depths of 6.5 m at AEC40BH01, 6 m at AEC40BH02 and 5 m at AEC40BH03.

Measured groundwater levels are summarised in Table 6.

Table 6: Groundwater Levels

Borehole	Prior to Well Development on 28 September 2022		Prior to Well Sampling on 5 October 2022	
	Groundwater Depth (m bgl)	Groundwater Level (m AHD)	Groundwater Depth (m bgl)	Groundwater Level (m AHD)
AEC40BH01	3.13	51.17	3.63	50.67
AEC40BH02	2.75	53.75	2.79	53.71
AEC40BH03	5.12	54.48	4.84	54.76

Groundwater levels indicate that groundwater flows generally to the southeast. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

The water from development of AEC40BH01 and AEC40BH03 was observed to be pale grey, cloudy and have no odour.

At the time of development, the end cap at AEC40BH02 was observed to have been dislodged from the top of the pipe, presumably by grazing cows. The water from development of AEC40BH02 was colourless and slightly cloudy and had no odour. It was considered that the well had been adequately developed and was in working condition despite the prior dislodgment of the end cap.

No phase separated hydrocarbons were identified in any of the wells from use of the interface dipmeter prior to sampling. The water sampled from AEC40BH01 was observed to be colourless and slightly cloudy and have no odour. The water sampled from AEC40BH02 was observed to be clear and have no odour. The water sampled from AEC40H03 was observed to be pale grey, cloudy and have no odour.

The groundwater field sheets and water quality meter calibration record are provided in Appendix H.

11. Discussion of Laboratory Analytical Results

11.1 Soil Samples

Analytical results for soil samples for the current investigation are summarised in Table I1, Appendix I, against the most conservative (Tier 1) SAC (see Appendix F). Analytical results for previous investigations sample locations are shown in Table C1 and C2, Appendix C.

For the current investigation, concentrations of chemicals for all analysed soil samples were within the SAC for all CoPC analysed. Asbestos was not detected in any analysed sample. It is noted that concentrations of TRH C_6-C_{10}, TRH >C_{10}-C_{16}, BTEX, PAH, OCP, OPP, PCB and phenols were less than the practical quantitation limits.

For the previous investigations (sampling locations SMGW-BH-B321, SMGW-TP-B362 to SMGW-TP-B364), concentrations of chemicals were within the SAC. Asbestos was not detected in any analysed sample. It is noted that:

- Concentrations of TRH C_6-C_{10}, TRH >C_{10}-C_{16}, BTEXN, PAH, volatile organics, OCP, PCB and phenols were below the practical quantitation limits;
- A low concentration (0.3 mg/kg) of EPN (an organophosphorus pesticide) was identified in the sample from SMGW-TP-B362, depth 0.5 m. There is no guideline value in NEPC (2013) or other Australian guideline for assessing EPN in soil; and
- Very low concentrations of PFAS including Perfluorodecanoic acid (PFDA), Perfluorododecanoic acid (PFDoDA), Perfluorohexanoic acid (PFHxA), Perfluorononanoic acid (PFNA), Perfluorooctane sulfonic acid (PFOS), Perfluoropentanoic acid (PFPeA), Perfluoroheptanoic acid (PFHpA), Perfluorooctanoate (PFOA), and Perfluorohexane sulfonic acid (PFHxS) were detected throughout the soil profile. With respect to human health exposure, The Netherlands National Institute for Public Health and the Environment, *Mixture exposure to PFAS: A Relative Potency Factor approach, RIVM Report,* 2018 (RIVM 2018) provides Relative Potency Factors (RPF) with respect to PFOA for PFPeA (RPF 0.01 to 0.05), PFHxA (RPF 0.01), PFNA (RPF 10), PFDA (RPF 10), PFDoDA (RPF 3) and PFHpA (0.01 to 1) The highest PFOA equivalents are 0.00001 mg/kg for PFPeA, 0.000002 mg/kg for PFHxA, 0.002 mg/kg for PFNA, 0.006 mg/kg for PFDA, 0.0006 for PFDoDA and 0.0001 mg/kg for PFHpA. These PFOA equivalent concentrations are substantially less than HIL C (10 mg/kg) and HIL D (50 mg/kg) for PFOA.

11.2 Groundwater Samples

Analytical results for groundwater samples are summarised in Table I2, Appendix I. Hardness adjusted DGV for metals are shown with the unadjusted DGV.

Concentrations of metals are within the SAC (including hardness adjusted DGV where applicable) except for copper in samples from AEC40BH01 (2 µg/L) and AEC40BH03 (4 µg/L and 5 µg/L) which exceeded the DGV. These copper concentrations are low and are considered to be at typical background levels. Similarly, other metal concentrations are considered to be at typical background levels.

Apart from a very low concentration of naphthalene in the replicate sample (BD2/20221005) from AEC40BH02, concentrations of PAH, TRH, BTEX and VOC were less than the PQL. Concentrations of PAH (including naphthalene), TRH, BTEX and VOC were within the SAC.

Concentrations of OCP, OPP, PCB and phenols were less than the practical quantitation limits (PQL) and within the SAC.

11.3 Preliminary Waste Classification Comments

Although it is understood that excavated soil it to be reused for the SCAW project, preliminary waste classification comments are provided below for the case that spoil is to be disposed to landfill or is not to be reused for the SCAW project.

Table I3, Appendix I, presents the current investigation against criteria from NSW EPA, *Waste Classification Guidelines*, 2014 (NSW EPA, 2014) and NSW EPA, *The excavated natural material order 2014*. Table C1 and C2, Appendix C, presents the analytical results for the previous investigations against the same criteria as well as NSW EPA, *Addendum to the Waste Classification Guidelines (2014) - Part 1: classifying waste*, 2016.

With respect to fill, concentrations of chemical contaminants were within the CT1 criteria for general solid waste. With respect to PFAS, concentrations for the fill samples from previous investigations were within the SCC1 criteria, however, it is noted that it appears that TCLP (toxicity characteristic leaching procedure) has not been reported for comparison with TCLP1 criteria. TCLP analysis for PFAS may need to be undertaken to provide waste classification (if required). Results for metals, TRH, BTEX, PAH and pH were within the associated criteria for excavated natural material (ENM) except for:

- Zinc (310 mg/kg) in the sample from AEC40TP11, depth 0.1 m. The zinc concentration exceeded the absolute maximum concentration for ENM;
- TRH C_{10}-C_{36} (371 mg/kg) in the sample from SMGW-BH-B32, depth 0.1 m. The TRH concentration exceeded the maximum average concentration for ENM;
- Copper (140 mg/kg) in the sample from SMGW-TP-B364, depth 0.1 m. The copper concentration exceeded the maximum average concentration for ENM;
- Zinc (410 mg/kg) in the sample from SMGW-TP-B364, depth 0.1 m. The zinc concentration exceeded the absolute maximum concentration for ENM; and
- TRH C_{10}-C_{36} (266 mg/kg) in the sample from SMGW-TP-B364, depth 0.1 m. The TRH concentration exceeded the maximum average concentration for ENM.

With respect to natural soil samples, it is noted that:

- EPN was detected in the sample from SMGW-TP-B362, depth 0.5 m; and
- PFAS was detected in a number of samples.

According to the definition of virgin excavated natural material (VENM), as defined in *Protection of the Environment Operations Act 1997,* the presence of these manufactured chemicals in the natural soil precludes the natural soil (impacted by these chemicals) as being classifiable as VENM.

Concentrations of other chemicals in natural soil samples were within typical background ranges and were considered to be consistent with the definition of VENM.

11.4 Data Quality Assurance and Quality Control

The data quality assurance and quality control (QA / QC) results are included in Appendix J. 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.

12. Conclusion

Field observations and analysis of soil and groundwater samples has not revealed contamination that requires remediation. Based on the results reported herein, it is considered, from a contamination perspective, that the site (at AEC 40) is suitable for the final intended land use. Tested soils are considered suitable to remain on-site.

13. Limitations

Douglas Partners (DP) has prepared this report (or services) for the SCAW package for SMWSA. The work was carried out under a Service Contract. This report is provided for the exclusive use of CPBUI JV 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.

Asbestos has not been detected in laboratory analysis of soil samples. 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 hazardous building materials (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.

The assessment of atypical safety hazards arising from this advice is restricted to the (environmental) 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.

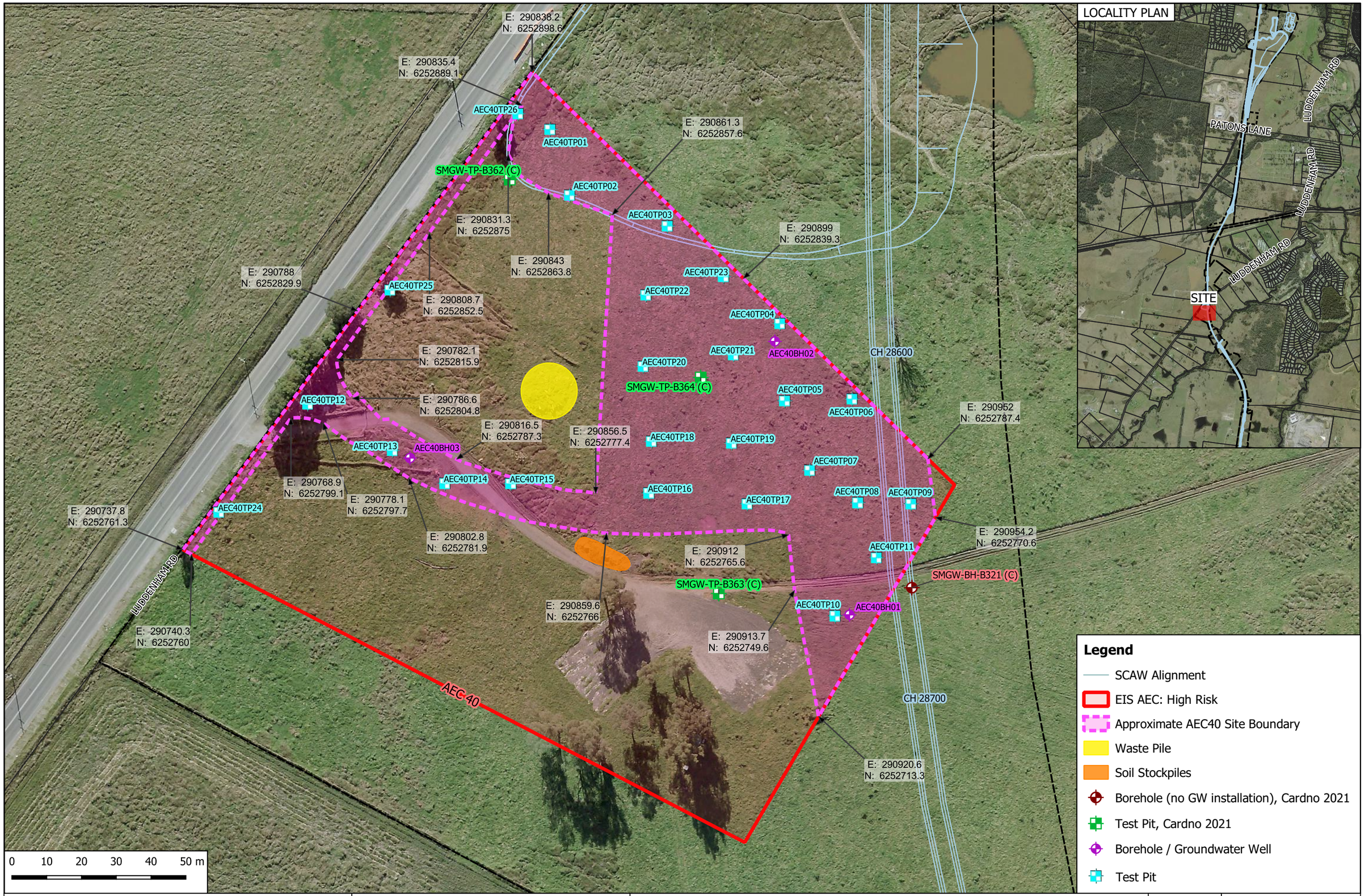
This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation,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

Douglas Partners Pty Ltd

Appendix A

Drawing



Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	CPBUI JV		
OFFICE:	Sydney	DRAWN BY:	MG
SCALE:	1:1000 @ A3	DATE:	16/12/2022

TITLE: **AEC40 Test Location Plan**
Sydney Metro Western Sydney Airport - SCAW
Luddenham Road, Orchard Hills

N

PROJECT No:	204814.01
DRAWING No:	AEC40-01
REVISION:	Rev 1

Appendix B

About this Report

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 C

Borehole Log and Summary of Results from Previous Investigation

NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : SMGW-BH-B321 REV 1
FILE / JOB NO : 80021888
SHEET : 1 OF 4

PROJECT : SMWSA GI
LOCATION : 546-640 Luddenham Road Luddenham

POSITION : E: 290947.406, N: 6252750.376 (56 MGA2020) SURFACE ELEVATION : 53.199 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Comacchio 450 MOUNTING : Track CONTRACTOR : Terratest DRILLER : BM

DATE STARTED : 22/2/21 DATE COMPLETED : 22/2/21 DATE LOGGED : 22/2/21 LOGGED BY : LJ CHECKED BY : KP

DRILLING						MATERIAL					
PROGRESS: DRILLING & CASING	PROGRESS: WATER	DRILLING PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m) RL (m AHD)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	STRUCTURE & Other Observations
SD	N/A	E			0.0 53.2			FILL: SANDY SILT: brown, low plasticity, fine grained sand, with fine to medium grained, siltstone gravel, trace rootlets			FILL 0.10: Non-calcareous
				0.30m D 0.40m			SP	GRAVELLY SAND: brown, fine grained sand, fine to coarse grained, angular, siltstone gravel		D	POSSIBLE RESIDUAL SOIL 0.25: Non-calcareous
				0.70m				SILTY CLAY: orange to yellow, low plasticity, trace rootlets			0.45: Non-calcareous
				0.80m 8, 9, 10 N=19			CL			VSt	0.80: Non-calcareous
		F	Not Encountered		1.0 52.2				D		0.95: Non-calcareous 1.05: Non-calcareous
				1.25m				SANDY SILT: grey, low plasticity, fine to coarse grained sand, with fine to medium grained, angular, sandstone gravel, with grey stained orange nads (30%) clay, 10% stained red-brown			1.40: Non-calcareous
				1.70m D 1.90m			ML			VSt to H	
HWT Casing		H		2.00m SPT 5/10mm N=R 2.01m	2.0 51.2			Continued as Cored Drill Hole			2.00: Non-calcareous
					3.0 50.2						
					4.0 49.2						
					5.0 48.2						
					6.0 47.2						
					7.0 46.2						
					8.0 45.2						

See Explanatory Notes for details of abbreviations & basis of descriptions.

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Cardno

CORED DRILL HOLE LOG

HOLE NO : SMGW-BH-B321 REV 1
FILE / JOB NO : 80021888
SHEET : 2 OF 4

PROJECT : SMWSA GI
LOCATION : 546-640 Luddenham Road Luddenham

POSITION : E: 290947.406, N: 6252750.376 (56 MGA2020) SURFACE ELEVATION : 53.199 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Comacchio 450 MOUNTING : Track CONTRACTOR : Terratest DRILLER : BM

DATE STARTED : 22/2/21 DATE COMPLETED : 22/2/21 DATE LOGGED : 22/2/21 LOGGED BY : LJ CHECKED BY : KP

CASING DIAMETER : HWT BARREL (Length) : 3.00 m BIT : Step BIT CONDITION : Good

DRILLING					MATERIAL			FRACTURES	
PROGRESS: DRILLING & CASING	PROGRESS: WATER	(CORE LOSS RUN %) / DRILL DEPTH	RQD (%)	SAMPLES & FIELD TESTS	DEPTH (m) / RL (m AHD)	GRAPHIC LOG	DESCRIPTION: ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral: VL -0.1, L -0.4, M -1.3, H -3.8, VH -12.5, EH	NATURAL FRACTURE (mm): 20, 40, 100, 300, 1000	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
					0.0 / 53.2						
					1.0 / 52.2						
					2.0 / 51.2		2.05m START CORING AT 2.05m				
							2.15m CORE LOSS 0.10m (2.05-2.15)				
HWT Casing	0% Water LOSS	8% LOSS	0				SANDSTONE: pale grey to brown, fine grained, laminated from 1-20mm, carbonaceous laminations	HW			2.18: BP 5° CN PR S 2.20-2.21: EWS Clay PR S 10 mm 2.20-2.23: JT 70 - 90° Silt VNR CU S 2.24-2.25: CS 5° Gravel, Silt PR S 10 mm 2.37-2.43: JT 65° CN PR S 2.48: Non-calcareous 2.49-2.54: CS 0° Clay, Silt, Gravel PR S 50 mm 2.78: BP 0 - 10° Clay CU S 2.82-2.87: JT 65° Silt VNR PR S 2.86: BP 20° Silt CT PR S 2 mm
							2.49-2.54m: Gravelly SILT: grey to orange, low plasticity, fine to medium grained ironstone gravel				
							2.75m SILTSTONE: grey to dark grey, indistinctly laminated to massive, some orange staining				
				Is(50) d=0.01 a=0.02 MPa	3.0 / 50.2						3.25: BP 15° CN S
		3.38									3.43-3.45: BP 15° CN PR S
		0% LOSS	11	Is(50) d=0.04 a=0.04 MPa Is(50) d=0.04 a=0.05 MPa			3.63-3.79m: Gravelly CLAY: grey to orange, medium plasticity, fine grained gravel	EW HW			3.58-3.59: EWS 0° Clay, Gravel PR S 5 mm 3.63-3.79: EWS 5° Gravel PR S 160 mm
					4.0 / 49.2		4.19-4.22m: Gravelly SILT: dark grey, low plasticity, fine grained gravel				4.00: Non-calcareous 3.99-4.02: EWS Clay PR S 30 mm 4.09: BP 0 - 10° CN IR S 4.19-4.22: CS Gravel, Sand, Silt PR S 30 mm 4.33: BP Clay, Gravel CT PR S 2 mm 4.48: Non-calcareous
							4.58-4.61m: Gravelly SILT: dark grey, low plasticity, fine grained gravel				4.58-4.61: EWS 10° Silt PR S 30 mm
HW				Is(50) d=0.15 a=0.13 MPa Is(50) d=0.01 a=0.02 MPa	5.0 / 48.2						4.99: BP Clay PR S 5 mm 5.07: BP 5° CN PR S 5.12-5.13: JT 70° CN PR S 5.14-5.16: JT 80° CN PR S
				Is(50) d=0.06 a=0.05 MPa							5.35-5.36: EWS 0 - 5° CN PR S 10 mm 5.41: BP 5° Fe CT PR S
								MW			5.77: Non-calcareous 5.78: BP Fe VNR PR S
				Is(50) d=0.09 a=0.16 MPa	6.0 / 47.2		5.87-5.95m: carbonaceous laminations	HW			6.16: BP 5° CN PR S
		6.38		Is(50) d=0.04 a=0.08 MPa				EW			6.33-6.38: CS 0° Clay PR S 50 mm
		0% LOSS	67					MW			6.42-6.49: BP 0° CN PR S
	0% Water LOSS						6.51-6.60m: disturbed laminations				6.62-6.66: CS 5° Clay PR S 40 mm 6.64: Non-calcareous 6.70: BP 10° Clay CN PR S 10 mm 6.79-6.85: BP 5 - 10° X CT IR S
					7.0 / 46.2		6.91-6.98m: disturbed and irregular laminations				7.00: Non-calcareous 7.03: BP 10° CN PR S 7.07: BP 5° CN PR S 7.25: BP 5° CN PR S
							7.45m: bioturbation				7.41: BP 5° CN PR S
				UCS =4.4 MPa 8.00m	8.0 / 45.2						7.67: BP 5° Clay CT PR S

See Explanatory Notes for details of abbreviations & basis of descriptions.

