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Integrated Practical Solutions

Remediation Action Plan

Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA) Area of Environmental Concern (AEC) 35, Luddenham Road, Orchard Hills

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

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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	[redacted]	16 March 2023
Reviewer	[redacted]	16 March 2023

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FS 604853

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

Executive Summary

Douglas Partners Pty Ltd (DP) has prepared this Remediation Action Plan (RAP) for the Surface and Civil Alignment (SCAW) package for Sydney Metro - Western Sydney Airport (SMWSA) at Area of Environmental Concern (AEC) 35, 43A Luddenham Road, Orchard Hills. The RAP was commissioned by CPBUI JV.

The remediation objectives, devised in accordance with CRC (2019a), are to:

- Address potentially unacceptable risks to relevant environmental values from contamination; and
- Render the site suitable, from a contamination perspective, for the proposed development.

This RAP provides details of the work that will be required at the site to meet the remediation objectives.

The site layout is shown on Drawing AEC35-01, Appendix A.

During previous investigations, fill containing waste materials was identified at borehole SMGW-BH-B106 to a depth of 3.95 m. Total recoverable hydrocarbons (TRH) $>C_{16}$-C_{34} were identified in the fill at a depth of 0.2 m. TRH was identified in the groundwater (in the fill profile) at SMGW-BH-B106.

The preferred remediation strategy is to excavate and dispose of contaminated soil (and to reuse any excavated soil that is not deemed to be contaminated). The general sequence of remediation is to excavate all fill materials containing waste materials at SMGW-BH-B106, based on visual assessment; stockpiling of contaminated soil; collection of seepage water; collection of validation samples, stockpile samples and water samples by the Environmental Consultant; disposal of stockpiled materials deemed unsuitable for re-use; and appropriate treatment/disposal of seepage water.

The remediation and validation methods and approach (including QA / QC for validation) are documented in this RAP. In addition, this RAP provides a contingency plan and unexpected finds protocol and general site management plan.

It is considered that the site can be made suitable for the proposed development subject to implementation of this RAP.

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Remediation Action Plan

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

Area of Environmental Concern (AEC) 35, Luddenham Road, Orchard Hills

1. Introduction

Douglas Partners Pty Ltd (DP) has prepared this remediation action plan for the Surface and Civil Alignment (SCAW) package for Sydney Metro - Western Sydney Airport (SMWSA) at Area of Environmental Concern (AEC) 35, Luddenham Road, Orchard Hills. The RAP was commissioned by CPBUI JV.

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);
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020); and
- CRC CARE *Remediation Action Plan: Development - Guideline on Establishing Remediation Objectives* (CRC CARE, 2019a).

The remediation objectives, devised in accordance with CRC (2019a), are to:

- Address potentially unacceptable risks to relevant environmental values from contamination; and
- Render the site suitable, from a contamination perspective, for the proposed development.

This RAP provides details of the work that will be required at the site to meet the remediation objectives.

CPBUI JV has engaged NSW EPA accredited site auditor, Melissa Porter, to complete a site audit under the *Contaminated Land Management Act 1997* (NSW), which involves review of this RAP and associated reports.

It should be noted that this RAP does not form a detailed specification for the proposed site remediation works, but rather represents a planning document which outlines the means by which site remediation can be achieved.

The site layout is shown on Drawing AEC35-01, Appendix A. This report must be read in conjunction with all appendices including the notes provided in Appendix B.

2. Site Identification and Proposed Development

Technical Paper 8: Contamination, prepared as part of Sydney Metro - Western Sydney Airport, Environmental Impact Statement (EIS), documents AECs identified for the Sydney Metro - Western Sydney Airport project, one of which is AEC 35. The site covers two areas which are within the SCAW package, as shown on Drawing AEC35-01, Appendix A.

Table 1 provides a summary of information for site identification.