CARDNO NSW/ACT PTY LTD

Cardno

CORED DRILL HOLE LOG

HOLE NO : SMGW-BH-B321 REV 1
FILE / JOB NO : 80021888
SHEET : 3 OF 4

PROJECT : SMWSA GI
LOCATION : 546-640 Luddenham Road Luddenham

POSITION : E: 290947.406, N: 6252750.376 (56 MGA2020) SURFACE ELEVATION : 53.199 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Comacchio 450 MOUNTING : Track CONTRACTOR : Terratest DRILLER : BM

DATE STARTED : 22/2/21 DATE COMPLETED : 22/2/21 DATE LOGGED : 22/2/21 LOGGED BY : LJ CHECKED BY : KP

CASING DIAMETER : HWT BARREL (Length) : 3.00 m BIT : Step BIT CONDITION : Good

DRILLING						MATERIAL			FRACTURES	
PROGRESS: DRILLING & CASING	PROGRESS: WATER	(CORE LOSS RUN %) / DRILL DEPTH	RQD (%)	SAMPLES & FIELD TESTS	DEPTH (m) / RL (m AHD)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	NATURAL FRACTURE (mm)	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
HW	0% Water LOSS	0% LOSS 9.43	67	Is(50) d=0.18 a=0.23 MPa	8.0 45.2		SILTSTONE: grey to dark grey, indistinctly laminated to massive, some orange staining *(continued)*	MW		8.00: Non-calcareous 8.16: BP 5° CN PR S 8.29-8.31: CS 10 - 15° Gravel, Silt CU S 20 mm 8.41: BP Clay, Gravel CT UN S 5 mm 8.48-8.78: BP 5° CN PR S
				Is(50) d=0.15 a=0.29 MPa	9.0 44.2		8.34-8.40m: disturbed laminations 8.52-8.74m: sandstone clasts up to 1-5mm, soft sediment deformation			9.00: Non-calcareous
		0% LOSS	41	Is(50) d=0.17 a=0.23 MPa			9.15-9.30m: sandstone clasts up to 10mm, soft sediment deformation 9.61-9.68m: grey, fine grained, high angle sandstone laminations			9.25: BP 5° CN PR S 9.69: BP 5° CN PR S
					10.0 43.2		9.89-10.06m: sandstone clasts up to 20mm	HW		9.88: BP 5° CN IR S 9.97: BP 5° CN IR S 10.00: Non-calcareous 10.00-10.06: SZ 0 - 5° PR 60 mm 10.12: BP 5° CN PR S 10.19: BP 0° CN PR S 10.19-10.24: JT 80° CN PR S 10.23: BP 0° CN PR S 10.31-10.49: BP 5° CN PR S 10.55: BP 10° CN PR S 10.60: BP 5° CN PR S
				Is(50) d=0.03 a=0.17 MPa	11.0 42.2		11.15m			10.96-11.00: CS 0° 40 mm 11.00: Non-calcareous
				Is(50) d=0.56 a=1.76 MPa			SANDSTONE: grey to dark grey, fine grained 11.20-11.78m: interlaminated grey, fine to medium grained sandstone (70%), slightly disturbed 5-15mm laminations, and dark grey siltstone (30%), 1-5mm laminations	SW MW		11.78: BP 0° CN PR S 11.87: BP 0° CN PR S
				Is(50) d=0.27 a=0.49 MPa Is(50) d=0.41 a=0.51 MPa	12.0 41.2					12.00: Non-calcareous 12.13: BP 15° CN PR S 12.23: JT 45° CN DIS
		12.43 0% LOSS	67							12.39: BP 5 - 15° CN CU S 12.57: BP 0° CN PR S
				Is(50) d=0.31 a=0.33 MPa	13.0 40.2					12.96: BP 0 - 10° CN CU S 13.00: Non-calcareous
				UCS =7 MPa 13.48m						13.16: BP 0° CN PR S 13.17-13.20: CS 0° Gravel PR S 30 mm 13.21: BP 0° CN PR S
	0% Water LOSS						13.42-14.39m: interlaminated grey, fine to medium grained sandstone (70%), slightly disturbed 5-15mm laminations, and dark grey siltstone (30%), 1-5mm laminations, trace quartz veins, 1-2mm. 5 degrees			13.48: BP Qz CT CU S 1 mm 13.50: Calcareous 13.68-13.72: CS 0° Gravel CN PR S 40 mm 13.75: BP 5 - 10° CN UN S
				Is(50) d=0.44 a=0.31 MPa	14.0 39.2					14.23: BP 5 - 10° CN UN S 14.33: Non-calcareous 14.39: BP 0° Clay CT PR S 2 mm 14.40-14.50: EWS 0° Clay PR S 100 mm
				Is(50) d=0.1 a=0.34 MPa				EW HW		
				Is(50) d=0.01 a=0.09 MPa						14.75-14.80: JT 60° CN PR S 14.93: BP 0° CA, Clay CT PR S
				Is(50) d=0.05 a=0.2 MPa	15.0 38.2			MW		15.00: Non-calcareous 15.04: BP 0° CN PR S
		15.37 0% LOSS	88							15.51-15.52: EWS 10° 10 mm 15.59: BP 0° CN PR S 15.65-15.66: EWS 0° 10 mm
	0% Water LOSS			Is(50) d=0.31 a=0.51 MPa	16.0 37.2		15.72-15.83m: interlaminated grey, fine to medium grained sandstone (70%), slightly disturbed 5-15mm laminations, and dark grey	SW		15.82: BP 10° CN IR S

ESTIMATED STRENGTH Is(50) — ● - Axial ○ - Diametral — VL -0.1 L -0.4 M -1.3 H -3.8 VH -12.5 EH

NATURAL FRACTURE (mm) — 20 40 100 300 1000

See Explanatory Notes for details of abbreviations & basis of descriptions.

CARDNO NSW/ACT PTY LTD

Cardno

CORED DRILL HOLE LOG

HOLE NO : SMGW-BH-B321 REV 1
FILE / JOB NO : 80021888
SHEET : 4 OF 4

PROJECT : SMWSA GI
LOCATION : 546-640 Luddenham Road Luddenham

POSITION : E: 290947.406, N: 6252750.376 (56 MGA2020) SURFACE ELEVATION : 53.199 (AHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Comacchio 450 MOUNTING : Track CONTRACTOR : Terratest DRILLER : BM

DATE STARTED : 22/2/21 DATE COMPLETED : 22/2/21 DATE LOGGED : 22/2/21 LOGGED BY : LJ CHECKED BY : KP

CASING DIAMETER : HWT BARREL (Length) : 3.00 m BIT : Step BIT CONDITION : Good

DRILLING						MATERIAL				FRACTURES	
PROGRESS: DRILLING & CASING	PROGRESS: WATER	(CORE LOSS RUN %) / DRILL DEPTH	RQD (%)	SAMPLES & FIELD TESTS	DEPTH (m) / RL (m AHD)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral VL -0.1 L -0.4 M -1.3 H -3.8 VH -12.5 EH	NATURAL FRACTURE (mm) 20 40 100 300 1000	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, orientation, infilling or coating, shape, roughness, thickness, other
HW	0% Water LOSS	0% LOSS	88	UCS =11 MPa 16.42m Is(50) d=0.32 a=0.53 MPa	16.0 37.2		siltstone (30%), 1-5mm laminations SANDSTONE: grey to dark grey, fine grained *(continued)* 16.17-17.82m: interlaminated grey, fine to medium grained sandstone (50%), slightly disturbed 5-15mm laminations, and dark grey siltstone (50%), 1-5mm laminations,trace quartz veins, 1-2mm, 0 degrees	SW EW SW			16.00: Non-calcareous 16.08-16.10: CS 0° Gravel PR S 20 mm 16.42: BP 5° CN PR S 16.52-16.62: CS 0 - 20° Clay, Gravel IR S 100 mm
					17.0 36.2						17.00: Non-calcareous 17.11-17.18: JT 70° CN ST Healed 17.15: Calcareous
				Is(50) d=0.3 a=0.76 MPa			Trace siltstone clasts, 10-20mm, angular, irregular				17.50: Non-calcareous 17.63: BP 5° CN PR S
				UCS =5 MPa 18.34m	18.0 35.2						18.00: Non-calcareous
		18.44		Is(50) d=0.24 a=0.46 MPa			18.29-18.33m: interlaminated grey, fine to medium grained sandstone (50%), slightly disturbed 5-15mm laminations, and dark grey siltstone (50%), 1-5mm laminations				18.33: BP 5° CN UN S
	0% Water LOSS	0% LOSS	68				18.68-19.03m: brown sandstone clasts up to 5-30mm				18.68: BP 5° CN UN S
					19.0 34.2						19.00: Non-calcareous
				Is(50) d=0.81 a=0.72 MPa				MW			
				Is(50) d=0.23 a=0.37 MPa			19.80-19.83m: quartz veins up to 1mm	EW MW			19.68: BP 0 - 10° CN UN S 19.74-19.82: SZ 0° X PR S 80 mm 19.96-19.99: CS 0° CN PR S 30 mm 20.00: Non-calcareous
		20.46		Is(50) d=0.29 a=0.48 MPa	20.0 33.2		20.46m 20.33m: bioturbation BOREHOLE SMGW-BH-B321 REV 1 TERMINATED AT 20.46 m Target depth				
					21.0 32.2						
					22.0 31.2						
					23.0 30.2						
					24.0 29.2						

See Explanatory Notes for details of abbreviations & basis of descriptions.

CARDNO NSW/ACT PTY LTD

Cardno

File: 80021888 SMGW-BH-B321 REV 1 4 OF 4

EXCAVATION - GEOLOGICAL LOG

PIT NO : SMGW-TP-B362 REV 0
FILE / JOB NO : 80021888
SHEET : 1 OF 1

PROJECT : SMWSA GI
LOCATION : 640 Luddenham Rd Luddenham

POSITION : E: 290831.826, N: 6252867.650 (56 MGA2020) | SURFACE ELEVATION : 57.089 (AHD)
EQUIPMENT TYPE : 8t Excavator | METHOD : 600mm Toothed Bucket
DATE EXCAVATED : 4/8/21 | LOGGED BY : TH | CHECKED BY : PW
EXCAVATION DIMENSIONS : 3.00 m LONG 1.00 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa 100 200 300 400	DCP TEST (AS 1289.6.3.2-1997) Blows/100 mm 5 10 15 20 25	STRUCTURE & Other Observations
	STABLE	N/A	0.30m B	0.0			FILL: SILTY SAND: brown, fine to medium grained sand, with rootlets				6	TOPSOIL 0.00: All ES PID<10 ppm
				0.20m								
			0.50m B	0.5		SC	CLAYEY SAND: yellow-brown, fine grained sand, low plasticity clay, with silt, trace fine grained, sub-angular gravel		MD to D		7 10	POSSIBLE RESIDUAL SOIL
				0.50m								
		Not Encountered	1.00m			CI-CH	SILTY CLAY: orange brown, medium to high plasticity, trace fine grained gravel, trace rootlets		VSt to H		13 14 10	
			1.30m B	1.0		CI	SILTY CLAY: orange brown mottled pale grey, medium plasticity, with ironstone, angular cobbles	M			12 15 15	1.00: Non-calcareous
			1.50m	1.40m								
				1.5		CI-CH	SILTY CLAY: pale yellow, medium to high plasticity, with weathered siltstone rock cobbles up to 300mm, angular		H		20 25	1.50: Non-calcareous
				2.00m								
				2.0			EXCAVATION SMGW-TP-B362 REV 0 TERMINATED AT 2.00 m Target depth					
				2.5								
				3.0								
				3.5								
				4.0								
				4.5								
				5.0								

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
N Natural Exposure
E Existing Excavation
BH Backhoe Bucket
B Bulldozer Blade
R Ripper

SUPPORT
T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
U50 - Undisturbed Sample 50 mm diameter
D - Disturbed Sample
B - Bulk Disturbed Sample
MC - Moisture Content
HP - Hand Penetrometer (UCS kPa)
VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D - Dry
M - Moist
W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

See Explanatory Notes for details of abbreviations & basis of descriptions.

CARDNO NSW/ACT PTY LTD

Cardno

File: 80021888 SMGW-TP-B362 REV 0 1 OF 1

EXCAVATION - GEOLOGICAL LOG

PIT NO : SMGW-TP-B363 REV 0
FILE / JOB NO : 80021888
SHEET : 1 OF 1

PROJECT : SMWSA GI
LOCATION : 640 Luddenham Rd Luddenham

POSITION : E: 290891.878, N: 6252748.662 (56 MGA2020) | SURFACE ELEVATION : 55.949 (AHD)
EQUIPMENT TYPE : 8t Excavator | METHOD : 600mm Toothed Bucket
DATE EXCAVATED : 4/8/21 | LOGGED BY : TH | CHECKED BY : PW
EXCAVATION DIMENSIONS : 3.00 m LONG 1.00 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND KPa PENETRO-METER 100 200 300 400	DCP TEST (AS 1289.6.3.2-1997) Blows/100 mm 5 10 15 20 25	STRUCTURE & Other Observations
	STABLE	N/A		0.0			FILL: SILTY SAND: yellow-brown, medium grained sand, with fine to medium grained gravel, trace organics (grass, rootlets)				6	TOPSOIL 0.00: All ES PID<10 ppm
				0.20m			SILTY CLAY: orange, brown, medium plasticity, with fine grained sand	D			6	POSSIBLE RESIDUAL SOIL
			0.50m B	0.5		CI					14	
		Not Encountered		0.50m			SILTY CLAY: pale grey, mottled brown, high plasticity, trace medium to coarse grained, ironstone gravel, trace rootlets		VSt to H		12	
											11	
			1.00m	1.0							15	
											15	1.00: Non-calcareous
						CH		M			12	
							1.30m: increased ironstone content				10	
				1.5							12	
											18	1.50: Non-calcareous
									H		25	
				2.00m			EXCAVATION SMGW-TP-B363 REV 0 TERMINATED AT 2.00 m Target depth					
				2.0								
				2.5								
				3.0								
				3.5								
				4.0								
				4.5								
				5.0								

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
N Natural Exposure
E Existing Excavation
BH Backhoe Bucket
B Bulldozer Blade
R Ripper

SUPPORT
T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
U50 - Undisturbed Sample 50 mm diameter
D - Disturbed Sample
B - Bulk Disturbed Sample
MC - Moisture Content
HP - Hand Penetrometer (UCS kPa)
VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D - Dry
M - Moist
W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

See Explanatory Notes for details of abbreviations & basis of descriptions.

CARDNO NSW/ACT PTY LTD

Cardno

File: 80021888 SMGW-TP-B363 REV 0 1 OF 1

EXCAVATION - GEOLOGICAL LOG

PIT NO : SMGW-TP-B364 REV 0
FILE / JOB NO : 80021888
SHEET : 1 OF 1

PROJECT : SMWSA GI
LOCATION : 640 Luddenham Rd Luddenham

POSITION : E: 290886.727, N: 6252810.839 (56 MGA2020) | SURFACE ELEVATION : 57.444 (AHD)
EQUIPMENT TYPE : 8t Excavator | METHOD : 600mm Toothed Bucket
DATE EXCAVATED : 4/8/21 | LOGGED BY : TH | CHECKED BY : PW
EXCAVATION DIMENSIONS : 3.00 m LONG 1.00 m WIDE

DRILLING | MATERIAL

DEPTH (m)	PENETRATION (VE E F H)	SUPPORT	GROUNDWATER LEVELS	SAMPLES & FIELD TESTS	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION (Soil Type, Colour, Plasticity or Particle Characteristic, Secondary and Minor Components)	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	HAND PENETROMETER kPa (100 200 300 400)	DCP TEST (AS 1289.6.3.2-1997) Blows/100 mm (5 10 15 20 25)	STRUCTURE & Other Observations
0.0	VE	STABLE	N/A				FILL: SILTY SAND: brown, fine to medium grained sand, with organics (rootlets)				4	TOPSOIL 0.00: All ES PID<10 ppm
0.20m												
						CL	SANDY CLAY: brown orange, low plasticity, with silt		St to VSt		6	POSSIBLE RESIDUAL SOIL
0.50m				B 0.50m								
0.5							SILTY CLAY: pale grey, pale red, medium plasticity, with red-brown, fine to medium grained, sub-angular, ironstone gravel				8	
			Not Encountered								8	
											11	
											14	
				1.00m B		CI		M	VSt to H		14	1.00: Non-calcareous
1.0											12	
											12	
1.40m												
				1.50m		CI-CH	CLAY: grey, medium to high plasticity, with medium to coarse grained, angular, gravel, trace ironstone				10	1.50: Non-calcareous
1.5											15	
1.70m												
						CI-CH	SILTY CLAY: pale grey, and red-brown, mottled brown, medium to high plasticity, trace fine to medium grained, sub-angular, ironstone gravel		H		18	
2.00m											25	
2.0							EXCAVATION SMGW-TP-B364 REV 0 TERMINATED AT 2.00 m Target depth					
2.5												
3.0												
3.5												
4.0												
4.5												
5.0												

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
N Natural Exposure
E Existing Excavation
BH Backhoe Bucket
B Bulldozer Blade
R Ripper

SUPPORT
T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
U50 - Undisturbed Sample 50 mm diameter
D - Disturbed Sample
B - Bulk Disturbed Sample
MC - Moisture Content
HP - Hand Penetrometer (UCS kPa)
VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

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D - Dry
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VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

See Explanatory Notes for details of abbreviations & basis of descriptions.

CARDNO NSW/ACT PTY LTD

Cardno

File: 80021888 SMGW-TP-B364 REV 0 1 OF 1

Results Table C1: Full Data Set

							BTEX						MAH					TPH					CRC Care TPH Fractions							Metals							
							Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total MAH	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	Isopropylbenzene	Styrene	C6 - C9	C10 - C14	C15 - C28	C29-C36	>C10 - C36 (Sum of total)	C6-C10	C10-C16	C16-C34	C34-C40	C10 - C40 (Sum of total)	F1: C6-C10 less BTEX	F2: >C10-C16 less NAPHTHALENE	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc
							mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR							0.1	0.1	0.1	0.2	0.1	0.3	0.5	0.5	0.5	0.5	0.5	20	20	50	50	50	20	50	100	100	50	20	50	2	0.4	1	1	1	0.1	1	1
NSW 2014 Excavated Natural Material (Absolute Max)							0.5	65	25			15										500							40	1	150	200	100	1	60	300
NSW 2014 Excavated Natural Material (Maximum average)																						250							20	0.5	75	100	50	0.5	30	150
NSW 2014 General Solid Waste CT1 (No Leaching)							10	288	600			1000					60	650				10000							100	20	100		100	4	40	
NSW EPA PFAS Waste Class Addendum 2016 - SCC1																																				
NSW 2014 Restricted Solid Waste CT2 (No Leaching)							40	1152	2400			4000					240	2600				40000							400	80	400		400	16	160	
NSW EPA PFAS Waste Class Addendum 2016 - SCC2																																				
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)							65	105	105			45												120	1300	5600		180		100		190	200	1100		220	450
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)							95	135	165			180												170	2500	6600		215		160		320	280	1800		380	650
PFAS NEMP 2.0 Table 3 Ecological Indirect Exposure																																				
PFAS NEMP 2.0 Ecological Direct Exposure																																				
NEPM 2013 HIL, Recreational C																														300	90		17000	600	80	1200	30000
NEPM 2013 HSL for direct contact, Recreational C							120	18,000	5300			15,000													5300	7400		5100	3800							
PFAS NEMP 2.0 Table 2 Health Public open space																																				
NEPM 2013 HIL, Commercial/Industrial D																														3000	900		240000	1500	730	6000	400000
NEPM 2013 HSL for direct contact, Commercial/Industrial D							430	99,000	27,000			81,000													27,000	38,000		26,000	20,000							
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																																				
0-1m							4	NL	NL			NL																310	NL							
1-2m							6	NL	NL			NL																480	NL							
2-4m							9	NL	NL			NL																NL	NL							
>4m							20	NL	NL			NL																NL	NL							
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Silt																																				
0-1m							4	NL	NL			NL																250	NL							
1-2m							4	NL	NL			NL																360	NL							
2-4m							6	NL	NL			NL																590	NL							
>4m							10	NL	NL			NL																NL	NL							
PFAS NEMP 2.0 Table 2 Health Industrial / Commercial																																				
NEPM 2013 Management Limits, POS, Fine Soil																							800	1000	3500	10000										
NEPM 2013 Management Limits, C/I, Fine Soil																							800	1000	5000	10000										
Field ID	**Location ID**	**Sample Date**	**Easting**	**Northing**	**Lab Report**																																
BH-B321_0.1	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997		<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	-	-	-	-	<20	21	130	220	371	<20	<50	270	160	430	<20	<50	6.9	<0.4	15	47	15	<0.1	13	130
BH-B321_0.25	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997		<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	58	90	148	<20	<50	120	<100	120	<20	<50	13	<0.4	19	35	22	<0.1	26	110
QA129	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997		<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	-	-	-	-	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	13	<0.4	19	31	22	<0.1	15	73
QA229	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	263410		<0.2	<0.5	<1	<2	<1	<3	-	-	-	-	-	<25	<50	<100	<100	-	<25	<50	<100	<100	<50	<25	<50	11	<0.4	16	28	19	<0.1	13	63
BH-B321_0.45	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-B321_0.95	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997		<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	-	-	-	-	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	13	<0.4	14	47	17	<0.1	27	84
BH-B321_2	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
HSL C for vapour intrusion are not included as all guidelines are non-limiting.
Duplicate naphthalene results may be present due to different test methods used for BTEXN and PAH.

		Asbestos				Organochlorine Pesticides																							
		Asbestos Results	Moisture Content	Moisture Content (dried @ 103°C)	pH (aqueous extract)	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene
		Comment	%	%	pH Units	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
LOR			0.1	1	0.1	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
NSW 2014 Excavated Natural Material (Absolute Max)																											
NSW 2014 Excavated Natural Material (Maximum average)																											
NSW 2014 General Solid Waste CT1 (No Leaching)																	60	60	60								
NSW EPA PFAS Waste Class Addendum 2016 - SCC1																											
NSW 2014 Restricted Solid Waste CT2 (No Leaching)																	240	240	240								
NSW EPA PFAS Waste Class Addendum 2016 - SCC2																											
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)														180													
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)														640													
PFAS NEMP 2.0 Table 3 Ecologcal Indirect Exposure																											
PFAS NEMP 2.0 Ecological Direct Exposure																											
NEPM 2013 HIL, Recreational C									10		70				400					20				10		10
NEPM 2013 HSL for direct contact, Recreational C																											
PFAS NEMP 2.0 Table 2 Health Public open space																											
NEPM 2013 HIL, Commercial/Industrial D									45		530				3600					100				50		80
NEPM 2013 HSL for direct contact, Commercial/Industrial D																											
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																											
0-1m																											
1-2m																											
2-4m																											
>4m																											
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Silt																											
0-1m																											
1-2m																											
2-4m																											
>4m																											
PFAS NEMP 2.0 Table 2 Health Industrial / Commercial																											
NEPM 2013 Management Limits, POS, Fine Soil																											
NEPM 2013 Management Limits, C/I, Fine Soil																											
BH-B321_0.1	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	No asbestos detected at the reporting limit of 0.01% w/w.Organic fibre detected.No trace asbestos detected	-	29	7.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BH-B321_0.25	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	No asbestos detected at the reporting limit of 0.01% w/w.Organic fibre detected.No trace asbestos detected	-	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA129	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA229	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	263410	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-B321_0.45	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	13	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-B321_0.95	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	11	6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-B321_2	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	6.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
HSL C for vapour intrusion are not included as all guidelines are non-limiting.
Duplicate naphthalene results may be present due to different test methods used for BTEXN and PAH.

Results Table C1: Full Data Set

			Organophosphorous Pesticides																													Insecticides			
	Methoxychlor	Toxaphene	Azinophos methyl	Bolstar (Sulprofos)	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethoprop	Fenitrothion	Fensulfothion	Fenthion	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Phorate	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos	Tokuthion	Parathion	Pirimiphos-methyl	Naphthalene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	0.1	0.1	0.1	0.2	0.2	0.1	0.1	2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.2	2	0.2	2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.1
NSW 2014 Excavated Natural Material (Absolute Max)																																				
NSW 2014 Excavated Natural Material (Maximum average)																																				
NSW 2014 General Solid Waste CT1 (No Leaching)						4																														
NSW EPA PFAS Waste Class Addendum 2016 - SCC1																																				
NSW 2014 Restricted Solid Waste CT2 (No Leaching)						16																														
NSW EPA PFAS Waste Class Addendum 2016 - SCC2																																				
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)																																				170
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)																																				370
PFAS NEMP 2.0 Table 3 Ecologcal Indirect Exposure																																				
PFAS NEMP 2.0 Ecological Direct Exposure																																				
NEPM 2013 HIL, Recreational C	400	30				250																														
NEPM 2013 HSL for direct contact, Recreational C																																				1900
PFAS NEMP 2.0 Table 2 Health Public open space																																				
NEPM 2013 HIL, Commercial/Industrial D	2500	160				2000																														
NEPM 2013 HSL for direct contact, Commercial/Industrial D																																				11,000
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																																				
0-1m																																				NL
1-2m																																				NL
2-4m																																				NL
>4m																																				NL
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Silt																																				
0-1m																																				NL
1-2m																																				NL
2-4m																																				NL
>4m																																				NL
PFAS NEMP 2.0 Table 2 Health Industrial / Commercial																																				
NEPM 2013 Management Limits, POS, Fine Soil																																				
NEPM 2013 Management Limits, C/I, Fine Soil																																				

Field ID	Location ID	Sample Date	Easting	Northing	Lab Report																																
BH-B321_0.1	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	<0.2	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
BH-B321_0.25	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
QA129	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
QA229	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	263410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH-B321_0.45	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-B321_0.95	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
BH-B321_2	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
HSL C for vapour intrusion are not included as all guidelines are non-limiting.
Duplicate naphthalene results may be present due to different test methods used for BTEXN and PAH.

Results Table C1: Full Data Set

						PAH																			Polychlorinated Biphenyls																		
						Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(k)fluoranthene	Benzo(b+j)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene	Benzo(a)pyrene TEQ (Zero LOR)	Benzo(a)pyrene TEQ (Half LOR)_1	Benzo(a)pyrene TEQ (Full LOR)	PAHs (Sum of total)	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	8:2 Fluorotelomer sulfonate	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	Perfluorobutane sulfonic acid (PFBS)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoDA)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid (PFNA)
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR						0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.5	0.05	0.1	0.1	0.1	0.5	0.5	0.5	0.5	0.5	0.1	0.5	0.5	0.5	0.5	0.5	0.5	0.0005	0.0001	0.0005	0.0005	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
NSW 2014 Excavated Natural Material (Absolute Max)																	1							40																			
NSW 2014 Excavated Natural Material (Maximum average)																	0.5							20																			
NSW 2014 General Solid Waste CT1 (No Leaching)																	0.8							200								<50											
NSW EPA PFAS Waste Class Addendum 2016 - SCC1																																											
NSW 2014 Restricted Solid Waste CT2 (No Leaching)																	3.2															<50											
NSW EPA PFAS Waste Class Addendum 2016 - SCC2																																											
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)																																											
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)																																											
PFAS NEMP 2.0 Table 3 Ecologcal Indirect Exposure																																											
PFAS NEMP 2.0 Ecological Direct Exposure																																											
NEPM 2013 HIL, Recreational C																						3		300								1											
NEPM 2013 HSL for direct contact, Recreational C																																											
PFAS NEMP 2.0 Table 2 Health Public open space																																											
NEPM 2013 HIL, Commercial/Industrial D																						40		4000								7											
NEPM 2013 HSL for direct contact, Commercial/Industrial D																																											
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																																											
0-1m																																											
1-2m																																											
2-4m																																											
>4m																																											
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Silt																																											
0-1m																																											
1-2m																																											
2-4m																																											
>4m																																											
PFAS NEMP 2.0 Table 2 Health Industrial / Commercial																																											
NEPM 2013 Management Limits, POS, Fine Soil																																											
NEPM 2013 Management Limits, C/I, Fine Soil																																											
Field ID	**Location ID**	**Sample Date**	**Easting**	**Northing**	**Lab Report**																																						
BH-B321_0.1	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	0.0006	0.0002	<0.0001	<0.0001	0.0002
BH-B321_0.25	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA129	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0001
QA229	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	263410	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.05	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	<0.001	<0.0002	<0.001	<0.005	<0.001	<0.0001	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001
BH-B321_0.45	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
BH-B321_0.95	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
BH-B321_2	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Notes:

HSL C for vapour intrusion are not included as all guidelines are non-limiting.

Duplicate naphthalene results may be present due to different test methods used for BTEXN and PAH.

	Perfluorocarbons																								Chlorina													
	Perfluorooctane sulfonamide (FOSA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)	Sum of PFAS (WA DER List)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	Perfluorobutanoic acid (PFBA)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctane sulfonic acid (PFOS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluoropentanoic acid (PFPeA)	Sum of PFAS	Perfluorodecanesulfonic acid (PFDS)	Sum of PFHxS and PFOS	6:2 Fluorotelomer Sulfonate (6:2 FtS)	Perfluorooctanoate (PFOA)	Perfluorononanesulfonic acid (PFNS)	Perfluoropropanesulfonic acid (PFPrS)	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	EPN	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,2,3-trichloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	Bromochloromethane	Bromodichloromethane	Bromoform
	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	µg/kg	µg/kg	µg/kg	µg/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
LOR	0.0005	0.0001	0.0001	0.0001	0.0005	0.0001	0.0001	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.1	0.1	0.1	0.1	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW 2014 Excavated Natural Material (Absolute Max)																																						
NSW 2014 Excavated Natural Material (Maximum average)																																						
NSW 2014 General Solid Waste CT1 (No Leaching)																										200	600	26	24		14		10					
NSW EPA PFAS Waste Class Addendum 2016 - SCC1													1.8	1.8							18																
NSW 2014 Restricted Solid Waste CT2 (No Leaching)																										800	2400	104	96		56		40					
NSW EPA PFAS Waste Class Addendum 2016 - SCC2													7.2	7.2							72																
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)																																						
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)																																						
PFAS NEMP 2.0 Table 3 Ecologcal Indirect Exposure														0.01																								
PFAS NEMP 2.0 Ecological Direct Exposure														1							10																
NEPM 2013 HIL, Recreational C																																						
NEPM 2013 HSL for direct contact, Recreational C																																						
PFAS NEMP 2.0 Table 2 Health Public open space																				1		10																
NEPM 2013 HIL, Commercial/Industrial D																																						
NEPM 2013 HSL for direct contact, Commercial/Industrial D																																						
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																																						
0-1m																																						
1-2m																																						
2-4m																																						
>4m																																						
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Silt																																						
0-1m																																						
1-2m																																						
2-4m																																						
>4m																																						
PFAS NEMP 2.0 Table 2 Health Industrial / Commercial																				20		50																
NEPM 2013 Management Limits, POS, Fine Soil																																						
NEPM 2013 Management Limits, C/I, Fine Soil																																						

Field ID	Location ID	Sample Date	Easting	Northing	Lab Report																																		
BH-B321_0.1	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	<0.0005	<0.0001	<0.0001	<0.0001	0.0025	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	0.002	<0.0001	<0.0001	0.0035	<0.0001	0.002	<0.0005	0.0005	<0.1	<0.1	2.5	2.5	<0.2	-	-	-	-	-	-	-	-	-	-
BH-B321_0.25	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
QA129	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	<0.0005	<0.0001	<0.0001	<0.0001	0.0017	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	0.001	<0.0001	<0.0001	0.0021	<0.0001	0.001	<0.0005	0.0007	<0.1	<0.1	1.7	1.7	-	-	-	-	-	-	-	-	-	-
QA229	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	263410	<0.001	<0.005	<0.0005	<0.0005	-	<0.0002	<0.0001	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	0.0004	<0.0001	<0.0002	0.0008	<0.0002	0.0004	<0.0001	0.0003	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-
BH-B321_0.45	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	<0.0005	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0005	0.0003	<0.1	<0.1	0.3	0.3	-	-	-	-	-	-	-	-	-	-
BH-B321_0.95	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	<0.0005	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0005	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
BH-B321_2	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	<0.0005	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-

Notes:
HSL C for vapour intrusion are not included as all guidelines are non-limiting.
Duplicate naphthalene results may be present due to different test methods used for BTEXN and PAH.

Results Table C1: Full Data Set

	ted Hydrocarbons																								Solvents				
	Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Dichloromethane	Trichloroethene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Vinyl chloride	1,2-dibromoethane	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	4-chlorotoluene	Bromobenzene	Bromomethane	Chlorobenzene	Dichlorodifluoromethane	Iodomethane	Trichlorofluoromethane	Methyl Ethyl Ketone	4-Methyl-2-pentanone	Acetone	Ethyl chloride	Carbon disulfide
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW 2014 Excavated Natural Material (Absolute Max)																														
NSW 2014 Excavated Natural Material (Maximum average)																														
NSW 2014 General Solid Waste CT1 (No Leaching)	10			120					172	10	14			4		86		150				2000				4000				
NSW EPA PFAS Waste Class Addendum 2016 - SCC1																														
NSW 2014 Restricted Solid Waste CT2 (No Leaching)	40			480					688	40	56			16		344		600				8000				16000				
NSW EPA PFAS Waste Class Addendum 2016 - SCC2																														
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)																														
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)																														
PFAS NEMP 2.0 Table 3 Ecologcal Indirect Exposure																														
PFAS NEMP 2.0 Ecological Direct Exposure																														
NEPM 2013 HIL, Recreational C																														
NEPM 2013 HSL for direct contact, Recreational C																														
PFAS NEMP 2.0 Table 2 Health Public open space																														
NEPM 2013 HIL, Commercial/Industrial D																														
NEPM 2013 HSL for direct contact, Commercial/Industrial D																														
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																														
0-1m																														
1-2m																														
2-4m																														
>4m																														
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Silt																														
0-1m																														
1-2m																														
2-4m																														
>4m																														
PFAS NEMP 2.0 Table 2 Health Industrial / Commercial																														
NEPM 2013 Management Limits, POS, Fine Soil																														
NEPM 2013 Management Limits, C/I, Fine Soil																														
Field ID	**Location ID**	**Sample Date**	**Easting**	**Northing**	**Lab Report**																										
BH-B321_0.1	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-B321_0.25	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
QA129	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA229	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	263410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-B321_0.45	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-B321_0.95	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-B321_2	SMGW-BH-B321	22/02/2021	290947.406	6252750.376	777997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
HSL C for vapour intrusion are not included as all guidelines are non-limiting.
Duplicate naphthalene results may be present due to different test methods used for BTEXN and PAH.

Sydney Metro Western Sydney Airport
Table C2 - Full Datsaset

	BTEX						MAH					TRH					CRC Care TPH Fractions							Metals								Asbestos
	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total MAH	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	Isopropylbenzene	Styrene	C6 - C9	C10 - C14	C15 - C28	C29-C36	>C10 - C36 (Sum of total)	C6-C10	C10-C16	C16-C34	C34-C40	C10 - C40 (Sum of total)	F1: C6-C10 less BTEX	F2: >C10-C16 less NAPHTHALENE	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	Asbestos Results
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	Comment
EQL	0.1	0.1	0.1	0.2	0.1	0.3	0.5	0.5	0.5	0.5	0.5	20	20	50	50	50	20	50	100	100	100	20	50	2	0.4	5	5	5	0.1	5	5	
NSW 2014 Excavated Natural Material (Absolute Max)	0.5	65	25			15										500								40	1	150	200	100	1	60	300	
NSW 2014 Excavated Natural Material (Maximum Average)																250								20	0.5	75	100	50	0.5	30	150	
NSW 2014 General Solid Waste CT1 (No Leaching)	10	288	600			1000					60	650				10000								100	20	100		100	4	40		
NSW EPA PFAS Waste Class Addendum 2016 - SCC1																																
NSW 2014 Restricted Solid Waste CT2 (No Leaching)	40	1152	2400			4000					240	2600				40000								400	80	400		400	16	160		
NSW EPA PFAS Waste Class Addendum 2016 - SCC2																																
NSW TCLP1 Criteria																																
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)	65	105	125			45												120	1300	5600		180		100		190	200	1100		220	450	
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)	75	135	165			180												170	2500	6600		215		160		320	280	1800		380	650	
PFAS NEMP 2.0 Ecological Direct Exposure																																
PFAS NEMP 2.0 Table 3 Ecological Indirect Exposure - All Land Uses																																
NEPM 2013 HIL, Recreational C																								300	90		17000	600	80	1200	30000	
HSL for Direct Contact, POS	120	18,000	5300			15,000													5300	7400		5100	3800									
PFAS NEMP 2.0 Table 2 Health Public open space																																
NEPM 2013 HIL, Commercial/Industrial D																								3000	900		240000	1500	730	6000	400000	
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																																
0-1m	4	NL	NL			NL																310	NL									
1-2m	6	NL	NL			NL																480	NL									
2-4m	9	NL	NL			NL																NL	NL									
>4m	20	NL	NL			NL																NL	NL									
HSL for Direct Contact, C/I	430	99,000	27,000			81,000													27,000	38,000		26,000	20,000									
PFAS NEMP 2.0 Table 2 Industrial/Commercial																																
NEPM 2013 Management Limits, POS, Fine soil																	800	1000	3500	10000												
NEPM 2013 Management Limits, C/I, Coarse Soil																	800	1000	5000	10000												

Field ID	Alternative Name	Sample Date	Easting	Northing	Depth	Report number																											
TP-B362_0.1	SMGW-TP-B362_0.1	4/08/2021	290831.826	6252867.65	0.1	815255	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	9.5	<0.4	28	11	14	<0.1	6.7	22	No asbestos detected at the reporting limit of 0.01% w/w.Organic fibre detected.No trace asbestos detected
TP-B362_0.5	SMGW-TP-B362_0.5	4/08/2021	290831.826	6252867.65	0.5	815255	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	34	<0.4	61	72	36	<0.1	31	110	-
TP-B362_1	SMGW-TP-B362_1	4/08/2021	290831.826	6252867.65	1	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	<0.4	18	32	14	<0.1	10	40	-
TP-B362_1.5	SMGW-TP-B362_1.5	4/08/2021	290831.826	6252867.65	1.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.2	<0.4	15	35	15	<0.1	31	85	-
TP-B362_2	SMGW-TP-B362_2	4/08/2021	290831.826	6252867.65	2	815255	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	5.9	<0.4	11	34	17	<0.1	19	62	-
TP-B364_0.1	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	96	170	266	<20	<50	230	<100	230	<20	<50	5.1	<0.4	11	140	15	<0.1	14	410	No asbestos detected at the reporting limit of 0.01% w/w.Organic fibre detected.No trace asbestos detected
QA100_40821	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	-	-	-	-	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	12	<0.4	25	17	19	<0.1	10	37	-
TP-B364_0.3	SMGW-TP-B364_0.3	4/08/2021	290886.727	6252810.839	0.3	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.5	<0.4	14	32	16	<0.1	6.7	32	-
TP-B364_0.5	SMGW-TP-B364_0.5	4/08/2021	290886.727	6252810.839	0.5	815255	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	3.1	<0.4	8.3	21	9	<0.1	<5	17	-
TP-B364_1	SMGW-TP-B364_1	4/08/2021	290886.727	6252810.839	1	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	<0.4	6.6	21	9.9	<0.1	<5	17	-
TP-B364_1.5	SMGW-TP-B364_1.5	4/08/2021	290886.727	6252810.839	1.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.2	<0.4	5.2	40	11	<0.1	<5	25	-
TP-B364_2	SMGW-TP-B364_2	4/08/2021	290886.727	6252810.839	2	815255	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	18	<0.4	6.5	27	13	<0.1	10	58	-
TP-B363_0.1	SMGW-TP-B363_0.1	4/08/2021	290891.878	6252748.662	0.1	815255	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	10	<0.4	26	31	34	<0.1	17	65	No asbestos detected at the reporting limit of 0.01% w/w.Organic fibre detected.No trace asbestos detected
TP-B363_0.5	SMGW-TP-B363_0.5	4/08/2021	290891.878	6252748.662	0.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.2	<0.4	16	28	18	<0.1	<5	25	-
TP-B363_1	SMGW-TP-B363_1	4/08/2021	290891.878	6252748.662	1	815255	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	2.3	<0.4	5.5	17	9.5	<0.1	<5	8.1	-
TP-B363_1.5	SMGW-TP-B363_1.5	4/08/2021	290891.878	6252748.662	1.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	<0.4	5.8	21	11	<0.1	<5	17	-
TP-B363_2	SMGW-TP-B363_2	4/08/2021	290891.878	6252748.662	2	815255	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	5	<0.4	5.2	19	9.2	<0.1	<5	13	-

Paired QA Samples

Sydney Metro Western Sydney Airport
Table C2 - Full Datsaset

									Organochlorine Pesticides																							
							Moisture Content (dried @ 103°C)	pH (aqueous extract)	Other organochlorine pesticides IWRG621	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Toxaphene
							%	pH_Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL							1	0.1	0.1	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1
NSW 2014 Excavated Natural Material (Absolute Max)																																
NSW 2014 Excavated Natural Material (Maximum Average)																																
NSW 2014 General Solid Waste CT1 (No Leaching)																					60	60	60									
NSW EPA PFAS Waste Class Addendum 2016 - SCC1																																
NSW 2014 Restricted Solid Waste CT2 (No Leaching)																					240	240	240									
NSW EPA PFAS Waste Class Addendum 2016 - SCC2																																
NSW TCLP1 Criteria																																
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)																		180														
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)																		640														
PFAS NEMP 2.0 Ecological Direct Exposure																																
PFAS NEMP 2.0 Table 3 Ecological Indirect Exposure - All Land Uses																																
NEPM 2013 HIL, Recreational C													10		70				400					20				10		10	400	30
HSL for Direct Contact, POS																																
PFAS NEMP 2.0 Table 2 Health Public open space																																
NEPM 2013 HIL, Commercial/Industrial D													45		530				3600					100				50		80	2500	160
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																																
0-1m																																
1-2m																																
2-4m																																
>4m																																
HSL for Direct Contact, C/I																																
PFAS NEMP 2.0 Table 2 Industrial/Commercial																																
NEPM 2013 Management Limits, POS, Fine soil																																
NEPM 2013 Management Limits, C/I, Coarse Soil																																
Field ID	**Alternative Name**	**Sample Date**	**Easting**	**Northing**	**Depth**	**Report nur**																										
TP-B362_0.1	SMGW-TP-B362_0.1	4/08/2021	290831.826	6252867.65	0.1	815255	9	6.5	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1
TP-B362_0.5	SMGW-TP-B362_0.5	4/08/2021	290831.826	6252867.65	0.5	815255	7.7	6.3	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1
TP-B362_1	SMGW-TP-B362_1	4/08/2021	290831.826	6252867.65	1	815255	15	5.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B362_1.5	SMGW-TP-B362_1.5	4/08/2021	290831.826	6252867.65	1.5	815255	12	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B362_2	SMGW-TP-B362_2	4/08/2021	290831.826	6252867.65	2	815255	13	8.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_0.1	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	30	6	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1
QA100_40821	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	10	6.4	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1
TP-B364_0.3	SMGW-TP-B364_0.3	4/08/2021	290886.727	6252810.839	0.3	815255	16	5.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_0.5	SMGW-TP-B364_0.5	4/08/2021	290886.727	6252810.839	0.5	815255	19	5.4	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1
TP-B364_1	SMGW-TP-B364_1	4/08/2021	290886.727	6252810.839	1	815255	15	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_1.5	SMGW-TP-B364_1.5	4/08/2021	290886.727	6252810.839	1.5	815255	14	4.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_2	SMGW-TP-B364_2	4/08/2021	290886.727	6252810.839	2	815255	17	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_0.1	SMGW-TP-B363_0.1	4/08/2021	290891.878	6252748.662	0.1	815255	9.4	6.4	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1
TP-B363_0.5	SMGW-TP-B363_0.5	4/08/2021	290891.878	6252748.662	0.5	815255	19	4.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_1	SMGW-TP-B363_1	4/08/2021	290891.878	6252748.662	1	815255	18	4.4	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1
TP-B363_1.5	SMGW-TP-B363_1.5	4/08/2021	290891.878	6252748.662	1.5	815255	13	4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_2	SMGW-TP-B363_2	4/08/2021	290891.878	6252748.662	2	815255	11	4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Organophosphorous Pesticides																				
	Azinophos methyl	Bolstar (Sulprofos)	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethoprop	Fenitrothion	Fensulfothion	Fenthion	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.2	0.2	0.2	0.2	0.2	2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
NSW 2014 Excavated Natural Material (Absolute Max)																					
NSW 2014 Excavated Natural Material (Maximum Average)																					
NSW 2014 General Solid Waste CT1 (No Leaching)				4																	
NSW EPA PFAS Waste Class Addendum 2016 - SCC1																					
NSW 2014 Restricted Solid Waste CT2 (No Leaching)				16																	
NSW EPA PFAS Waste Class Addendum 2016 - SCC2																					
NSW TCLP1 Criteria																					
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)																					
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)																					
PFAS NEMP 2.0 Ecological Direct Exposure																					
PFAS NEMP 2.0 Table 3 Ecological Indirect Exposure - All Land Uses																					
NEPM 2013 HIL, Recreational C				250																	
HSL for Direct Contact, POS																					
PFAS NEMP 2.0 Table 2 Health Public open space																					
NEPM 2013 HIL, Commercial/Industrial D				2000																	
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																					
0-1m																					
1-2m																					
2-4m																					
>4m																					
HSL for Direct Contact, C/I																					
PFAS NEMP 2.0 Table 2 Industrial/Commercial																					
NEPM 2013 Management Limits, POS, Fine soil																					
NEPM 2013 Management Limits, C/I, Coarse Soil																					
Field ID																					
TP-B362_0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP-B362_0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP-B362_1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B362_1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B362_2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
QA100_40821	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP-B364_0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP-B364_1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP-B363_0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_1	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TP-B363_1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