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 10, Deposited Plan 1280205
Approximate area of AEC 43	Western area: 0.41 ha Eastern area: 0.33 ha Total area: 0.74 ha
Approximate site area (within AEC 43)	RU2: Rural Landscape; and Not zoned along proposed rail line.
Zones for site (from ePlanning Spatial Viewer)	Penrith City Council
Local Government Area	43A Luddenham Road, Orchard Hills, NSW

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.

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.

AEC 35 will be part of an area used as a stabling yard and rail line (i.e., rail corridor usage), although a small part of the site (on the western fringe) may be part of passive open space.

Development of the site will likely include stripping of topsoil across the entire site and cut for rail lines and stabling yard. Stripped and cut soil from the site will be subject to reuse elsewhere within the greater SCAW area. Soil to raise ground levels (if required) may be sourced from off-site.

3. Scope of Work

The scope of works to achieve the objective is as follows:

- Summarise the findings of previous investigations used to inform the status of contamination and contamination risk at the site;
- Present a conceptual site model (CSM) to list potential and likely contamination source, pathway and receptor linkages to address potentially unacceptable risks to relevant environmental values from contamination;
- Define the anticipated extent of remediation;
- Assess, select and justify a preferred approach to remediation to render the site suitable for its proposed use, and which will minimise potentially unacceptable risk to human health and / or the environment and which includes the consideration of the principles of ecologically sustainable development;
- Select an appropriate remediation strategy to render the site suitable, from a contamination perspective, for the proposed development;
- Establish the remediation acceptance criteria (RAC) to be adopted for validation of remediation;
- Identify how successful implementation of the RAP will be validated;
- Outline waste classification, handling and tracking requirements;
- Outline environmental safeguards required to complete the remediation works; and
- Include contingency plans and an unexpected finds protocol.

4. Site Condition and Environment Information

Table 2 provides a summary of information relating to the site condition and environment.

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 for the majority of the site (Penrith 1:100 000 Geology Sheet).
Soil landscape	Blacktown soil landscape which comprises residual soils (Penrith 1:100 000 Soils Landscape Sheet).
Topography	The eastern part of the site is at approximately 42 m relative to Australian Height Datum (AHD). The western part of the site is at approximately 40 m AHD. Slopes at and around the site are generally down to the north and west.
Salinity	The site is at an area of moderate salinity potential. (Department of Infrastructure Planning and Natural Resources, Salinity Potential in Western Sydney Map).

Item	Details
Acid sulfate soils	The site is not within an area or close to an area associated with a risk of acid sufate soils (NSW Acid Sulfate Soil Risk map).
Surface water and surface water bodies	Farm dams are located close to the site, with the nearest one located approximately 10 m to the south of the western area. Blaxland Creek is located approximately 340 m to the northwest of the site. Rainfall at the site is expected to infiltrate permeable surfaces. Runoff at the eastern area may flow to the north or west including towards the adjacent dam. Runoff at the western area is expected to flow to the west and northwest, generally towards Blaxland Creek.
Groundwater flow direction and discharge	Based on topography, shallow groundwater (if any) is expected to flow to the northwest and potentially discharge into Blaxland Creek.
Registered groundwater bores	Registered groundwater bore GW110455 (WaterNSW) is located approximately 150 m to the southwest of the western part of the site. The bore was installed in 2009 to depth of 44.4 m at the Patons Lane Landfill for monitoring purposes. Clay to a depth of 4.8 m was underlain by shale.
Site land use	The site was used for pastural paddocks (EIS).
Surrounding land use	Surrounding land is used for pastural paddocks. Dams, a horse track and a shed are in the surrounding land (EIS).
Information from historical aerial photographs	The land at and surrounding the site appears to have been pastoral land since 1955. There appeared to be potential farm tip waste burial areas (including at AEC 35) (EIS).
NSW EPA records	There were no NSW EPA regulated sites (under the Contaminated Land Management Act 1997) located within a 1 km radius of the site (EIS). There were no sites notified to the NSW EPA (under the Contaminated Land Management Act 1997) within a 1 km radius of the site (EIS). The Patons Lane Landfill, located at 129 Patons Lane, Orchard Hills, approximately 140 m to the southwest of the site, is licensed (EPL 20814 and EPL 21259) under the Protection of the Operations Act 1997. The Patons Lane Landfill was formerly licensed to Orchard Holdings (NSW) Pty Ltd under EPL 11706 for land based extractive activity until 2012. In 2007 Orchard Holdings (NSW) Pty Ltd was issued with a clean-up notice due to unlawfully receiving soil and demolition waste at the quarry (EIS). There were no NSW EPA PFAS investigation sites within a 2 km radius of the site (EIS).