▨ Paired QA Samples

Sydney Metro Western Sydney Airport
Table C2 - Full Datsaset

																Herbicides	Insecticides	Pesticides		PAH					PAH															Phenols												
							Monocrotophos	Naled (Dibrom)	Omethoate	Phorate	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos	Dinoseb	Tokuthion	Parathion	Pirimiphos-methyl	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(k)fluoranthene	Benzo(b+j)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene	Benzo(a)pyrene TEQ (Zero LOR)	Benzo(a)pyrene TEQ (Half LOR)_0	Benzo(a)pyrene TEQ (Full LOR)	PAHs (Sum of total)	Phenols (non-halogenated) IWRG621	Phenols(halogenated) IWRG621	2,4-dimethylphenol	2,4-dinitrophenol	2-methylphenol	2-nitrophenol	3-&4-methylphenol	4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexyl phenol	4-chloro-3-methylphenol	4-nitrophenol	Cresol (Total)	Phenol
							mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL							2	0.2	2	0.2	0.2	0.2	0.2	0.2	0.2	20	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	20	1	0.5	5	0.2	1	0.4	5	20	1	5	0.5	0.5
NSW 2014 Excavated Natural Material (Absolute Max)																																1							40													
NSW 2014 Excavated Natural Material (Maximum Average)																																0.5							20													
NSW 2014 General Solid Waste CT1 (No Leaching)																																0.8							200	288				4000							4000	
NSW EPA PFAS Waste Class Addendum 2016 - SCC1																																																				
NSW 2014 Restricted Solid Waste CT2 (No Leaching)																																3.2								1152				16000							16000	
NSW EPA PFAS Waste Class Addendum 2016 - SCC2																																																				
NSW TCLP1 Criteria																																																				
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)																				170																																
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)																				370																																
PFAS NEMP 2.0 Ecological Direct Exposure																																																				
PFAS NEMP 2.0 Table 3 Ecological Indirect Exposure - All Land Uses																																																				
NEPM 2013 HIL, Recreational C																																						3		300												4000	40000
HSL for Direct Contact, POS																				1900																																
PFAS NEMP 2.0 Table 2 Health Public open space																																																				
NEPM 2013 HIL, Commercial/Industrial D																																						40		4000												25000	240000
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																																																				
0-1m																				NL																																
1-2m																				NL																																
2-4m																				NL																																
>4m																				NL																																
HSL for Direct Contact, C/I																																																				
PFAS NEMP 2.0 Table 2 Industrial/Commercial																																																				
NEPM 2013 Management Limits, POS, Fine soil																																																				
NEPM 2013 Management Limits, C/I, Coarse Soil																																																				
Field ID	**Alternative Name**	**Sample Date**	**Easting**	**Northing**	**Depth**	**Report nur**																																															
TP-B362_0.1	SMGW-TP-B362_0.1	4/08/2021	290831.826	6252867.65	0.1	815255	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<20	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<20	<1	<0.5	<5	<0.2	<1	<0.4	<5	<20	<1	<5	<0.5	<0.5
TP-B362_0.5	SMGW-TP-B362_0.5	4/08/2021	290831.826	6252867.65	0.5	815255	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<20	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<20	<1	<0.5	<5	<0.2	<1	<0.4	<5	<20	<1	<5	<0.5	<0.5
TP-B362_1	SMGW-TP-B362_1	4/08/2021	290831.826	6252867.65	1	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B362_1.5	SMGW-TP-B362_1.5	4/08/2021	290831.826	6252867.65	1.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B362_2	SMGW-TP-B362_2	4/08/2021	290831.826	6252867.65	2	815255	-	-	-	-	-	-	-	-	-	<20	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<20	<1	<0.5	<5	<0.2	<1	<0.4	<5	<20	<1	<5	<0.5	<0.5
TP-B364_0.1	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<20	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<20	<1	<0.5	<5	<0.2	<1	<0.4	<5	<20	<1	<5	<0.5	<0.5
QA100_40821	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_0.3	SMGW-TP-B364_0.3	4/08/2021	290886.727	6252810.839	0.3	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_0.5	SMGW-TP-B364_0.5	4/08/2021	290886.727	6252810.839	0.5	815255	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<20	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<20	<1	<0.5	<5	<0.2	<1	<0.4	<5	<20	<1	<5	<0.5	<0.5
TP-B364_1	SMGW-TP-B364_1	4/08/2021	290886.727	6252810.839	1	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_1.5	SMGW-TP-B364_1.5	4/08/2021	290886.727	6252810.839	1.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_2	SMGW-TP-B364_2	4/08/2021	290886.727	6252810.839	2	815255	-	-	-	-	-	-	-	-	-	<20	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<20	<1	<0.5	<5	<0.2	<1	<0.4	<5	<20	<1	<5	<0.5	<0.5
TP-B363_0.1	SMGW-TP-B363_0.1	4/08/2021	290891.878	6252748.662	0.1	815255	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<20	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<20	<1	<0.5	<5	<0.2	<1	<0.4	<5	<20	<1	<5	<0.5	<0.5
TP-B363_0.5	SMGW-TP-B363_0.5	4/08/2021	290891.878	6252748.662	0.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_1	SMGW-TP-B363_1	4/08/2021	290891.878	6252748.662	1	815255	<2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<20	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<20	<1	<0.5	<5	<0.2	<1	<0.4	<5	<20	<1	<5	<0.5	<0.5
TP-B363_1.5	SMGW-TP-B363_1.5	4/08/2021	290891.878	6252748.662	1.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_2	SMGW-TP-B363_2	4/08/2021	290891.878	6252748.662	2	815255	-	-	-	-	-	-	-	-	-	<20	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	<20	<1	<0.5	<5	<0.2	<1	<0.4	<5	<20	<1	<5	<0.5	<0.5

▨ Paired QA Samples

Sydney Metro Western Sydney Airport
Table C2 - Full Datsaset

	Polychlorinated Biphenyls								Perfluorocarbons																												
	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	8:2 Fluorotelomer sulfonate	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	Perfluorobutane sulfonic acid (PFBS)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoDA)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid (PFNA)	Perfluorooctane sulfonamide (FOSA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	Perfluorobutanoic acid (PFBA)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctane sulfonic acid (PFOS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluoropentanoic acid (PFPeA)	Sum of PFAS
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0005	0.0001	0.0005	0.0005	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0005	0.0005	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0005
NSW 2014 Excavated Natural Material (Absolute Max)																																					
NSW 2014 Excavated Natural Material (Maximum Average)																																					
NSW 2014 General Solid Waste CT1 (No Leaching)								<50																													
NSW EPA PFAS Waste Class Addendum 2016 - SCC1																																	1.8	1.8			
NSW 2014 Restricted Solid Waste CT2 (No Leaching)								<50																													
NSW EPA PFAS Waste Class Addendum 2016 - SCC2																																	7.2	7.2			
NSW TCLP1 Criteria																																					
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)																																					
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)																																					
PFAS NEMP 2.0 Ecological Direct Exposure																																		1			
PFAS NEMP 2.0 Table 3 Ecological Indirect Exposure - All Land Uses																																		0.01			
NEPM 2013 HIL, Recreational C								1																													
HSL for Direct Contact, POS																																					
PFAS NEMP 2.0 Table 2 Health Public open space																																					
NEPM 2013 HIL, Commercial/Industrial D								7																													
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																																					
0-1m																																					
1-2m																																					
2-4m																																					
>4m																																					
HSL for Direct Contact, C/I																																					
PFAS NEMP 2.0 Table 2 Industrial/Commercial																																					
NEPM 2013 Management Limits, POS, Fine soil																																					
NEPM 2013 Management Limits, C/I, Coarse Soil																																					

Field ID	Alternative Name	Sample Date	Easting	Northing	Depth	Report nur																																	
TP-B362_0.1	SMGW-TP-B362_0.1	4/08/2021	290831.826	6252867.65	0.1	815255	<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	0.0002	0.0005
TP-B362_0.5	SMGW-TP-B362_0.5	4/08/2021	290831.826	6252867.65	0.5	815255	<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	0.0001	<0.0005
TP-B362_1	SMGW-TP-B362_1	4/08/2021	290831.826	6252867.65	1	815255	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005
TP-B362_1.5	SMGW-TP-B362_1.5	4/08/2021	290831.826	6252867.65	1.5	815255	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005
TP-B362_2	SMGW-TP-B362_2	4/08/2021	290831.826	6252867.65	2	815255	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005
TP-B364_0.1	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	0.0004	0.0001	0.0001	0.0001	0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	0.0005	<0.0001	<0.0001	0.0017
QA100_40821	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	0.0002	<0.0001	0.0001	0.0007
TP-B364_0.3	SMGW-TP-B364_0.3	4/08/2021	290886.727	6252810.839	0.3	815255	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	0.0001	<0.0005
TP-B364_0.5	SMGW-TP-B364_0.5	4/08/2021	290886.727	6252810.839	0.5	815255	<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	0.0003	0.0005	<0.0001	<0.0001	0.0008
TP-B364_1	SMGW-TP-B364_1	4/08/2021	290886.727	6252810.839	1	815255	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005
TP-B364_1.5	SMGW-TP-B364_1.5	4/08/2021	290886.727	6252810.839	1.5	815255	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005
TP-B364_2	SMGW-TP-B364_2	4/08/2021	290886.727	6252810.839	2	815255	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005
TP-B363_0.1	SMGW-TP-B363_0.1	4/08/2021	290891.878	6252748.662	0.1	815255	<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	0.0001	<0.0001	<0.0001	<0.0005
TP-B363_0.5	SMGW-TP-B363_0.5	4/08/2021	290891.878	6252748.662	0.5	815255	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005
TP-B363_1	SMGW-TP-B363_1	4/08/2021	290891.878	6252748.662	1	815255	<0.5	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005
TP-B363_1.5	SMGW-TP-B363_1.5	4/08/2021	290891.878	6252748.662	1.5	815255	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005
TP-B363_2	SMGW-TP-B363_2	4/08/2021	290891.878	6252748.662	2	815255	-	-	-	-	-	-	-	-	<0.0005	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005
	Paired QA Samples																																				

Sydney Metro Western Sydney Airport
Table C2 - Full Datsaset

					Organic				SVOCs	Chlorinated Hydrocarbons																										
	Perfluorodecanesulfonic acid (PFDS)	Sum of PFHxS and PFOS	6:2 Fluorotelomer Sulfonate (6:2 FtS)	Perfluorooctanoate (PFOA)	Perfluorononanesulfonic acid (PFNS)	Perfluoropropanesulfonic acid (PFPrS)	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	EPN	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,2,3-trichloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Dichloromethane	Trichloroethene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Vinyl chloride
	mg/kg	mg/kg	mg/kg	mg/kg	UG/KG	UG/KG	UG/KG	UG/KG	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.0001	0.0001	0.0005	0.0001	0.1	0.1	0.1	0.1	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW 2014 Excavated Natural Material (Absolute Max)																																				
NSW 2014 Excavated Natural Material (Maximum Average)																																				
NSW 2014 General Solid Waste CT1 (No Leaching)										200	600	26	24		14		10						10			120					172	10	14			4
NSW EPA PFAS Waste Class Addendum 2016 - SCC1				18																																
NSW 2014 Restricted Solid Waste CT2 (No Leaching)										800	2400	104	96		56		40						40			480					688	40	56			16
NSW EPA PFAS Waste Class Addendum 2016 - SCC2				72																																
NSW TCLP1 Criteria																																				
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)																																				
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)																																				
PFAS NEMP 2.0 Ecological Direct Exposure				10																																
PFAS NEMP 2.0 Table 3 Ecological Indirect Exposure - All Land Uses																																				
NEPM 2013 HIL, Recreational C																																				
HSL for Direct Contact, POS																																				
PFAS NEMP 2.0 Table 2 Health Public open space		1		10																																
NEPM 2013 HIL, Commercial/Industrial D																																				
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																																				
0-1m																																				
1-2m																																				
2-4m																																				
>4m																																				
HSL for Direct Contact, C/I																																				
PFAS NEMP 2.0 Table 2 Industrial/Commercial		20		50																																
NEPM 2013 Management Limits, POS, Fine soil																																				
NEPM 2013 Management Limits, C/I, Coarse Soil																																				

Field ID	**Alternative Name**	**Sample Date**	**Easting**	**Northing**	**Depth**	**Report nur**	Perfluorodecanesulfonic acid (PFDS)	Sum of PFHxS and PFOS	6:2 Fluorotelomer Sulfonate (6:2 FtS)	Perfluorooctanoate (PFOA)	Perfluorononanesulfonic acid (PFNS)	Perfluoropropanesulfonic acid (PFPrS)	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	EPN	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,2,3-trichloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Dichloromethane	Trichloroethene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Vinyl chloride
TP-B362_0.1	SMGW-TP-B362_0.1	4/08/2021	290831.826	6252867.65	0.1	815255	<0.0001	<0.0001	<0.0005	0.0002	<0.1	<0.1	0.2	0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP-B362_0.5	SMGW-TP-B362_0.5	4/08/2021	290831.826	6252867.65	0.5	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	**0.3**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP-B362_1	SMGW-TP-B362_1	4/08/2021	290831.826	6252867.65	1	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B362_1.5	SMGW-TP-B362_1.5	4/08/2021	290831.826	6252867.65	1.5	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B362_2	SMGW-TP-B362_2	4/08/2021	290831.826	6252867.65	2	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP-B364_0.1	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	<0.0001	0.0005	<0.0005	0.0004	<0.1	<0.1	0.9	0.9	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
QA100_40821	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	<0.0001	0.0002	<0.0005	0.0002	<0.1	<0.1	0.4	0.4	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_0.3	SMGW-TP-B364_0.3	4/08/2021	290886.727	6252810.839	0.3	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_0.5	SMGW-TP-B364_0.5	4/08/2021	290886.727	6252810.839	0.5	815255	<0.0001	0.0008	<0.0005	<0.0001	<0.1	<0.1	0.5	0.8	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP-B364_1	SMGW-TP-B364_1	4/08/2021	290886.727	6252810.839	1	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_1.5	SMGW-TP-B364_1.5	4/08/2021	290886.727	6252810.839	1.5	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_2	SMGW-TP-B364_2	4/08/2021	290886.727	6252810.839	2	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP-B363_0.1	SMGW-TP-B363_0.1	4/08/2021	290891.878	6252748.662	0.1	815255	<0.0001	0.0001	<0.0005	<0.0001	<0.1	<0.1	0.1	0.1	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP-B363_0.5	SMGW-TP-B363_0.5	4/08/2021	290891.878	6252748.662	0.5	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_1	SMGW-TP-B363_1	4/08/2021	290891.878	6252748.662	1	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP-B363_1.5	SMGW-TP-B363_1.5	4/08/2021	290891.878	6252748.662	1.5	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_2	SMGW-TP-B363_2	4/08/2021	290891.878	6252748.662	2	815255	<0.0001	<0.0001	<0.0005	<0.0001	<0.1	<0.1	<0.1	<0.1	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

▨ Paired QA Samples

Sydney Metro Western Sydney Airport
Table C2 - Full Datsaset

							Halogenated Hydrocarbons											Halogenated Phenols							Solvents						
							Chlorinated hydrocarbons IWRG621	1,2-dibromoethane	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	4-chlorotoluene	Bromobenzene	Bromomethane	Chlorobenzene	Dichlorodifluoromethane	Iodomethane	Trichlorofluoromethane	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,6-dichlorophenol	2-chlorophenol	Pentachlorophenol	tetrachlorophenols	Methyl Ethyl Ketone	4-Methyl-2-pentanone	Acetone	Allyl chloride	Carbon disulfide	Vic EPA IWRG 621 OCP (Total)*	Vic EPA IWRG 621 Other CHC (Total)*
							mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	MG/KG	MG/KG
EQL							0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	1	0.5	0.5	0.5	1	10	0.5	0.5	0.5	0.5	0.5	0.1	0.5
NSW 2014 Excavated Natural Material (Absolute Max)																															
NSW 2014 Excavated Natural Material (Maximum Average)																															
NSW 2014 General Solid Waste CT1 (No Leaching)									86		150				2000				8000	40					4000						
NSW EPA PFAS Waste Class Addendum 2016 - SCC1																															
NSW 2014 Restricted Solid Waste CT2 (No Leaching)									344		600				8000				32000	160					16000						
NSW EPA PFAS Waste Class Addendum 2016 - SCC2																															
NSW TCLP1 Criteria																															
NEPM 2013 EIL/ESL UR/POS, Site Specific (Clay)																															
NEPM 2013 EIL/ESL Comm./Ind., Site Specific (Clay)																															
PFAS NEPM 2.0 Ecological Direct Exposure																															
PFAS NEPM 2.0 Table 3 Ecological Indirect Exposure - All Land Uses																															
NEPM 2013 HIL, Recreational C																							120								
HSL for Direct Contact, POS																															
PFAS NEPM 2.0 Table 2 Health Public open space																															
NEPM 2013 HIL, Commercial/Industrial D																							660								
NEPM 2013 Soil HSL Commercial/Industrial D, for Vapour Intrusion, Clay																															
0-1m																															
1-2m																															
2-4m																															
>4m																															
HSL for Direct Contact, C/I																															
PFAS NEPM 2.0 Table 2 Industrial/Commercial																															
NEPM 2013 Management Limits, POS, Fine soil																															
NEPM 2013 Management Limits, C/I, Coarse Soil																															

Field ID	Alternative Name	Sample Date	Easting	Northing	Depth	Report nur																									
TP-B362_0.1	SMGW-TP-B362_0.1	4/08/2021	290831.826	6252867.65	0.1	815255	<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	<1	<0.5	<0.5	<0.5	<1	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
TP-B362_0.5	SMGW-TP-B362_0.5	4/08/2021	290831.826	6252867.65	0.5	815255	<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	<1	<0.5	<0.5	<0.5	<1	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
TP-B362_1	SMGW-TP-B362_1	4/08/2021	290831.826	6252867.65	1	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B362_1.5	SMGW-TP-B362_1.5	4/08/2021	290831.826	6252867.65	1.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B362_2	SMGW-TP-B362_2	4/08/2021	290831.826	6252867.65	2	815255	<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	<1	<0.5	<0.5	<0.5	<1	<10	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
TP-B364_0.1	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	<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	<1	<0.5	<0.5	<0.5	<1	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
QA100_40821	SMGW-TP-B364_0.1	4/08/2021	290886.727	6252810.839	0.1	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-
TP-B364_0.3	SMGW-TP-B364_0.3	4/08/2021	290886.727	6252810.839	0.3	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_0.5	SMGW-TP-B364_0.5	4/08/2021	290886.727	6252810.839	0.5	815255	<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	<1	<0.5	<0.5	<0.5	<1	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
TP-B364_1	SMGW-TP-B364_1	4/08/2021	290886.727	6252810.839	1	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_1.5	SMGW-TP-B364_1.5	4/08/2021	290886.727	6252810.839	1.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B364_2	SMGW-TP-B364_2	4/08/2021	290886.727	6252810.839	2	815255	<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	<1	<0.5	<0.5	<0.5	<1	<10	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
TP-B363_0.1	SMGW-TP-B363_0.1	4/08/2021	290891.878	6252748.662	0.1	815255	<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	<1	<0.5	<0.5	<0.5	<1	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
TP-B363_0.5	SMGW-TP-B363_0.5	4/08/2021	290891.878	6252748.662	0.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_1	SMGW-TP-B363_1	4/08/2021	290891.878	6252748.662	1	815255	<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	<1	<0.5	<0.5	<0.5	<1	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5
TP-B363_1.5	SMGW-TP-B363_1.5	4/08/2021	290891.878	6252748.662	1.5	815255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-B363_2	SMGW-TP-B363_2	4/08/2021	290891.878	6252748.662	2	815255	<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	<1	<0.5	<0.5	<0.5	<1	<10	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
	Paired QA Samples																														

Appendix D

Data Quality Objectives

Data Quality Objectives
DSI for AEC40, Luddenham Road, Luddenham
SCAW Package for SMWSA

As shown in the table below, 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 problem to be addressed is that the extent and nature of potential contamination at the site is unknown and it is unclear whether the site is suitable for the proposed uses. The objective of the proposed DSI is to determine the contamination status of the site with respect to the proposed land use and, if contamination is confirmed, to make recommendations for further investigations and / or remediation to render the site suitable for the proposed uses. In addition, soil from the site may potentially be reused elsewhere within SCAW and the data obtained in the DSI, therefore, may also be used for this purpose. A preliminary conceptual site model (CSM) has been prepared for the proposed development. The project team consists of experienced environmental engineers and scientists.
2: Identify the decisions / goal of the study	The site history has identified possible contaminating previous uses which are identified in the preliminary CSM. The SAC for potential contaminants are detailed in Appendix F. The decision is to establish whether or not the results fall below the SAC or 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 concentrations of potential contaminants at the site using NATA accredited laboratories and methods, where possible. The SAC for each of the potential contaminants are detailed in Appendix F. A photoionization detector (PID) is used on-site to screen soils for volatile contaminants. PID readings were used to inform sample selection for laboratory analysis.
4: Define the study boundaries	The site is identified in section 2. The lateral boundaries of the investigation area are shown on Drawing AEC40-1, Appendix A.

Step	Summary
5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with SAC. Initial comparisons will be with individual results then, where required and if possible, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL)) to assess potential risks posed by the site contamination. 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). 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).
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 pose a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Contaminants at the site and statistical analysis of data (in line with NEPC (2013)) comply with human health and environmental SAC and as such, do 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 data-sets, 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 sampling plan are presented in section 7. Adequately experienced environmental scientists / engineers are to conduct field work and sample analysis interpretation.

Appendix E

Laboratory Certificates and Chain of Custody

Appendix F

Site Assessment Criteria

Site Assessment Criteria for Soil for AEC40

Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA)

1.0 Introduction

It is understood that the two general future land uses associated at the site will comprise:

- The rail corridor. The rail corridor will include the rail line, embankments / noise barriers, a stabling yard and maintenance facility and stations; and
- Passive open space. These are areas immediately adjacent to the rail corridor that may be used for bike / commuter paths. It is assumed that there is an absence of buildings in areas of passive open space.

The following references were consulted for deriving 'Tier 1' SAC for soil for the two above-listed land uses:

- 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); and
- HEPA, *PFAS National Environmental Management Plan* (NEMP) (HEPA, 2020).

2.0 Human Health-based Criteria

Human health-based SAC for soil and the associated future land uses are listed in Tables 1 to 6. Tier 1 criteria comprise:

- Health Investigation Levels (HIL) for a broad range of metals and organics (Table 1). HIL are applicable for assessing human health risk via all relevant pathways of exposure;
- Health Screening Levels (HSL) for vapour intrusion for selected petroleum hydrocarbons and fractions (Tables 2 and 3). These are applicable for assessing human health via the inhalation pathway. HSL are dependent on soil type and depth. HSL D are applicable to soil / areas to be covered by buildings (e.g., stations, offices and enclosed sheds);
- HSL for direct contact for selected petroleum hydrocarbons and fractions (Table 4). These are applicable for assessing human health via the direct contact pathway;
- Health investigation levels (HIL) for per- and poly-fluoroalkyl substances (PFAS) (Table 5). At the time of preparing this document, screening values were available only for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS); and
- Health screening levels for asbestos (Table 6).

For HSL for vapour intrusion, HSL for silt and clay soils are shown as these are the predominant soil types at the site.

Table 1: Health Investigation Levels (Tier 1) from NEPM

Contaminant	HIL C for Passive Open Space (mg/kg)	HIL D for Rail Corridor (mg/kg)
Metals and Inorganics		
Arsenic	300	3000
Cadmium	90	900
Chromium (VI)	300	3600
Copper	17 000	240 000
Lead	600	1500
Mercury (inorganic)	80	730
Nickel	1200	6000
Zinc	30 000	400 000
Polycyclic Aromatic Hydrocarbons (PAH)		
Benzo(a)pyrene TEQ	3	40
Total PAH	300	4000
Phenols		
Phenol	40 000	240 000
Pentachlorophenol	120	660
Cresols	4000	25 000
Organochlorine Pesticides (OCP)		
DDT+DDE+DDD	400	3600
Aldrin and dieldrin	10	45
Chlordane	70	530
Endosulfan	340	2000
Endrin	20	100
Heptachlor	10	50
HCB	10	80
Methoxychlor	400	2500
Toxaphene	30	160
Organophosphorus Pesticides (OPP)		
Chlorpyrifos	250	2000
Polychlorinated Biphenyls (PCB)		
PCB	1	7

Table 2: Health Screening Levels (Tier 1) for Vapour Intrusion for Passive Open Space from NEPM

Contaminant	HSL C (mg/kg)	HSL C (mg/kg)	HSL C (mg/kg)	HSL C (mg/kg)
SILT	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	NL	NL	NL	NL
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	NL	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TPH C6-C10 less BTEX	NL	NL	NL	NL
TPH >C_{10}-C_{16} less naphthalene	NL	NL	NL	NL
CLAY	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	NL	NL	NL	NL
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	NL	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TPH C6-C10 less BTEX	NL	NL	NL	NL
TPH >C10-C16 less naphthalene	NL	NL	NL	NL

Notes: TPH is total petroleum hydrocarbons

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'

Table 3: Health Screening Levels (Tier 1) for Vapour Intrusion for Rail Corridor from NEPM

Contaminant	HSL D (mg/kg)	HSL D (mg/kg)	HSL D (mg/kg)	HSL D (mg/kg)
SILT	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	4	4	6	10
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	NL	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TPH C6-C10 less BTEX	250	360	590	NL
TPH >C10-C16 less naphthalene	NL	NL	NL	NL

Contaminant	HSL D (mg/kg)	HSL D (mg/kg)	HSL D (mg/kg)	HSL D (mg/kg)
CLAY	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	4	6	9	20
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	NL	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TPH C6-C10 less BTEX	310	480	NL	NL
TPH >C10-C16 less naphthalene	NL	NL	NL	NL

Notes: TPH is total petroleum hydrocarbons

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'

Table 4: Health Screening Levels (Tier 1) for Direct Contact from CRC CARE (2011)

Contaminant	HSL C for Passive Open Space (mg/kg)	HSL D for Rail Corridor (mg/kg)
Benzene	120	430
Toluene	18 000	99 000
Ethylbenzene	5300	27 000
Xylenes	15 000	81 000
Naphthalene	1900	11 000
TPH C6-C10 less BTEX	5100	26 000
TPH >C10-C16 less naphthalene	3800	20 000
TPH >C16-C34	5300	27 000
TPH >C34-C40	7400	38 000

Notes: TPH is total petroleum hydrocarbons.

Table 5: Health Investigation Levels (Tier 1) for PFAS from NEMP

Contaminant	HIL C for Passive Open Space (mg/kg)	HIL D for Rail Corridor (mg/kg)
PFOS and PFHxS *	1	20
PFOA	10	50

Notes: * Includes PFOS only, PFHxS only and the sum of the two.

Table 6: Health Screening Levels (Tier 1) for Asbestos from NEPM

Form of Asbestos	Health Screening Level C for Passive Open Space	Health Screening Level D for Rail Corridor
Bonded asbestos containing materials (ACM)	0.02%	0.05%
Fibrous asbestos (FA) and asbestos fines (AF) (friable asbestos)	0.001%	0.001%
All forms of asbestos	No visible asbestos for surface soil	No visible asbestos for surface soil

Notes: FA comprises friable asbestos material and includes severely weathered cement sheet, insulation products and woven asbestos material. This type of friable asbestos is defined here as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. This material is typically unbonded or was previously bonded and is now significantly degraded (crumbling).
AF includes free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve.
Surface soils defined as top 10 cm.

3.0 Ecological Criteria

Ecological SAC for soil and the associated future use are listed are listed in Tables 7 to 9. Tier 1 criteria comprise:

- Ecological Investigation Levels (EIL) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene (Table 7). These are derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website and are used to assess contamination with respect to terrestrial ecosystems. Site specific inputs (including soil parameters) are required to calculate EIL. EIL typically apply to the top 2 m of soil;
- Ecological Screening Levels (ESL) for selected petroleum hydrocarbon compounds and fractions, and benzo(a)pyrene, and are used to assess contamination with respect to terrestrial ecosystems (Table 8). ESL are dependent on soil type and typically apply to the top 2 m of soil; and
- Ecological Soil Guideline Values (EGV) for PFAS (Table 9). At the time of preparing this document, screening values were available only for PFOS and PFOA.

EIL were determined using the NEPC Ecological Investigation Level Spreadsheet based on the following inputs:

- A pH of 5.9 which is the average pH for analysed soil samples in this investigation (see laboratory certificates) and the previous results for previous test pit SMWG-TP-B364;
- A Cation Exchange Capacity (CEC) of 15 meq/100g which is the average CEC for analysed soil samples (see laboratory certificates);
- Contamination is assumed to be ‘aged’ based on site history;
- A (default) organic carbon content value of 1 % has been used as a default value;
- A clay content of 1% has been used as a conservative value given the soil profile encountered during the investigation; and
- The state is NSW and the traffic volume is ‘low’.

Predominantly silt and clay soils were encountered during the investigation and, so, ESL for fine soils have been adopted.

Table 7: Ecological Investigation Levels (Tier 1) from NEPM toolbox

Contaminant	Public Open Space EIL for Passive Open Space (mg/kg)	Commercial and Industrial EIL for Rail Corridor (mg/kg)
Metals		
Arsenic	100	160
Copper	200	280
Nickel	220	380
Chromium III	190	320
Lead	1100	1800
Zinc	450	650
PAH		
Naphthalene	170	370
OCP		
DDT	180	640

Table 8: Ecological Screening Levels (Tier 1) from NEPM

Contaminant	Soil Type	Public Open Space ESL for Passive Open Space (mg/kg)	Commercial and Industrial ESL for Rail Corridor (mg/kg)
Benzene	Fine	65	95
Toluene	Fine	105	135
Ethylbenzene	Fine	125	185
Xylenes	Fine	45	95
TPH C6-C10 less BTEX	Coarse/ Fine	180*	215*
TPH >C10-C16	Coarse/ Fine	120*	170*
TPH >C16-C34	Fine	1300	2500
TPH >C34-C40	Fine	5600	6600
Benzo(a)pyrene	Coarse / Fine	0.7	1.4

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TPH is total petroleum hydrocarbons

Table 9: Ecological Soil Guideline Values (Tier 1) from NEMP for all Land Uses

Contaminant	Direct Exposure (mg/kg)	Indirect Exposure (mg/kg)
PFOS	1	0.01
PFOA	10	NC

Notes: NC no criterion
Direct exposure ecological soil guideline applies specifically to protection of organisms that live within, or in close contact with soil, such as earthworms and plants.
The indirect exposure ecological soil guideline accounts for the various pathways through which organisms can be exposed whether or not they are in direct contact with PFAS contaminated soil (i.e. exposure through the food chain). For intensively developed sites with no secondary consumers and minimal potential for indirect ecological exposure, a higher criterion of up to 0.14 mg/kg may be appropriate.

4.0 Management Limits

In addition to appropriate consideration and application of the human health and ecological criteria, 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.

Management limits are shown in Table 10. Although gravel and sand soils (coarse soil) were encountered, predominantly silt and clay soils were encountered during the investigation and, so, management limits for fine soils have been adopted.

Table 10: Management Limits for TPH from NEPM (mg/kg)

Contaminant	Soil Type	Public Open Space Management Limits for Passive Open Space (mg/kg)	Commercial and Industrial Management Limit for Rail Corridor (mg/kg)
TPH C6-C10	Fine	800	800
TRH >C10-C16	Fine	1000	1000
TPH >C16-C34	Fine	3500	5000
TPH >C34-C40	Fine	10 000	10 000

Site Assessment Criteria for Groundwater for AEC40

Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA)

1.0 Introduction

The following references were consulted for deriving 'Tier 1' SAC for groundwater:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).
- ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018).
- NHMRC *Guidelines for Managing Risks In Recreational Water* (NHMRC, 2008).
- NHMRC, NRMMC *Australian Drinking Water Guidelines 6 2011, Version 3.8, 2022* (NHMRC, NRMMC, 2022).
- ANZECC *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000).
- HEPA PFAS *National Environmental Management Plan* (NEMP) (HEPA, 2020).

2.0 Ecological Criteria

SAC for the protection of aquatic freshwater ecosystems which may receive groundwater from the site include:

- Default guideline values (DGV) recommended for the protection of slightly to moderately disturbed freshwater ecosystems (or otherwise for an unknown level of protection) from ANZG (2018) (Table 1).

It is noted that livestock at surrounding farmland could potentially be a receptor to discharged groundwater (as surface water) that was sourced from the site, however, water quality guidelines for livestock in ANZECC (2000) are generally less conservative than the DGV and have not been listed herein.

Table 1: Default Guideline Values for Protection of Aquatic Ecosystems from ANZG (2018)

Contaminant	Fresh Water DGV (µg/L)
Metals	
Arsenic (III)	24
Arsenic (V)	13
Cadmium	0.2 (19*)

Contaminant	Fresh Water DGV (µg/L)
Chromium (III)	3.3 (219*)
Chromium (VI)	1.0
Copper	1.4
Lead	3.4 (2255*)
Mercury (inorganic)	0.06
Nickel	11 (851*)
Zinc	8 (619)*
Aromatic Hydrocarbons (including BTEX)	
Benzene	950
Ethylbenzene	80
Toluene	180
m-Xylene	75
o-Xylene	350
p-Xylene	200
Isopropylbenzene	30
PAH	
Anthracene	0.01
Benzo(a)pyrene	0.1
Fluoranthene	1
Naphthalene	16
Phenanthrene	0.6
Phenols	
2,4-dinitrophenol	45
2,4-dimethylphenol	2
4-nitrophenol	58
Phenol	320
2,3,4,6-tetrachlorophenol	10
2,3,5,6-tetrachlorophenol	0.2
2,4,6-trichlorophenol	3
2,4-dichlorophenol	120
2,6-dichlorophenol	34
2-chlorophenol	340
Pentachlorophenol	3.6
OCP	
Aldrin	0.001
Chlordane	0.03

Contaminant	Fresh Water DGV (µg/L)
DDT	0.006
Dicofol	0.5
Dieldrin	0.01
Endosulfan	0.03
Endrin	0.01
Heptachlor	0.01
Lindane	0.2
Methoxychlor	0.005
Mirex	0.04
Toxaphene	0.1
Hexachlorobenzene	0.05
OPP	
Azinphos methyl	0.01
Chlorpyrifos	0.01
Diazinon	0.01
Dimethoate	0.15
Fenitrothion	0.2
Malathion	0.05
Parathion	0.004
PCB	
Aroclor 1242	0.3
Aroclor 1254	0.01
Other Organics	
1,1,2-trichloroethane	6500
1,1-dichloroethene	700
1,2-dichloroethane	1900
1,2-dichloropropane	900
1,3-dichloropropane	1100
Carbon tetrachloride	240
Chloroform	370
Tetrachloroethene	70
Vinyl chloride	100
1,2,3-trichlorobenzene	3
1,2,4-trichlorobenzene	85
1,2-dichlorobenzene	160
1,3-dichlorobenzene	260

Contaminant	Fresh Water DGV (µg/L)
1,4-dichlorobenzene	60
Chlorobenzene	55
1,1,1-Trichloroethane	270
Trichloroethene	330
1,1,2,2-Tetrachloroethane	400
Carbon disulfide	20

Notes: * Modified for hardness 5000 mgCaCO3/L

3.0 Human Health and Aesthetic Criteria

Human health-based SAC include:

- Health Screening Levels (HSL) for vapour intrusion for selected petroleum hydrocarbons and fractions (Tables 2 and 3). These are applicable for assessing human health via the inhalation pathway. HSL are shown for clay, given that clay is the predominant soil type. HSL D are applicable for areas to be covered by buildings (e.g., stations, offices and enclosed sheds);
- Health-based guidelines for recreational waters (Table 4). These are health-based criteria from NHMRC, NRMMC (2022) multiplied by 10 (to account for lower human consumption of recreational waters compared to drinking water); and
- Recreational water quality guideline values (Table 5) from NEMP.

Given that groundwater in the area is not used for drinking or domestic purposes (according to groundwater bore registered with Water NSW), health-based drinking water guidelines have not been adopted as SAC.

For the consideration of aesthetics of recreational waters, aesthetic guideline values from NHMRC, NRMMC (2022) have been included in Table 4.

Table 2: Groundwater Health Screening Levels for Vapour Intrusion from NEPM for Passive Open Space

Contaminant	HSL C (µg/L)	HSL C (µg/L)	HSL C (µg/L)
CLAY	**2 m to <4 m**	**4 m to <8 m**	**8 m+**
Benzene	NL	NL	NL
Toluene	NL	NL	NL
Ethylbenzene	NL	NL	NL
Xylenes	NL	NL	NL
Naphthalene	NL	NL	NL
TPH C6-C10 minus BTEX	NL	NL	NL
TPH >C10-C16 minus naphthalene	NL	NL	NL

Notes: 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'.

Table 3: Groundwater Health Screening Levels for Vapour Intrusion from NEPM for Rail Corridor

Contaminant	HSL D (µg/L)	HSL D (µg/L)	HSL D (µg/L)
CLAY	**2 m to <4 m**	**4 m to <8 m**	**8 m+**
Benzene	30 000	30 000	35 000
Toluene	NL	NL	NL
Ethylbenzene	NL	NL	NL
Xylenes	NL	NL	NL
Naphthalene	NL	NL	NL
TPH C6-C10 minus BTEX	NL	NL	NL
TPH >C10-C16 minus naphthalene	NL	NL	NL

Notes: 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'.

Table 4: Guidelines for Protection of Recreational Waters from NHMRC (2008) and NHMRC, NRMMC (2022)

Contaminant	Health-based Guideline Value (µg/L)	Aesthetic Guideline Value (µg/L)
Metals		
Arsenic	100	-
Cadmium	20	-

Contaminant	Health-based Guideline Value (µg/L)	Aesthetic Guideline Value (µg/L)
Chromium (VI)	500	-
Copper	20 000	1000
Lead	100	-
Mercury	10	-
Nickel	200	-
Zinc	-	3000
BTEX		
Benzene	10	-
Toluene	8000	25
Ethylbenzene	3000	3
Xylene (total)	6000	20
PAH		
Benzo(a)pyrene	0.1	-
OCP		
Aldrin + Dieldrin	3	-
Chlordane	20	-
DDT	90	-
Endosulfan	200	-
Lindane	100	-
Heptachlor	3	-
Methoxychlor	3000	
OPP		
Azinphos methyl	300	-
Bromophos-ethyl	100	-
Chlorfenvinphos	20	-
Chlorpyrifos	100	-
Diazinon	40	-
Dichlorvos	50	-
Dimethoate	70	-
Disulfoton	40	-
Ethion	40	-
Ethoprophos (Ethoprop)	10	-
Fenitrothion	70	-
Fensulfothion	100	-
Fenthion	70	-

Contaminant	Health-based Guideline Value (µg/L)	Aesthetic Guideline Value (µg/L)
Malathion	700	-
Methyl parathion	7	-
Mevinphos (Phosdrin)	50	-
Monocrotophos	20	-
Omethoate	10	-
Pyrazophos	200	-
Terbufos	9	-
Tetrachlorvinphos	1000	-
Parathion	200	-
Pirimiphos-methyl	900	-
Halogenated Phenols		
2,4,6-trichlorophenol	200	2
2,4-dichlorophenol	2000	0.3
2-chlorophenol	3000	0.1
Pentachlorophenol	100	-
Other Organics		
1,1-dichloroethene	300	-
1,2-dichloroethane	30	-
Carbon tetrachloride	30	-
Hexachlorobutadiene	7	-
Tetrachloroethene	500	-
Vinyl chloride	3	-
1,2-dichlorobenzene	15 000	1
1,3-dichlorobenzene	-	20
1,4-dichlorobenzene	400	0.3
Chlorobenzene	3000	10
Styrene	300	4
Trihalomethanes	2500	-
1,2,3-Trichlorobenzenes (total)	300	5
1,3-Dichloropropene	1000	-
1,2-Dichloroethene	600	-
Dichloromethane (methylene chloride)	40	-

Table 5: Recreational Water Quality Guideline Values From NEMP

Contaminant	Recreational Water Quality Guideline Values (µg/L)
Sum of PFOS and PFHxS	2
PFOA	10

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Appendix G

Test Pit Logs and Borehole Logs

PIEZOMETER CONSTRUCTION

HOLE NO : AEC40-BH01
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

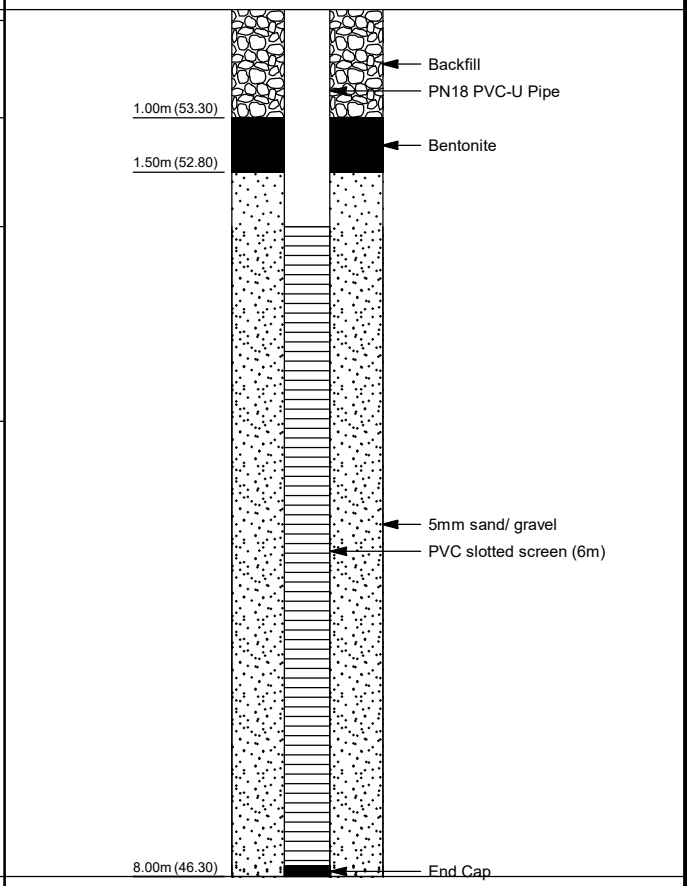
PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290929.5, N: 6252742.6 (56 MGA2020) SURFACE ELEVATION : 54.30 (mAHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : DB520 MOUNTING : Track CONTRACTOR : Numac

DATE STARTED : 05/09/22 DATE COMPLETED : 05/09/22 DATE LOGGED : 05/09/22 LOGGED BY : NB CHECKED BY : MB

DRILLING				MATERIAL			PIEZOMETER CONSTRUCTION DETAILS				
PROGRESS: DRILLING & CASING	PROGRESS: WATER LOSS	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL (See geotechnical log for soil/rock detail)	ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date / Static Water Level
							1			8.00 m	46.30 mAHD 05/09/2022
AD/T		Slow Seep	0.0			0.10m TOPSOIL: silty CLAY: low to medium plasticity, dark brown, trace gravel and rootlets					
					CI-CH	Silty CLAY: medium to high plasticity, red-orange with mottled grey					
						1.00m			1.00m (53.30)		
						Silty CLAY: medium to high plasticity, orange yellow pale grey, trace fine sand					
					CI-CH				1.50m (52.80)		
			2.0			2.00m					
						SANDSTONE: orange-brown; highly weathered, very low to low strength					
						3.80m					
			4.0			SILTSTONE: dark grey and brown; highly weathered to fresh, very low to medium strength At 4.0m: brown and dark gery					
			6.0			At 6.0m: dark grey					
			8.0			8.00m			8.00m (46.30)		
						AEC40-BH01 TERMINATED AT 8.00 m Target depth					
			10.0								
			12.0								
			14.0								



This report of well/VWP installation must be read in conjunction with accompanying notes and abbreviations. The geotechnical log is a summary only and the detailed log should be referred to for strata details and any core loss zones.

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PIEZOMETER CONSTRUCTION

HOLE NO : AEC40-BH02
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290908.0, N: 6252821.2 (56 MGA2020) SURFACE ELEVATION : 56.50 (mAHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : DB520 MOUNTING : Track CONTRACTOR : Numac

DATE STARTED : 05/09/22 DATE COMPLETED : 05/09/22 DATE LOGGED : 05/09/22 LOGGED BY : NB CHECKED BY : MB

DRILLING				MATERIAL			PIEZOMETER CONSTRUCTION DETAILS
PROGRESS: DRILLING & CASING	PROGRESS: WATER LOSS	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL (See geotechnical log for soil/rock detail)	
AD/T		Slow Seep	0.0			0.15m TOPSOIL: silty CLAY: low to medium plasticity, dark brown, trace gravel and rootlets	ID 1 / Type / Stick Up & RL / Tip Depth & RL: 8.50 m 48.00 mAHD / Installation Date: 05/09/2022 / Static Water Level
					CI-CH	Silty CLAY: medium to high plasticity, red-orange with mottled grey	
						1.20m	
			2.0		CI-CH	Silty CLAY: medium to high plasticity, orange-yellow and pale grey, trace fine sand and ironstone gravel	Backfill; PN18 PVC-U Pipe
						3.00m	
						SANDSTONE: orange-brown; highly weathered, very low to low strength	3.50m (53.00)
						4.00m	Bentonite; 4.00m (52.50)
			4.0			SILTSTONE: dark grey and brown; highly weathered to fresh, very low to medium strength	
			6.0			At 6.0m: dark grey	5mm sand/ gravel; PVC slotted screen (6m)
			8.0			8.50m	8.50m (48.00) End Cap
						AEC40-BH02 TERMINATED AT 8.50 m Target depth	
			10.0				
			12.0				
			14.0				

This report of well/VWP installation must be read in conjunction with accompanying notes and abbreviations. The geotechnical log is a summary only and the detailed log should be referred to for strata details and any core loss zones.

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PIEZOMETER CONSTRUCTION

HOLE NO : AEC40-BH03
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290803.1, N: 6252787.6 (56 MGA2020) SURFACE ELEVATION : 59.60 (mAHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : DB520 MOUNTING : Track CONTRACTOR : Numac

DATE STARTED : 08/09/22 DATE COMPLETED : 08/09/22 DATE LOGGED : 08/09/22 LOGGED BY : NB CHECKED BY : MB

DRILLING				MATERIAL			PIEZOMETER CONSTRUCTION DETAILS
PROGRESS: DRILLING & CASING	WATER LOSS	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL (See geotechnical log for soil/rock detail)	ID 1 — Type — Stick Up & RL — Tip Depth & RL: 6.00 m 53.60 mAHD — Installation Date: 09/09/2022 — Static Water Level
AD/T		Slow seep	0.0			0.15m TOPSOIL: silty CLAY: low to medium plasticity, dark brown, trace gravel and rootlets	Backfill
					CI-CH	Silty CLAY: medium to high plasticity, red-orange with mottled grey	PN18 PVC-U Pipe
						1.20m	
					CI-CH	Silty CLAY: medium to high plasticity, orange-yellow and pale grey, trace fine sand and ironstone gravel	
			2.0			2.00m	2.00m (57.60)
						SANDSTONE: orange-brown; highly weathered, very low to low strength	Bentonite
							2.50m (57.10)
						3.00m	
						SILTSTONE: dark grey and brown; highly weathered to slightly weathered, very low to medium strength	
			4.0				5mm sand/ gravel
							PVC slotted screen (6m)
						At 5.5m: dark gery	
			6.0			6.00m	6.00m (53.60)
						AEC40-BH03 TERMINATED AT 6.00 m Target depth	End Cap
			8.0				
			10.0				
			12.0				
			14.0				

This report of well/VWP installation must be read in conjunction with accompanying notes and abbreviations. The geotechnical log is a summary only and the detailed log should be referred to for strata details and any core loss zones.

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP01
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290843.1, N: 6252881.9 (56 MGA2020)	SURFACE ELEVATION : 55.80 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 24/08/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w>PL			FILL 0.00: PID <1
			0.30m ES 0.40m	0.20m		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	VSt	×	Field Replicate BD1/20220824 taken at 0.0-0.1m depth RESIDUAL SOIL 0.30: HP =260 kPa 0.30: PID <1
			0.80m ES 0.90m	0.5 0.70m		CH	Silty CLAY: high plasticity, pale brown, trace fine to medium siltstone gravel	w~PL	VSt	×	0.80: HP =240 kPa 0.80: PID <1
				1.0 1.10m			EXCAVATION AEC40TP01 TERMINATED AT 1.10 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP02

FILE / JOB NO : 204814.01

SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works

LOCATION : Luddenham Road - Luddenham

POSITION : E: 290848.8, N: 6252862.9 (56 MGA2020) | SURFACE ELEVATION : 57.00 (mAHD)

EQUIPMENT TYPE : 14 tonne Excavator | METHOD : 800mm bucket

DATE EXCAVATED : 24/08/22 | LOGGED BY : PJ | CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING					MATERIAL						
PENETRATION (VE, E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER (kPa)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <1
			0.30m ES 0.40m				0.20m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel			200	RESIDUAL SOIL 0.30: HP =200 kPa 0.30: PID <1
			0.80m ES 0.90m	0.5		CI-CH		w~PL	St to VSt		
				1.0			1.10m At 0.8m: red-brown mottled grey			200	0.80: HP =180 kPa 0.80: PID <1
							EXCAVATION AEC40TP02 TERMINATED AT 1.10 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD

- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT

- T Timbering

PENETRATION

VE E F H VH — No Resistance

WATER

10 Oct., 73 Water Level on Date shown

water inflow

water outflow

SAMPLES & FIELD TESTS

- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION

Based on Unified Classification System

MOISTURE

- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP03
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290876.9, N: 6252854.1 (56 MGA2020)	SURFACE ELEVATION : 56.50 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 24/08/22	LOGGED BY : PJ	CHECKED BY : MB
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

DEPTH (m)	PENETRATION (VE / E / F / H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY / RELATIVE DENSITY	HAND PENETROMETER (kPa)	STRUCTURE & Other Observations
0.0			Not Observed	ES 0.10m			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <1
0.20m				0.30m ES 0.40m		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St	×	RESIDUAL SOIL 0.30: HP =180 kPa 0.30: PID <1
0.50m							Silty CLAY: high plasticity, red-brown mottled pale grey, trace fine to coarse siltstone gravel				
0.5				0.80m ES 0.90m		CH		w~PL	St	×	0.80: HP =170 kPa 0.80: PID <1
1.00m							EXCAVATION AEC40TP03 TERMINATED AT 1.00 m Target depth				
1.0											
1.5											
2.0											
2.5											
3.0											
3.5											
4.0											
4.5											
5.0											

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP04
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290909.2, N: 6252826.1 (56 MGA2020) | SURFACE ELEVATION : 56.50 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator | METHOD : 800mm bucket
DATE EXCAVATED : 24/08/22 | LOGGED BY : PJ | CHECKED BY : MB
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING					MATERIAL					
PENETRATION (VE, E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER (kPa)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <1
			0.30m ES 0.40m	0.20m		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St to VSt	×	Field Replicate BD2/20220824 taken at 0.0-0.1m depth RESIDUAL SOIL 0.30: HP =200 kPa 0.30: PID <1
				0.5							
			0.80m ES 0.90m	0.50m		CH	Silty CLAY: high plasticity, red-brown mottled pale grey, trace fine to coarse siltstone gravel	w~PL	St to VSt	×	0.80: HP =180 kPa 0.80: PID <1
				0.90m			EXCAVATION AEC40TP04 TERMINATED AT 0.90 m Target depth				
				1.0							
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE, E, F, H, VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP05
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290910.6, N: 6252803.9 (56 MGA2020)	SURFACE ELEVATION : 55.90 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 24/08/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION / E / F / H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER (kPa)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <1
			0.30m ES 0.40m	0.20m		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St to VSt	× 220	RESIDUAL SOIL 0.30: HP =220 kPa 0.30: PID <1
			0.80m ES 0.90m	0.50m 0.5		CH	Silty CLAY: high plasticity, red-brown mottled pale grey, trace fine to coarse siltstone gravel	w~PL	St to VSt	× 180	0.80: HP =180 kPa 0.80: PID <1
				0.90m 1.0			EXCAVATION AEC40TP05 TERMINATED AT 0.90 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP06

FILE / JOB NO : 204814.01

SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works

LOCATION : Luddenham Road - Luddenham

POSITION : E: 290930.0, N: 6252804.4 (56 MGA2020)	SURFACE ELEVATION : 55.00 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 24/08/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <1
			0.30m ES 0.40m	0.20m		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St to VSt	X	RESIDUAL SOIL 0.30: HP =210 kPa 0.30: PID <1
				0.5							
			0.80m ES 0.90m	0.50m		CI-CH	Silty CLAY: medium to high plasticity, pale grey, trace fine to coarse siltstone gravel	w~PL	St to VSt	X	0.80: HP =210 kPa 0.80: PID <1
				1.0							
				1.10m			EXCAVATION AEC40TP06 TERMINATED AT 1.10 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION

WATER

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP07
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290917.8, N: 6252783.9 (56 MGA2020)	SURFACE ELEVATION : 54.90 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 24/08/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <1
			0.40m ES 0.50m	0.30m		CI-CH	Silty CLAY: medium to high plasticity, red-brown mottled grey, trace fine to medium ironstone gravel	w~PL	St to VSt	×	RESIDUAL SOIL 0.40: HP =210 kPa 0.40: PID <1
			0.90m ES 1.00m	1.0						×	0.90: HP =210 kPa 0.90: PID <1
				1.10m			EXCAVATION AEC40TP07 TERMINATED AT 1.10 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP08
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290931.7, N: 6252774.6 (56 MGA2020)	SURFACE ELEVATION : 54.00 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 24/08/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <1
			0.30m ES 0.40m	0.20m			Silty CLAY: medium to high plasticity, red-brown mottled grey, trace fine to medium ironstone gravel			×	RESIDUAL SOIL 0.30: HP =200 kPa 0.30: PID <1
			0.80m ES 0.90m	0.5		CI-CH		w~PL	St to VSt	×	0.80: HP =180 kPa 0.80: PID <1
				1.00m			EXCAVATION AEC40TP08 TERMINATED AT 1.00 m Target depth				
				1.0							
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP09
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290946.9, N: 6252774.3 (56 MGA2020)	SURFACE ELEVATION : 53.30 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 24/08/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <1
			0.30m ES 0.40m				0.20m Silty CLAY: medium to high plasticity, red-brown mottled grey, trace fine to medium ironstone gravel			×	RESIDUAL SOIL 0.30: HP =200 kPa 0.30: PID <1
			0.80m 0.80m ES	0.5		CI-CH		w~PL	St to VSt	×	0.80: HP =160 kPa 0.80: PID <1
							0.90m EXCAVATION AEC40TP09 TERMINATED AT 0.90 m Target depth				
				1.0							
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP10
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290925.1, N: 6252742.0 (56 MGA2020)	SURFACE ELEVATION : 54.40 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 24/08/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING					MATERIAL						
PENETRATION (VE, E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER (100, 200, 300, 400)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <1
			0.30m ES 0.40m	0.20m			Silty CLAY: high plasticity, red-brown, trace fine to medium ironstone gravel				RESIDUAL SOIL 0.30: PID <1
			0.80m ES 0.90m	0.5		CH	At 0.7m: red-brown mottled grey	w~PL	St to VSt		0.80: PID <1
				1.0							
				1.10m			EXCAVATION AEC40TP10 TERMINATED AT 1.10 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION


WATER


SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP11
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290937.0, N: 6252758.7 (56 MGA2020)	SURFACE ELEVATION : 53.80 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 24/08/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace fine to medium gravel, trace rootlets	w~PL			FILL 0.00: PID <1 Field Replicate BD3/20220824 taken at 0.0-0.1m depth
			0.50m ES 0.60m	0.5		CI-CH	0.40m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	VSt	×	RESIDUAL SOIL 0.50: HP =210 kPa 0.50: PID <1
			1.00m ES 1.10m	1.0			1.20m EXCAVATION AEC40TP11 TERMINATED AT 1.20 m Target depth			×	1.00: HP =270 kPa 1.00: PID <1
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP12
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290773.5, N: 6252802.9 (56 MGA2020)	SURFACE ELEVATION : 61.80 (mAHD)	
EQUIPMENT TYPE : 12 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w<PL			FILL 0.00: PID <5
			0.30m ES 0.40m	0.20m		CI-CH	Silty: medium to high plasticity, red-brown, trace fine to medium ironstone gravel, trace roots	w<PL	VSt to H	×	Field Replicate BD1/20220920 taken at 0.0-0.1m depth RESIDUAL SOIL 0.30: HP =390 kPa 0.30: PID <5
			0.80m ES 0.90m	0.70m		CH	Silty: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel	w<PL	H	×	0.80: HP =430 kPa 0.80: PID <5
				1.10			EXCAVATION AEC40TP12 TERMINATED AT 1.10 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP13
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290797.9, N: 6252789.6 (56 MGA2020)	SURFACE ELEVATION : 59.90 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <5
			0.30m ES 0.40m				0.20m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St	X	RESIDUAL SOIL 0.30: HP =170 kPa 0.30: PID <5
			0.80m ES-0 0.90m	0.5		CI-CH	0.70m Silty CLAY: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel	w~PL	St	X	0.80: HP =160 kPa 0.80: PID <5
				1.0		CH	1.10m EXCAVATION AEC40TP13 TERMINATED AT 1.10 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP14
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290812.9, N: 6252780.1 (56 MGA2020)	SURFACE ELEVATION : 58.90 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

DEPTH (m)	PENETRATION (VE, E, F, H)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER (kPa)	STRUCTURE & Other Observations
0.0			Not Observed	ES 0.10m			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <5
0.20m				0.30m ES 0.40m		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St to VSt	200	RESIDUAL SOIL 0.30: HP =190 kPa 0.30: PID <5
0.5											
0.70m				0.80m ES 0.90m		CH	Silty CLAY: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel	w~PL	St	200	0.80: HP =170 kPa 0.80: PID <5
1.00m							EXCAVATION AEC40TP14 TERMINATED AT 1.00 m Target depth				
1.0											
1.5											
2.0											
2.5											
3.0											
3.5											
4.0											
4.5											
5.0											

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP15
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290831.9, N: 6252780.1 (56 MGA2020)	SURFACE ELEVATION : 58.60 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa 100 200 300 400	STRUCTURE & Other Observations
			ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, medium to high sand, trace rootlets	w~PL			FILL 0.00: PID <5
			0.30m ES 0.40m	0.20m		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St	×	RESIDUAL SOIL 0.30: HP =160 kPa 0.30: PID <5
		20/09/22	0.80m ES 0.90m	0.5 0.60m		CH	Silty CLAY: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel	w~PL	St	×	0.80: HP =180 kPa 0.80: PID <5
				1.0 1.00m			EXCAVATION AEC40TP15 TERMINATED AT 1.00 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
N Natural Exposure
E Existing Excavation
BH Backhoe Bucket
B Bulldozer Blade
R Ripper

SUPPORT
T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
U50 - Undisturbed Sample 50 mm diameter
D - Disturbed Sample
B - Bulk Disturbed Sample
MC - Moisture Content
HP - Hand Penetrometer (UCS kPa)
VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D - Dry
M - Moist
W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP16
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290871.6, N: 6252777.3 (56 MGA2020)	SURFACE ELEVATION : 57.40 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

VE / PENETRATION / E / F / H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400 kPa	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			0.10m FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <5
			0.30m ES 0.40m	0.5		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St to VSt	X	RESIDUAL SOIL 0.30: HP =190 kPa 0.30: PID <5
			0.80m ES 0.90m			CH	0.70m Silty CLAY: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel 0.90m	w~PL	St	X	0.80: HP =170 kPa 0.80: PID <5
				1.0			EXCAVATION AEC40TP16 TERMINATED AT 0.90 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
N Natural Exposure
E Existing Excavation
BH Backhoe Bucket
B Bulldozer Blade
R Ripper

SUPPORT
T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
U50 - Undisturbed Sample 50 mm diameter
D - Disturbed Sample
B - Bulk Disturbed Sample
MC - Moisture Content
HP - Hand Penetrometer (UCS kPa)
VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
D - Dry
M - Moist
W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP17
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290899.9, N: 6252774.2 (56 MGA2020)	SURFACE ELEVATION : 55.80 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

VE / PENETRATION / E / F / H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa (100 / 200 / 300 / 400)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <5
			0.30m ES 0.40m	0.20m		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St	×	Field Replicate BD2/20220920 taken at 0.0-0.1m depth RESIDUAL SOIL 0.30: HP =180 kPa 0.30: PID <5
			0.80m ES 0.90m	0.5 0.70m		CH	Silty CLAY: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel	w~PL	St	×	0.80: HP =170 kPa 0.80: PID <5
				1.00m 1.0			EXCAVATION AEC40TP17 TERMINATED AT 1.00 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP18
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290872.3, N: 6252792.2 (56 MGA2020)	SURFACE ELEVATION : 57.80 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION / E / F / H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400 kPa	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			0.10m FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <5
			0.20m ES 0.30m			CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St to VSt	×	RESIDUAL SOIL 0.20: HP =200 kPa 0.20: PID <5
			0.70m ES 0.80m	0.5			0.60m Silty CLAY: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel	w~PL	St	×	0.70: HP =170 kPa 0.70: PID <5
				1.0			0.90m EXCAVATION AEC40TP18 TERMINATED AT 0.90 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP19
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290895.4, N: 6252791.7 (56 MGA2020)	SURFACE ELEVATION : 56.40 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

VE / PENETRATION / E / F / H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa (100 200 300 400)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to meium sand, trace rootlets	w~PL			FILL 0.00: PID <5
			0.30m ES 0.40m				0.20m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St to VSt	×	RESIDUAL SOIL 0.30: HP =200 kPa 0.30: PID <5
			0.80m ES 0.90m	0.5		CI-CH	0.70m Silty CLAY: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel	w~PL	St to VSt	×	0.80: HP =180 kPa 0.80: PID <5
				1.0		CH	1.00m EXCAVATION AEC40TP19 TERMINATED AT 1.00 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP20
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290870.0, N: 6252813.8 (56 MGA2020)	SURFACE ELEVATION : 58.30 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa 100 200 300 400	STRUCTURE & Other Observations
			ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <5
			0.30m ES 0.40m				0.20m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel, trace decomposed wood	w~PL	St to VSt	×	RESIDUAL SOIL 0.30: HP =200 kPa 0.30: PID <5
		20/09/22	0.80m ES 0.90m	0.5		CI-CH	0.80m Silty CLAY: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel	w~PL	St	×	0.80: HP =160 kPa 0.80: PID <5
				1.0		CH	1.00m EXCAVATION AEC40TP20 TERMINATED AT 1.00 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP21

FILE / JOB NO : 204814.01

SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works

LOCATION : Luddenham Road - Luddenham

POSITION : E: 290895.9, N: 6252817.1 (56 MGA2020)	SURFACE ELEVATION : 57.10 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ CHECKED BY : MB
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE	

DRILLING | MATERIAL

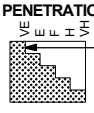
VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER 100 200 300 400 kPa	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets, trace plastic	w~PL			FILL 0.00: PID <5
			0.30m ES 0.40m	0.20m		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St	×	Field Replicate BD3/20220920 taken at 0.0-0.1m depth RESIDUAL SOIL 0.30: HP =180 kPa 0.30: PID <5
			0.80m ES 0.90m	0.60m		CH	Silty CLAY: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel	w~PL	St	×	0.80: HP =180 kPa 0.80: PID <5
				1.00m			EXCAVATION AEC40TP21 TERMINATED AT 1.00 m Target depth				

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION



WATER

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP22
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290870.8, N: 6252834.2 (56 MGA2020)	SURFACE ELEVATION : 58.10 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <5
			0.30m ES 0.40m	0.20m			Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel			×	RESIDUAL SOIL 0.30: HP =170 kPa 0.30: PID <5
			0.80m ES 0.90m	0.5		CI-CH		w~PL	St	×	0.80: HP =120 kPa 0.80: PID <5
				1.0							
				1.20m			EXCAVATION AEC40TP22 TERMINATED AT 1.20 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP23
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290893.0, N: 6252839.6 (56 MGA2020)	SURFACE ELEVATION : 57.00 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets				FILL 0.00: PID <5
			0.20m				0.20m				
			ES 0.30m			CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St	X	RESIDUAL SOIL 0.20: HP =180 kPa 0.20: PID <5
				0.5		CH	0.30m Silty CLAY: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel		St		
			0.70m ES 0.80m					w~PL		X	0.70: HP =170 kPa 0.70: PID <5
							0.90m EXCAVATION AEC40TP23 TERMINATED AT 0.90 m Target depth				
				1.0							
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP24
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290748.0, N: 6252771.8 (56 MGA2020)	SURFACE ELEVATION : 60.00 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

VE / PENETRATION / E / F / H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa (100 / 200 / 300 / 400)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <5
			0.30m ES 0.40m	0.20m		CI-CH	Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel	w~PL	St	×	RESIDUAL SOIL 0.30: HP =180 kPa 0.30: PID <5
			0.80m ES 0.90m	0.5 0.70m		CH	Silty CLAY: high plasticity, pale grey mottled red-brown, trace fine to medium ironstone gravel	w~PL	St	×	0.80: HP =160 kPa 0.80: PID <5
				1.0 1.00m			EXCAVATION AEC40TP24 TERMINATED AT 1.00 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE / E / F / H / VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP25
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290797.2, N: 6252835.7 (56 MGA2020)	SURFACE ELEVATION : 60.70 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE		

DRILLING | MATERIAL

VE / PENETRATION / E / F / H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa (100 / 200 / 300 / 400)	STRUCTURE & Other Observations
		Not Observed	ES 0.20m 0.30m ES 0.40m 0.80m ES 0.90m	0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0		CI-CH	FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets 0.20m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel 0.90m EXCAVATION AEC40TP25 TERMINATED AT 0.90 m Target depth	w~PL w~PL	St	X X	FILL 0.00: PID <5 Field Replicate BD4/20220920 taken at 0.0-0.1m depth RESIDUAL SOIL 0.30: HP =180 kPa 0.30: PID <5 0.80: HP =180 kPa 0.80: PID <5

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE E F H VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC40TP26
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : Luddenham Road - Luddenham

POSITION : E: 290834.0, N: 6252886.4 (56 MGA2020)	SURFACE ELEVATION : 56.70 (mAHD)	
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket	
DATE EXCAVATED : 20/09/22	LOGGED BY : PJ	CHECKED BY : MB

EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DRILLING | MATERIAL

VE / PENETRATION / E / F / H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa (100 / 200 / 300 / 400)	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy SILT: medium to high plasticity, dark brown, fine to medium sand, trace rootlets	w~PL			FILL 0.00: PID <5
			0.30m ES 0.40m				0.20m Silty CLAY: medium to high plasticity, red-brown, trace fine to medium ironstone gravel			X	RESIDUAL SOIL 0.30: HP =170 kPa 0.30: PID <5
				0.5		CI-CH		w~PL	St		
			0.80m ES 0.90m				At 0.7m: pale brown 0.90m			X	0.80: HP =150 kPa 0.80: PID <5
				1.0			EXCAVATION AEC40TP26 TERMINATED AT 0.90 m Target depth				
				1.5							
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							
				4.5							
				5.0							

PHOTOGRAPHS NOTES ☒ YES ☐ NO

METHOD
- N Natural Exposure
- E Existing Excavation
- BH Backhoe Bucket
- B Bulldozer Blade
- R Ripper

SUPPORT
- T Timbering

PENETRATION
VE / E / F / H / VH — No Resistance

WATER
10 Oct., 73 Water Level on Date shown
water inflow
water outflow

SAMPLES & FIELD TESTS
- U50 - Undisturbed Sample 50 mm diameter
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- MC - Moisture Content
- HP - Hand Penetrometer (UCS kPa)
- VS - Vane Shear; P-Peak, R-Remouded (uncorrected kPa)
- PBT - Plate Bearing Test

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

MOISTURE
- D - Dry
- M - Moist
- W - Wet

CONSISTENCY/ RELATIVE DENSITY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard
VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

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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

Douglas Partners

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

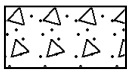
Symbols & Abbreviations

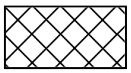
Graphic Symbols for Soil and Rock

General


Asphalt


Road base

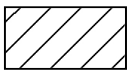

Concrete

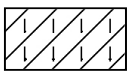

Filling

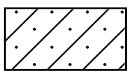
Soils


Topsoil

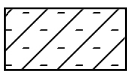

Peat

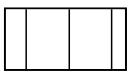

Clay

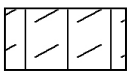

Silty clay

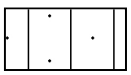

Sandy clay

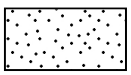

Gravelly clay

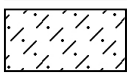

Shaly clay

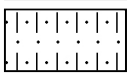

Silt


Clayey silt


Sandy silt

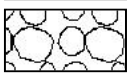

Sand

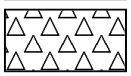

Clayey sand


Silty sand


Gravel

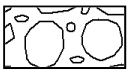

Sandy gravel


Cobbles, boulders

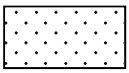

Talus

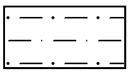
Sedimentary Rocks

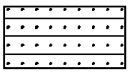

Boulder conglomerate

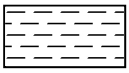

Conglomerate


Conglomeratic sandstone

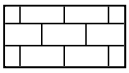

Sandstone


Siltstone

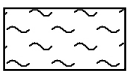

Laminite

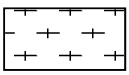

Mudstone, claystone, shale


Coal


Limestone

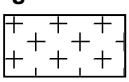
Metamorphic Rocks

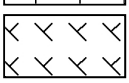

Slate, phyllite, schist

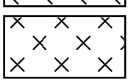

Gneiss

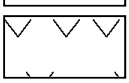

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

Appendix H

Groundwater Field Sheet and Calibration Certificates

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 18J104319

airmet
Air-Met Scientific Pty Ltd
1300 137 067

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

Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
2. pH 7.00		pH 7.00		381241	pH 7.02
3. pH 4.00		pH 4.00		389384	pH 4.03
4. mV		237.58mV		390802/393728	236.9mV
5. EC		2.76mS		385041	2.757mS
6. D.O		0ppm		379624	0 ppm
7. Temp		20.8°C		MultiTherm	20.1°C

Calibrated by: Lebelle Chee

Calibration date: 30/09/2022

Next calibration due: 30/10/2022

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-113854

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
	Recharge OK?	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
Pump	Operation	✓	
	Filter	✓	
	Flow	✓	
	Valves, Diaphragm	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	PID	✓	10.6 ev
Alarms	Beeper	✓	Low: 50ppm; High: 100ppm; TWA: ; STEL:
	Settings	✓	
Software	Version	✓	
Data logger	Operation	✓	
Download	Operation	✓	
Other tests:			

Certificate of Calibration

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

Diffusion mode Aspirated mode

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		93ppm Isobutylene	NATA	SY361		90.2 ppm Isobutylene

Calibrated by: Alex Buist

Calibration date: 1/09/2022

Next calibration due: 28/02/2023

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Geotechnics / Environment / Groundwater

AEL40BH01

Groundwater Field Sheet

Project and Bore Installation Details	
Bore / Standpipe ID:	
Project Name:	
Project Number:	
Site Location:	
Bore GPS Co-ord:	
Installation Date:	
GW Level (during drilling):	m bgl
Well Depth:	m bgl
Screened Interval:	m bgl
Contaminants/Comments:	

Bore Development Details	
Date/Time:	
Purged By:	
GW Level (pre-purge):	m bgl
Observed Well Depth:	m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Estimated Bore Volume:	L
Total Volume Purged:	(target: no drill mud, min 3 well vol. or dry)
GW Level (post-purge):	m bgl
Equipment:	

Micropurge and Sampling Details	
Date/Time:	9:24 5/10/22
Sampled By:	PJ
Weather Conditions:	Wet, cloudy, consistent rain
GW Level (pre-purge):	3.63 m bgl
Observed Well Depth:	8.09 m bgl
PSH observed:	Yes / ~~No~~ (interface / visual). Thickness if observed:
Estimated Bore Volume:	31.66 L
GW Level (post sample):	4.53 m bgl
Total Volume Purged:	4 L
Equipment:	Geo Peri Pump

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or ~~mS/cm~~)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	**0.1° C**	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
15 0.5	17.4	5.88	24.5	5.26		245.2
30 1	17.7	5.85	26.0	5.74		247.5
45 1.5	17.8	5.80	25.1	5.75		246.4
60 2	18.0	5.01	23.9	5.75		247.7
75 2.5	18.1	4.21	22.9	5.82		263.4
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			
	60.2	555.9 µS/cm	361.4 mg/L			

Sample Details

Sampling Depth (rationale):	6	m bgl,	Mid screening
Sample Appearance (e.g. colour, siltiness, odour):	Clear transpavent, slightly cloudy, no odour		
Sample ID:	AEL40BH01		
QA/QC Samples:			
Sampling Containers and filtration:	2x Plastic 2x glass, 2x Vials		
Comments / Observations:			

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AEC40BH02

Groundwater Field Sheet

Project and Bore Installation Details

Bore / Standpipe ID:	
Project Name:	
Project Number:	
Site Location:	
Bore GPS Co-ord:	
Installation Date:	
GW Level (during drilling):	m bgl
Well Depth:	m bgl
Screened Interval:	m bgl
Contaminants/Comments:	

Bore Development Details

Date/Time:	
Purged By:	
GW Level (pre-purge):	m bgl
Observed Well Depth:	m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Estimated Bore Volume:	L
Total Volume Purged:	(target: no drill mud, min 3 well vol. or dry)
GW Level (post-purge):	m bgl
Equipment:	

Micropurge and Sampling Details

Date/Time:	11:38am 5/10/22
Sampled By:	PS
Weather Conditions:	Wet, cloudy, consistent rain
GW Level (pre-purge):	2.79 m bgl
Observed Well Depth:	8.29 m bgl
PSH observed:	Yes / (No) (interface / visual). Thickness if observed:
Estimated Bore Volume:	39 L
GW Level (post sample):	3.8 m bgl
Total Volume Purged:	45 L
Equipment:	Geo Peri Pump

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	**0.1° C**	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
	17.1	8.66	27.3	4.11		262.1
	17.1	8.59	26.8	4.10		265.0
	17.1	8.53	26.4	4.10		263.3
	17.1	8.52	26.2	4.10		263.4

Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			
	58.8	24.1	15.60			

Sample Details

Sampling Depth (rationale):	6	m bgl,	Mid screen
Sample Appearance (e.g. colour, siltiness, odour):	Clear/transparent, no odour		
Sample ID:	AEC40BH02		
QA/QC Samples:	BD2/20221005		
Sampling Containers and filtration:	4x plastic, 4x glass 4x vials		
Comments / Observations:			

4.5|

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AEL40 BH03

Groundwater Field Sheet

Project and Bore Installation Details	
Bore / Standpipe ID:	
Project Name:	
Project Number:	
Site Location:	
Bore GPS Co-ord:	
Installation Date:	
GW Level (during drilling):	m bgl
Well Depth:	m bgl
Screened Interval:	m bgl
Contaminants/Comments:	

Bore Development Details	
Date/Time:	
Purged By:	
GW Level (pre-purge):	m bgl
Observed Well Depth:	m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Estimated Bore Volume:	L
Total Volume Purged:	(target: no drill mud, min 3 well vol. or dry)
GW Level (post-purge):	m bgl
Equipment:	~~Geo Peri Pump~~

Micropurge and Sampling Details	
Date/Time:	8:16 am 5/10/22
Sampled By:	PJ
Weather Conditions:	Wet, cloudy, consistent rain
GW Level (pre-purge):	4.84 m bgl
Observed Well Depth:	6.44 m bgl
PSH observed:	Yes / (No) (interface) / visual). Thickness if observed:
Estimated Bore Volume:	11.52 L
GW Level (post sample):	5.00 m bgl
Total Volume Purged:	4 L
Equipment:	Geo Peri Pump

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	**0.1° C**	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
15 0.5	16.3	3.40	10.6	6.32		254.4
30 1	16.7	3.47	10.8	6.30		254.8
45 1.5	16.9	3.99	11.8	6.35		255.6
60 2	16.9	4.52	11.7	6.35		255.8
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			
	22.9	~~10a~~ 4564	36.40			

Sample Details

Sampling Depth (rationale):	4	m bgl,	Middle of screen
Sample Appearance (e.g. colour, siltiness, odour):	No odour, slightly turbid, cloudy, pale grey-brown		
Sample ID:	AEL40BH03		
QA/QC Samples:	BD1/20221005		
Sampling Containers and filtration:	4x plastic, 4x glass 4x vials		
Comments / Observations:			

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GROUNDWATER SAMPLING FORM

Project: WSA SCAW Tender Design	**Project No:** 204814.01
Client: CPB Contractors Pty Limited & United Infrastructure Pty Limited (CPBUIJV)	
Location: Elizabeth Drive, Luddenham	
Sampling Method: Twister Pump	

Bore No.	AEC40BH01				
Purging Date	28/9/22				
Bore Casing Diameter (mm)	50mm				
SWL (m below top of casing)	4.06				
Height of Casing (m above GL*)	0.93				
SWL (m below GL*)	3.13				
Total Bore Depth (m below GL*)	8.1				
Well Volume (L) **[which for 50mm casing is 2L approx. per metre depth]	4.17 9.940L				
Purged Volume (L) (≈ well vol x 3)	20L/DRY				
Sampling Date					
Sampling Time					
Temperature (°C)					
pH (record to one decimal place)					
EC (µS/cm)					
Dissolved Oxygen (% Sat)					
Dissolved Oxygen (mg/L)					
Turbidity (NTU)					
Redox (mV)					
TDS (mg/L)					
Odour					
Colour					
Recharge Rate					
Observations					

Notes: Pale grey, cloudy, no odour

9.03
29

Supervisor:	**Date:**

Water quality meter calibration details (please tick calibration liquids used):

Meter ID							
Buffer (pH 4)	☐	Use-by Date		Conductivity Standard (2.76 mS/cm)	☐	Use-by Date	
Buffer (pH 6.88)	☐	Use-by Date		Total Dissolved Solids Standard (2 parts per thousand)	☐	Use-by Date	
Buffer (pH 9)	☐	Use-by Date		Rapid Cal Solution	☐	Use-by Date	

*GL – denotes ground level **Well Volume = πr^2 x depth of water, where r is internal casing radius

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GROUNDWATER SAMPLING FORM

Project: WSA SCAW Tender Design	**Project No:** 204814.01
Client: CPB Contractors Pty Limited & United Infrastructure Pty Limited (CPBUIJV)	
Location: Elizabeth Drive, Luddenham	
Sampling Method: Twister Pump	

Bore No.	AEC40BH02				
Purging Date	28/9/22				
Bore Casing Diameter (mm)	50mm				
SWL (m below top of casing)	3.45				
Height of Casing (m above GL*)	0.70				
SWL (m below GL*)	2.75				
Total Bore Depth (m below GL*)	8.32				
Well Volume (L) **[which for 50mm casing is 2L approx. per metre depth]	11.140 L				
Purged Volume (L) (≈ well vol x 3)	25L / DRY				
Sampling Date					
Sampling Time					
Temperature (°C)					
pH (record to one decimal place)					
EC (µS/cm)					
Dissolved Oxygen (% Sat)					
Dissolved Oxygen (mg/L)					
Turbidity (NTU)					
Redox (mV)					
TDS (mg/L)					
Odour					
Colour					
Recharge Rate					
Observations					

9.02
557
36

Notes: Cap pushed off by cows, transparent/clear, slightly cloudy no odour

Supervisor: **Date:**

Water quality meter calibration details (please tick calibration liquids used):

Meter ID							
Buffer (pH 4)	☐	Use-by Date		Conductivity Standard (2.76 mS/cm)	☐	Use-by Date	
Buffer (pH 6.88)	☐	Use-by Date		Total Dissolved Solids Standard (2 parts per thousand)	☐	Use-by Date	
Buffer (pH 9)	☐	Use-by Date		Rapid Cal Solution	☐	Use-by Date	

*GL – denotes ground level **Well Volume = πr^2 x depth of water, where r is internal casing radius

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GROUNDWATER SAMPLING FORM

Project: WSA SCAW Tender Design	**Project No:** 204814.01
Client: CPB Contractors Pty Limited & United Infrastructure Pty Limited (CPBUIJV)	
Location: Elizabeth Drive, Luddenham	
Sampling Method: Twister Pump	

Bore No.	AEC40BH03				
Purging Date	28/9/22				
Bore Casing Diameter (mm)	50mm				
SWL (m below top of casing)	6.21				
Height of Casing (m above GL*)	1.09				
SWL (m below GL*)	5.12				
Total Bore Depth (m below GL*)	6.48				
Well Volume (L) **[which for 50mm casing is 2L approx. per metre depth]	1.36 2.720L				
Purged Volume (L) (≈ well vol x 3)	5L / DRY				
Sampling Date					
Sampling Time					
Temperature (°C)					
pH (record to one decimal place)					
EC (µS/cm)					
Dissolved Oxygen (% Sat)					
Dissolved Oxygen (mg/L)					
Turbidity (NTU)					
Redox (mV)					
TDS (mg/L)					
Odour					
Colour					
Recharge Rate					
Observations					

Notes: Pale grey, cloudy, no odour

Supervisor:	**Date:**

Water quality meter calibration details (please tick calibration liquids used):

Meter ID							
Buffer (pH 4)	☐	Use-by Date		Conductivity Standard (2.76 mS/cm)	☐	Use-by Date	
Buffer (pH 6.88)	☐	Use-by Date		Total Dissolved Solids Standard (2 parts per thousand)	☐	Use-by Date	
Buffer (pH 9)	☐	Use-by Date		Rapid Cal Solution	☐	Use-by Date	

*GL – denotes ground level **Well Volume = πr^2 x depth of water, where r is internal casing radius

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CALIBRATION RECORD

Project:	
Project Number:	204814.01

Calibrated Equipment

Model:	Minirae
Serial No.:	
DP Reference:	DP710/ PID 4
Other:	10.6eV Lamp

Calibration

Date(s):	15/8/22
Operator(s):	DW
Zero Gas:	ambient air
Span Gas:	isobutylene
Span Gas Concentration:	100
Response Factor:	1.0
Pre-calibration Reading	
Post-calibration Reading	100

Approved:

Date: 15/8/22

Appendix I

Summary of Results for Current Investigation

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Table I1: Summary of Laboratory Results for Soil – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB, Asbestos

				Metals								TRH					BTEX				PAH				Phenols					OCP											OPP		PCB	Asbestos		
Sample ID	Depth	Sample type	Sample Date	Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	TRH C6-C10 less BTEX	TRH >C10-C16 less Naphthalene	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene	Benzo(a)pyrene TEQ	Total PAHs	Total Phenols	Pentachlorophenol	Cresols	Phenol	Other Phenols	DDT+DDE+DDD [c]	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Other OCP	Chlorpyriphos	Other OPP	Total PCB	ACM >7 mm Estimation	FA and AF Estimation	FA and AF Estimation
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	g	g	%(w/w)
AEC40TP01	0 - 0.1 m	Fill	24/08/2022	7	<0.4	16	30	19	<0.1	13	50	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
BD1/20220824	0 - 0.1m	Fill	24/08/2022	8.3	<0.4	20	23	23	<0.1	12	54	<20	<50	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<PQL	<1	<0.5	<0.5	<PQL	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<PQL	<0.2	<PQL	<0.1	-	-	-
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP01	0.3 - 0.4 m	Natural	24/08/2022	5	<0.4	14	24	13	<0.1	8	35	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP02	0 - 0.1 m	Fill	24/08/2022	5	<0.4	14	20	14	<0.1	6	38	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP03	0 - 0.1 m	Fill	24/08/2022	7	<0.4	10	15	12	<0.1	7	28	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP04	0 - 0.1 m	Fill	24/08/2022	5	<0.4	11	27	15	<0.1	7	32	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
BD2/20220824	0 - 0.1m	Fill	24/08/2022	6	<0.4	12	28	17	<0.1	8	36	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP04	0.3 - 0.4 m	Natural	24/08/2022	5	<0.4	9	28	11	<0.1	4	27	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP05	0 - 0.1 m	Fill	24/08/2022	7	<0.4	10	23	18	<0.1	12	41	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP06	0 - 0.1 m	Fill	24/08/2022	7	<0.4	19	33	22	<0.1	18	77	<25	<50	<25	<50	100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP07	0 - 0.1 m	Fill	24/08/2022	10	<0.4	13	33	21	<0.1	12	78	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP08	0 - 0.1 m	Fill	24/08/2022	11	<0.4	15	26	22	<0.1	12	49	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP08	0.3 - 0.4 m	Natural	24/08/2022	10	<0.4	11	27	14	<0.1	10	47	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP09	0 - 0.1 m	Fill	24/08/2022	9	<0.4	15	30	20	<0.1	12	67	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP10	0 - 0.1 m	Fill	24/08/2022	5	<0.4	11	39	13	<0.1	9	130	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP11	0 - 0.1 m	Fill	24/08/2022	5	<0.4	12	85	19	<0.1	15	310	<25	<50	<25	<50	170	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP11	0.5 - 0.6 m	Natural	24/08/2022	11	<0.4	11	17	13	<0.1	9	31	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP12	0 - 0.1 m	Fill	20/09/2022	5	<0.4	13	19	18	<0.1	8	37	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP13	0 - 0.1 m	Fill	20/09/2022	7	<0.4	15	23	19	<0.1	10	39	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP13	0.3 - 0.4 m	Natural	20/09/2022	5	<0.4	13	25	15	<0.1	6	26	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP14	0 - 0.1 m	Fill	20/09/2022	7	<0.4	13	22	17	<0.1	15	52	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP15	0 - 0.1 m	Fill	20/09/2022	6	<0.4	12	20	19	<0.1	11	58	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP16	0 - 0.1 m	Fill	20/09/2022	8	<0.4	18	27	18	<0.1	10	48	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP16	0.3 - 0.4 m	Natural	20/09/2022	5	<0.4	14	25	13	<0.1	5	29	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP17	0 - 0.1 m	Fill	20/09/2022	12	<0.4	24	24	23	<0.1	10	58	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP18	0 - 0.1 m	Fill	20/09/2022	6	<0.4	15	25	20	<0.1	10	73	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP19	0 - 0.1 m	Fill	20/09/2022	6	<0.4	19	37	27	<0.1	17	91	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP20	0 - 0.1 m	Fill	20/09/2022	7	<0.4	15	38	20	<0.1	13	60	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP21	0 - 0.1 m	Fill	20/09/2022	6	<0.4	14	34	19	<0.1	12	48	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
BD3/20220920	0 - 0.1 m	Fill	20/09/2022	4	<0.4	10	29	14	<0.1	9	68	<25	<50	<25	<50	140	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
BD3/20220920 - [TRIPLICATE]	0 - 0.1m	Fill	20/09/2022	6	<0.4	13	34	17	<0.1	10	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP22	0 - 0.1 m	Fill	20/09/2022	7	<0.4	12	18	16	<0.1	12	42	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -	120 -	4000 -	40000 -	- -	400 180	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -			
AEC40TP23	0 - 0.1 m	Fill	20/09/2022	5	<0.4	10	35	15	<0.1	9	51	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	NAD	NAD	<0.001
				300 100	90 -	300 190	17000 200	600 1100	80 -	1200 220	30000 450	- -	- 120	250 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -	120 -

Table I2: Summary of Results of Groundwater Analysis (All results in µg/L)

Sample Location / Identification (Borehole or Replicate)	Sample Date	Metals (dissolved)								Polycylic Aromatic Hydrocarbons						Total Recoverable Hydrocarbons, BTEX and Volatile Organic Compounds																																													
		Arsenic	Cadmium	Chromium (III + VI)	Copper	Lead	Mercury	Nickel	Zinc	Naphthalene	Anthracene	Fluoranthene	Benzo(a)pyrene	Phenanthrene	Other PAH	TRH C6-C10 less BTEX	TRH >C10-C16 less Naphthalene	TRH C6-C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toulene	Ethylbenzene	o-xylene	m+p-xylene	Isopropylbenzene	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	cis-1,3-Dichloropropene	Vinyl chloride	Tetrachloroethene	Trichloroethene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Chlorobenzene	1,1,2,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,2-Dichloroethane	Carbon tetrachloride	Chloroform	Bromodichloromethane	Dibromochloromethane	Bromoform	1,2-Dichloropropane	1,3-Dichloropropane	Styrene	Hexachlorobutadiene	Carbon disulfide	Dichloromethane (methylene chloride)	Other VOC
AEC40BH01	5/10/2022	1	0.7	<1	2	<1	<0.05	34	69	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
AEC40BH02	5/10/2022	1	0.7	<1	1	<1	<0.05	33	66	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
BD2/20221005	5/10/2022	1	0.6	<1	1	<1	<0.1	69	94	0.01	<0.01	<0.01	<0.01	<0.01	<PQL	<20	<50	<20	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<5	<1	<1	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	-	<1	<5	<PQL
AEC40BH03	5/10/2022	2	0.8	<1	4	<1	<0.05	34	40	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
BD1/20221005	5/10/2022	2	0.9	<1	5	<1	<0.05	34	40	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
Assessment Criteria																																																									
Freshwater DGV		24 for As(III) 13 for As(V)	0.2 (19*)	3.3 (219*) for Cr(III) 1.0 for Cr(VI)	1.4	3.4 (2255*)	0.06	11 (851*)	8 (619*)	16	0.01	1	0.1	0.6	-	-	-	-	-	-	-	950	180	80	350	75 for m-xylene 200 for p-xylene	30	700	-	-	-		100	70	330	3	85	160	260	60	55	400	270	6500	1900	240	370	-	-	-	900	1100	-	-	20	-	-
Guidelines for Recreational Water	Health	100	20	500 for Cr(VI)	20000	100	10	200	-	-	-	-	0.1	-	-	-	-	-	-	-	-	10	8000	3000	6000		-	300	600		1000		3	500	-	300		15000	-	400	3000	-	-	-	30	30	2500				-	-	300	7	-	40	-
	Aesthetic	-	-	-	1000	-	-	-	3000	-	-	-	-	-	-	-	-	-	-	-	-	-	25	3	20		-	-	-		-		-	-	-	5		1	20	0.3	10	-	-	-	-	-	-				-	-	4	-	-	-	-
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		-	-	-	-	-	-	-	-	NL	-	-	-	-	-	NL	NL	-	-	-	-	30000	NL	NL	NL		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

PQL	Practical Quantitation Limit
-	not defined/ not analysed/ not applicable
NL	Not Limiting
*	Modified for hardness of 5000 mgCaCO3/L
BD2/20221005	Blind replicate from AEC40BH02
BD1/20221005	Blind replicate from AEC40BH03
🟩	Exceedance of DGV

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Table I2 (continued): Summary of Results of Groundwater Analysis (All results in µg/L)

Sample Location / Identification (Borehole or Replicate)	Sample Date	Organochlorine Pesticides													Organophosphorus Pesticides																								Polychlorinated Biphenyls			Phenols											
		Aldrin	Dieldrin	gamma-Chlordane	alpha-Chlordane	Total Chlordanes	pp-DDT	Endosulfan I	Endosulfan II	Endrin	Heptachlor	Methoxychlor	Lindane	Other OCP	Azinphos-methyl	Bromophos-ethyl	Chlorpyrifos	Chlorfenvinphos	Diazinon	Dichlorovos	Dimethoate	Disulfoton	Ethion	Ethoprophos (Ethoprop)	Fenitrothion	Fensulfothion	Fenthion	Malathion	Mevinphos (Phosdrin)	Monocrotophos	Omethoate	Parathion	Methyl Parathion	Pyrazophos	Terbufos	Tetrachlorvinphos	Pirimiphos-methyl	Other OPP	Aroclor 1242	Aroclor 1254	Other PCB	Phenol	2,4,6-Trichlorophenol	2,4-Dinitrophenol	4-Nitrophenol	2,3,4,6-Tetrachlorophenol	Total Tetrachlorophenols	Pentachlorophenol	2-Chlorophenol	2,4-Dimethylphenol	2,4-Dichlorophenol	2,6-Dichlorophenol	Other Phenols
AEC40BH01	5/10/2022	<0.01	<0.01	<0.01	<0.01	-	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	-	<PQL	<0.02	<0.2	<0.01	-	<0.01	<0.2	<0.15	-	<0.2	-	<0.2	-	-	<0.05	-	-	-	<0.01	<0.2	-	-	-	-	<PQL	<0.1	<0.1	<0.1	<5	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL
AEC40BH02	5/10/2022	<0.01	<0.01	<0.01	<0.01	-	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	-	<PQL	<0.02	<0.2	<0.01	-	<0.01	<0.2	<0.15	-	<0.2	-	<0.2	-	-	<0.05	-	-	-	<0.01	<0.2	-	-	-	-	<PQL	<0.1	<0.1	<0.1	<5	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL
BD2/20221005	5/10/2022	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<PQL	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<PQL	<1	<1	<1	<3	<10	<30	<30	-	<30	<10	<3	<3	<3	<3	<PQL
AEC40BH03	5/10/2022	<0.01	<0.01	<0.01	<0.01	-	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	-	<PQL	<0.02	<0.2	<0.01	-	<0.01	<0.2	<0.15	-	<0.2	-	<0.2	-	-	<0.05	-	-	-	<0.01	<0.2	-	-	-	-	<PQL	<0.1	<0.1	<0.1	<5	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL
BD1/20221005	5/10/2022	<0.01	<0.01	<0.01	<0.01	-	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	-	<PQL	<0.02	<0.2	<0.01	-	<0.01	<0.2	<0.15	-	<0.2	-	<0.2	-	-	<0.05	-	-	-	<0.01	<0.2	-	-	-	-	<PQL	<0.1	<0.1	<0.1	<5	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL
Assessment Criteria																																																					
Freshwater DGV		0.001	0.01	0.03			0.006	0.03		0.01	0.01	0.005	-	-	0.01	-	0.01	-	0.01	-	0.15	-	-	-	0.2	-	-	0.05	-	-	-	0.004	-	-	-	-	-	-	0.3	0.01	-	320	3	45	58	10	0.2	3.6	340	2	120	34	-
Guidelines for Recreational Water	Health	3		20			90	200		-	3	3000	100	-	300	100	100	20	40	50	70	40	40	10	70	100	70	700	50	20	10	200	7	200	9	1000	900	-	-	-	-	-	200	-	-	-	-	100	3000	-	2000	-	-
	Aesthetic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	0.1	-	0.3	-	-
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

PQL	Practical Quantitation Limit
-	not defined/ not analysed/ not applicable
BD2/20221005	Blind replicate from AEC40BH02
BD1/20221005	Blind replicate from AEC40BH03

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Table I3: Summary of Laboratory Results for Waste Classification – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB, Asbestos

				Metals								TRH		BTEX				PAH		Phenols						OCP		OPP		PCB	Asbestos	pH
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C9	TRH C10-C36	Benzene	Toluene	Ethylbenzene	Xylenes (total)	Benzo(a)pyrene	Total PAH	Total Phenols	2-Methylphenol (0-Cresol)	Cresol (total)	2,4,5-trichlorophenol	2,4,6-trichlorophenol	Phenol (non-halogenated)	Total Endosulfan	Total Analysed OCP	Chlorpyriphos	Total Analysed OPP	Total PCB	Asbestos	pH
Sample ID	Depth	Sample type	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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	pH units
AEC40TP01	0 - 0.1 m	Fill	24/08/2022	7	<0.4	16	30	19	<0.1	13	50	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	6.3
BD1/20220824	0 - 0.1 m	Fill	24/08/2022	8.3	<0.4	20	23	23	<0.1	12	54	<20	<50	<0.1	<0.1	<0.1	<0.3	<0.5	<0.5	<PQL	<0.2	<0.5	<1	<1	<20	<0.05	<0.05	<0.2	<0.2	<0.1	-	-
AEC40TP01	0.3 - 0.4 m	Natural	24/08/2022	5	<0.4	14	24	13	<0.1	8	35	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
AEC40TP02	0 - 0.1 m	Fill	24/08/2022	5	<0.4	14	20	14	<0.1	6	38	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP03	0 - 0.1 m	Fill	24/08/2022	7	<0.4	10	15	12	<0.1	7	28	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP04	0 - 0.1 m	Fill	24/08/2022	5	<0.4	11	27	15	<0.1	7	32	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
BD2/20220824	0 - 0.1 m	Fill	24/08/2022	6	<0.4	12	28	17	<0.1	8	36	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
AEC40TP04	0.3 - 0.4 m	Natural	24/08/2022	5	<0.4	9	28	11	<0.1	4	27	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
AEC40TP05	0 - 0.1 m	Fill	24/08/2022	7	<0.4	10	23	18	<0.1	12	41	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP06	0 - 0.1 m	Fill	24/08/2022	7	<0.4	19	33	22	<0.1	18	77	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	6.6
AEC40TP07	0 - 0.1 m	Fill	24/08/2022	10	<0.4	13	33	21	<0.1	12	78	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP08	0 - 0.1 m	Fill	24/08/2022	11	<0.4	15	26	22	<0.1	12	49	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP08	0.3 - 0.4 m	Natural	24/08/2022	10	<0.4	11	27	14	<0.1	10	47	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	5.3
AEC40TP09	0 - 0.1 m	Fill	24/08/2022	9	<0.4	15	30	20	<0.1	12	67	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP10	0 - 0.1 m	Fill	24/08/2022	5	<0.4	11	39	13	<0.1	9	130	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	7.6
AEC40TP11	0 - 0.1 m	Fill	24/08/2022	5	<0.4	12	85	19	<0.1	15	**310**	<25	120	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP11	0.5 - 0.6 m	Natural	24/08/2022	11	<0.4	11	17	13	<0.1	9	31	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
AEC40TP12	0 - 0.1 m	Fill	20/09/2022	5	<0.4	13	19	18	<0.1	8	37	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP13	0 - 0.1 m	Fill	20/09/2022	7	<0.4	15	23	19	<0.1	10	39	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	6.8
AEC40TP13	0.3 - 0.4 m	Natural	20/09/2022	5	<0.4	13	25	15	<0.1	6	26	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
AEC40TP14	0 - 0.1 m	Fill	20/09/2022	7	<0.4	13	22	17	<0.1	15	52	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP15	0 - 0.1 m	Fill	20/09/2022	6	<0.4	12	20	19	<0.1	11	58	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP16	0 - 0.1 m	Fill	20/09/2022	8	<0.4	18	27	18	<0.1	10	48	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP16	0.3 - 0.4 m	Natural	20/09/2022	5	<0.4	14	25	13	<0.1	5	29	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
AEC40TP17	0 - 0.1 m	Fill	20/09/2022	12	<0.4	24	24	23	<0.1	10	58	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP18	0 - 0.1 m	Fill	20/09/2022	6	<0.4	15	25	20	<0.1	10	73	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP19	0 - 0.1 m	Fill	20/09/2022	6	<0.4	19	37	27	<0.1	17	91	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	7.3
AEC40TP20	0 - 0.1 m	Fill	20/09/2022	7	<0.4	15	38	20	<0.1	13	60	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP21	0 - 0.1 m	Fill	20/09/2022	6	<0.4	14	34	19	<0.1	12	48	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
BD3/20220920	0 - 0.1 m	Fill	20/09/2022	4	<0.4	10	29	14	<0.1	9	68	<25	100	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
BD3/20220920 - [TRIPLICATE]	0 - 0.1 m	Fill	20/09/2022	6	<0.4	13	34	17	<0.1	10	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AEC40TP22	0 - 0.1 m	Fill	20/09/2022	7	<0.4	12	18	16	<0.1	12	42	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP23	0 - 0.1 m	Fill	20/09/2022	5	<0.4	10	35	15	<0.1	9	51	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP24	0 - 0.1 m	Fill	20/09/2022	7	<0.4	13	23	21	<0.1	13	43	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
AEC40TP25	0 - 0.1 m	Fill	20/09/2022	5	<0.4	14	14	16	<0.1	7	32	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-
BD4/20220920	0 - 0.1 m	Fill	20/09/2022	9.3	<0.4	23	17	20	<0.1	11	35	<20	<50	<0.1	<0.1	<0.1	<0.3	<0.5	<0.5	<PQL	<0.2	<0.5	<1	<1	<20	<0.05	<0.05	<0.2	<0.2	<0.1	-	-
AEC40TP26	0 - 0.1 m	Fill	20/09/2022	12	<0.4	26	22	23	<0.1	11	36	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	-

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Table I3: Summary of Laboratory Results for Waste Classification – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB, Asbestos

				Metals								TRH		BTEX				PAH		Phenols						OCP		OPP		PCB	Asbestos	pH
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C9	TRH C10-C36	Benzene	Toluene	Ethylbenzene	Xylenes (total)	Benzo(a)pyrene	Total PAH	Total Phenols	2-Methylphenol (o-Cresol)	Cresol (total)	2,4,5-trichlorophenol	2,4,6-trichlorophenol	Phenol (non-halogenated)	Total Endosulfan	Total Analysed OCP	Chlorpyriphos	Total Analysed OPP	Total PCB	Asbestos	pH
Sample ID	Depth	Sample type	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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	pH units
Waste Classification Criteria [f]																																
CT1				100	20	100	NC	100	4	40	NC	650	10000	10	288	600	1000	0.8	200	288	4000	4000	8000	40	288	60	<50	4	4	<50	NC	-
SCC1				500	100	1900	NC	1500	50	1050	NC	650	10000	18	518	1080	1800	10	200	518	7200	200	14400	72	518	108	<50	7.5	7.5	<50	NC	-
TCLP1				N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NC	-
CT2				400	80	400	NC	400	16	160	NC	2600	40000	40	1152	2400	4000	3.2	800	1152	16000	16000	32000	160	1152	240	<50	16	16	<50	NC	-
SCC2				2000	400	7600	NC	6000	200	4200	NC	2600	40000	72	2073	4320	7200	23	800	2073	28800	28800	57600	288	2073	432	<50	30	30	<50	NC	-
TCLP2				N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NC	-
ENM criteria																																
Maximum average concentration				20	0.5	75	100	50	0.5	30	150	NC	250	N/A	N/A	N/A	N/A	0.5	20	NC						NC	NC	NC	NC	NC	NC	5 to 9
Absolute maximum concentration				40	1	150	200	100	1	60	300	NC	500	0.5	65	25	15	1	40	NC						NC	NC	NC	NC	NC	NC	4.5 to 10

CT1 exceedance | TCLP1 and/or SCC1 exceedance | CT2 exceedance | TCLP2 and/or SCC2 exceedance | As

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

Appendix J

Data Quality Assurance and Quality Control

Data Quality Assurance and Quality Control Report for DSI for AEC40

Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA)

1.0 Field and Laboratory Data Quality Assurance and Quality Control for Soil

The field and laboratory data quality assurance and quality control (QA / QC) procedures and results are summarised in the following Table 1. 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 field QC samples are included in the summary results Tables QA1 to QA7.

Table 1: 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	C
	<30% RPD	PC
Inter-laboratory replicates	5% of primary samples	C
	<30% RPD	PC
Trip Spikes	1 per sampling event; 60-140% recovery	C
Trip Blanks	1 per sampling event; <PQL	C
Rinsate	1 per sampling event; <PQL	C for groundwater NR for soil
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Laboratory Duplicate	1 per lab batch; As laboratory certificate	PC
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	PC
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; NR = not required

The RPD results for soil were within the acceptable range accept with the exception of a small number of metals in two of the replicate pairs and TRH >C_{16}-C_{34} in the replicate pair from AEC40TP21. The exceedances are not, however, considered to be of concern given the low actual differences in the concentrations between the primary and replicate samples.

The RPD results for groundwater samples were within the acceptable range with the exception of nickel and zinc in the replicate pair from AEC40BH02. The exceedances are not, however, considered to be of concern given the low actual differences in the concentrations between the primary and replicate samples and the concentrations of zinc and nickel are considered to be at background ranges.

As noted in laboratory certificate 304063, the spike recovery for metals in sample 304063-54 was poor. This sample was redigested and re-spiked and the low recovery was confirmed and was considered to be due to matrix interference. An acceptable recovery was obtained for the laboratory control sample.

As noted in laboratory certificate 306482, the laboratory RPD acceptance criteria was exceeded for sample 306482-74 for chromium, copper, lead and nickel. Therefore, a triplicate result was issued as laboratory sample number 306482-79. It is noted that the concentrations of these metals were generally low and the actual differences in concentrations were low, so the exceedances of the RPD are not considered to affect the assessment.

As noted in laboratory certificate 306482, spike recoveries were not able to be recorded for zinc in samples 306482-4 and 306482-54 due to the inhomogeneous nature of the elements in the sample. However, an acceptable recovery was obtained for the laboratory control sample.

For groundwater sampling, the electronic interface probe, flow cell and probes were decontaminated between monitoring wells by rinsing in a diluted Liquinox solution and then rinsing in demineralised water. A rinsate (Rinsate-W051022) was collected by running demineralised water over the decontaminated sampling equipment and directing the water into sampling bottles provided by the laboratory. For soil sampling, to avoid the need for decontaminating sampling equipment, disposable nitrile gloves were changed between each sampling event and used for sample collection. Rinsate test results for Rinsate-W051022 were all less than the practical quantitation limits except for a low concentration of TRH C_6 - C_{10} (16 ug/L). TRH C_6 - C_{10} concentrations in groundwater were less than the practical quantitation limits, and so it is considered that the detected TRH in the rinsate sample is likely due to disinfection by products (such as chloroform) in the demineralised water used rather than from cross-contamination. Therefore, the TRH detection in the rinsate sample is not considered to have an impact on the assessment of groundwater results.

Trip spikes and trip blanks were subject to the same conditions in the field as collected soil samples. Results for BTEX in trip spikes were within the acceptable range and the results for BTEX in trip blanks were less than the practical quantitation limits.

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

2.0 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 2: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Systematic and target locations sampled.
	Preparation of 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 above.
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.

3.0 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.

4.0 References

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

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Table QA1: Relative Percentage Difference Results – Intra-laboratory and Inter-laboratory Replicates

		Metals								TRH				BTEX				PAH				Phenols	OCP																		OPP					PCB
		Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	Total Phenols	DDD	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	alpha-BHC	beta-BHC	Bromophos-ethyl	Chlorpyriphos-methyl	delta-BHC	Diazinon	Dimethoate	Endrin Aldehyde	Lindane	Chlorpyriphos	Azinphos methyl (Guthion)	Ethion	Fenitrothion	Ronnel (fenchlorphos)	Total PCB
Sample ID	Depth	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BD1/20220824	0 - 0.1 m	8.3	<0.4	20	23	23	<0.1	12	54	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<PQL	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.2	<0.05	<0.2	<0.2	<0.05	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1
AEC40TP01	0 - 0.1 m	7	<0.4	16	30	19	<0.1	13	50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		1.3	0	4	7	4	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0
		17%	0%	22%	26%	19%	0%	8%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BD2/20220824	0 - 0.1 m	6	<0.4	12	28	17	<0.1	8	36	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
AEC40TP04	0 - 0.1 m	5	<0.4	11	27	15	<0.1	7	32	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		1	0	1	1	2	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		18%	0%	9%	4%	13%	0%	13%	12%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BD3/20220920	0 - 0.1 m	4	<0.4	10	29	14	<0.1	9	68	<25	<50	140	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
AEC40TP21	0 - 0.1 m	6	<0.4	14	34	19	<0.1	12	48	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		2	0	4	5	5	0	3	20	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40%	0%	**33%**	16%	**30%**	0%	29%	**34%**	0%	0%	**33%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BD4/20220920	0 - 0.1 m	9.3	<0.4	23	17	20	<0.1	11	35	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<PQL	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.2	<0.05	<0.2	<0.2	<0.05	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1
AEC40TP25	0 - 0.1 m	5	<0.4	14	14	16	<0.1	7	32	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		4.3	0	9	3	4	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0
		60%	0%	**49%**	19%	22%	0%	**44%**	9%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

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Table QA2: Trip Blank Results - Soils (mg/kg)

Sample ID	Sampling date	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TB-240822	24/08/2022	<0.2	<0.5	<1	<1	<2
TB-200922	20/09/2022	<0.2	<0.5	<1	<1	<2

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Table QA3: Trip Spike Results – Soils (% Recovery)

Sample ID	Sampling date	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TS-240822	24/08/2022	102	104	96	98	96
TS-200922	20/09/2022	107	104	102	106	103

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Table QA4: Relative Percentage Difference Results for Groundwater

	Metals								TRH				BTEX					PAH						Phenols											OCP											
	Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	o-xylene	m+p-xylene	Naphthalene	Anthracene	Fluoranthene	Benzo(a)pyrene	Phenanthrene	Other PAH	Phenol	2,4,6-Trichlorophenol	2,4-Dinitrophenol	4-Nitrophenol	2,3,4,6-Tetrachlorophenol	Pentachlorophenol	2-Chlorophenol	2,4-Dimethylphenol	2,4-Dichlorophenol	2,6-Dichlorophenol	Other Phenols	Aldrin	Dieldrin	gamma-Chlordane	alpha-Chlordane	pp-DDT	Endosulfan I	Endosulfan II	Endrin	Heptachlor	Methoxychlor	Other OCP
Sample ID	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BD2/20221005	1	0.6	<1	1	<1	<0.1	69	94	<20	<50	<100	<100	<1	<1	<1	<1	<2	0.01	<0.01	<0.01	<0.01	<0.01	<PQL	<3	<10	<30	<30	-	<10	<3	<3	<3	<3	<PQL	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<PQL
AEC40BH02	1	0.7	<1	1	<1	<0.05	33	66	<10	<50	<100	<100	<1	<1	<1	<1	<2	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<5	<1	<20	<20	<1	<5	<1	<1	<1	<1	<PQL	<0.01	<0.01	<0.01	<0.01	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	<PQL
	0	0.1	0	0	0	0	36	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0%	15%	0%	0%	0%	0%	**71%**	**35%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BD1/20221005	2	0.9	<1	5	<1	<0.05	34	40	<10	<50	<100	<100	<1	<1	<1	<1	<2	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<5	<1	<20	<20	<1	<5	<1	<1	<1	<1	<PQL	<0.01	<0.01	<0.01	<0.01	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	<PQL
AEC40BH03	2	0.8	<1	4	<1	<0.05	34	40	<10	<50	<100	<100	<1	<1	<1	<1	<2	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<5	<1	<20	<20	<1	<5	<1	<1	<1	<1	<PQL	<0.01	<0.01	<0.01	<0.01	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	<PQL
	0	0.1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0%	12%	0%	22%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table QA4: Relative Percentage Difference Results for Groundwater

	OPP												PCB			VOC																												
	Azinphos-methyl	Bromophos-ethyl	Chlorpyrifos	Diazinon	Dichlorovos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Methyl Parathion	Other OPP	Aroclor 1242	Aroclor 1254	Other PCB	Isopropylbenzene	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	cis-1,3-Dichloropropene	Vinyl chloride	Tetrachloroethene	Trichloroethene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Chlorobenzene	1,1,2,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,2-Dichloroethane	Carbon tetrachloride	Chloroform	Bromodichloromethane	Dibromochloromethane	Bromoform	1,2-Dichloropropane	1,3-Dichloropropane	Styrene	Hexachlorobutadiene	Other VOC
Sample ID	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
BD2/20221005	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<PQL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	-	<PQL
AEC40BH02	<0.02	<0.2	<0.01	<0.01	<0.2	<0.15	<0.2	<0.2	<0.05	<0.01	<0.2	<PQL	<0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<PQL
	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0
	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%
BD1/20221005	<0.02	<0.2	<0.01	<0.01	<0.2	<0.15	<0.2	<0.2	<0.05	<0.01	<0.2	<PQL	<0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<PQL
AEC40BH03	<0.02	<0.2	<0.01	<0.01	<0.2	<0.15	<0.2	<0.2	<0.05	<0.01	<0.2	<PQL	<0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<PQL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

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Table QA5: Trip Blank Results - Water (µg/L)

Sample ID	Sample date	TRH C6-C10	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TB-051022	5/10/2022	<10	<1	<1	<1	<1	<2

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Table QA6: Trip Spike Results – Water (% Recovery)

Sample ID	Sample date	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TS-051022	5/10/2022	91%	100%	116%	116%	115%

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Table QA7: Rinsate Results for Water Sampling

		Metals								TRH				BTEX					PAH						OCP															
		Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	o-xylene	m+p-xylene	Naphthalene	Anthracene	Fluoranthene	Benzo(a)pyrene	Phenanthrene	Other PAH	Aldrin	Dieldrin	gamma-Chlordane	alpha-Chlordane	pp-DDT	Endosulfan I	Endosulfan II	Endrin	Heptachlor	Methoxychlor	Other OCP
Sample ID	Sampling Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Rins-W051022	5/10/2022	<1	<0.1	<1	<1	<1	<0.05	<1	<1	**16**	<50	<100	<100	<1	<1	<1	<1	<2	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL	<0.01	<0.01	<0.01	<0.01	<0.006	<0.01	<0.01	<0.01	<0.01	<0.01	<PQL