5. Previous Reports

The following previous reports are relevant to the RAP:

- Golder and Douglas Partners, *Sydney Metro Greater West, Factual Contamination Report - Preliminary Site Investigation,* 19 February 2021 (19122621-003-Rev3) (Golder-DP, 2021a);
- Golder and Douglas Partners, *Sydney Metro Western Sydney Airport, Groundwater Monitoring Report - Phase 1-4 Locations*, 3 August 2021 (19122621-019-R-GWMR13 Rev0) (Golder- DP, 2021b); and
- DP, *Detailed Site Investigation (Contamination), Surface & Civil Alignment Works (SCAW) Package for Sydney Metro - Western Sydney Airport (SMWSA), Area of Environmental Concern (AEC) 35, 43A Luddenham Road, Orchard Hills,* February 2023 (DP, 2023) [DSI].

The reports are summarised below.

5.1 Golder-DP Reports

For Golder-DP investigations, Table 3 summarises the sample locations for the site, the associated soil / rock profile, as well as groundwater monitoring well information and groundwater depths. Sample locations are indicated on Drawing AEC35-01, Appendix A. Test pit and borehole logs are provided in Appendix C.

Table 3: Sample Location, Profile and Groundwater Wells

Sample Location	Test Pit / Borehole	Date	Soil / Rock Profile	Groundwater Well Details	Groundwater Depth (m)
SMGW-TP-B316 (at the western part of the site)	Test pit	9/12/2020	Silty clay fill to a depth of 0.3 m was underlain by silty clay and clay to a depth of 2.2 m, then siltstone to a depth of 3 m.	Not applicable	Not encountered
SMGW-BH-B106 (at the western part of the site)	Borehole (hand auger to 0.5 m, solid flight auger with tc-bit to 4.5 m, HQ3 core barrel to 25 m)	15 to 21/2/2020	Waste fill (including metal, a jerry can, glass, white fibres, hose, fishing wire, green substance) (with silty clay from 1.5 m) to a depth of 2.4 m underlain by silty clay fill with glass and rubbish waste to a depth of 3.95 m, then clay to a depth of 6.91 m. Clay was underlain by siltstone and interbedded and interlaminated sandstone and siltstone to a depth of 25 m.	Installed to 5 m deep. Slotted screen at 1 m to 4 m depth (in fill). Gravel pack at 0.8 to 5 m depth. Bentonite plug at 0.3 to 0.8 m depth. Gatic cover at surface. Cement bentonite grout at 9.6 to 25 m and bentonite at 5 to 9.6 m. Developed on 10/3/2020.	1.07 (on 19/2/2020); 2.9 (on 20/2/2020); 3.9 (on 21/2/2020).

Soil samples were selected to be analysed for asbestos; pH; metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc); total phenols; polychlorinated biphenyls (PCB); organochlorine pesticides (OCP); organophosphorus pesticides (OPP); monocyclic aromatic hydrocarbons (MAH); oxygenated compounds; carbon disulfide; fumigants; halogenated aliphatic compounds; halogenated aromatic compounds; trihalomethane; polynuclear aromatic hydrocarbons (PAH); total recoverable hydrocarbons (TRH); benzene, toluene, ethylbenzene, xylenes, naphthalene (BTEXN); per- and poly-fluoroalkyl substances (PFAS); total cyanide; and ammonia. Analytical results are summarised in Tables C1 to C5, Appendix D. For sample locations SMGW-BH-B106 and SMGW-TP-B316, concentrations of contaminants in soil were below the site assessment criteria adopted for the DSI except for:

- TRH >C_{16}-C_{34} in the sample from SMGW-BH-B106, depth 0.2 m. The concentration (10,800 mg/kg) exceeded:
    - The health screening level (HSL) for direct contact for public open space (5300 mg/kg);
    - The ecological screening level (ESL) for public open space (1300 mg/kg);
    - The ESL for a commercial / industrial land use (2500 mg/kg);
    - The management limit for public open space (5000 mg/kg); and
    - The management limit for commercial/industrial sites (5000 mg/kg).
- Benzo(a)pyrene in the sample from SMGW-BH-B106, depth 0.2 m. The concentration (1.8 mg/kg) exceeded the ESL for public open space (0.7 mg/kg) and commercial / industrial site (1.4 mg/kg). This benzo(a)pyrene concentration is significantly less than high reliability ecological guidelines (33 mg/kg for public open space and 172 mg/kg for a commercial / industrial land use) from CRC CARE, *Risk-based Management and Remediation Guidance for Benzo(a)pyrene. Technical Report no. 39*: *Cooperative Research Centre for Contamination Assessment and Remediation of the Environment,* 2017 (CRC CARE, 2017). It was considered in the DSI that this benzo(a)pyrene concentration (alone) did not trigger the need for remediation.

Groundwater samples were collected from SMGW-BH-B106 on six different occasions between April 2020 and May 2021. Groundwater samples were selected to be analysed for pH; electrical conductivity (EC); total dissolved solids (TDS); total suspended solids (TSS); alkalinity; sulfate; chloride; dissolved major cations; hardness; dissolved and total metals (aluminium, arsenic, beryllium, barium, cadmium, chromium, copper, cobalt, nickel, lead, zinc, mercury, manganese, molybdenum, selenium, strontium, vanadium, boron, iron); fluoride; ammonia; nitrite; total kjeldahl nitrogen; total nitrogen; total phosphorus; reactive phosphorus; ionic balance; methane; monocyclic aromatic hydrocarbons (MAH); oxygenated compounds; carbon disulfide; fumigants; halogenated aliphatic compounds; halogenated aromatic compounds; trihalomethanes; PAH; TRH; BTEXN; PFAS; and sulfate reducing bacteria. For these rounds of groundwater sampling at SMGW-BH-B106:

- Concentrations of sodium, chloride and sulfate exceeded the aesthetic drinking water guidelines (adopted for the DSI). It was considered in the DSI that these concentrations were likely to be representative of background conditions as these chemicals are naturally occurring;
- Concentrations of ammonia (0.67 mg/L to 1.31 mg/L) exceeded the recreational aesthetic guideline (adopted for the DSI) and, in two cases, the freshwater default guideline value (DGV) (adopted for the DSI) for pH 8. Concentrations of ammonia were, however, below the freshwater trigger value for pH 6.5 (which was the measured pH);
- Concentrations of PFAS were below the practical quantitation limits (and the adopted site assessment criteria for the DSI);

- Concentrations of PAH, TRH, VOC and BTEX were below the PQL (and the SAC for the DSI); and
- Concentrations of (filtered) aluminium, cobalt, manganese, chromium, copper and zinc exceeded the DGV (adopted for the DSI). Concentrations of aluminium and iron also exceeded the aesthetic drinking water guideline. It was considered in the DSI that the recorded concentrations for these metals are likely to be representative of background conditions.

5.2 DSI (DP, 2023)

The scope of field work for the DSI included:

- Soil sampling from test pits at 19 locations using an excavator (AEC35TP01 to AEC35TP19);
- Soil sampling at one location using a hand auger (AEC35HA20);
- Collection of soil samples from a stockpile (AEC35SP) using an excavator;
- Installation and development of three groundwater monitoring wells (AEC35BH01 to AEC35BH03); and
- Sampling of four groundwater monitoring wells (AEC35BH01 to AEC35BH03 and SMGW-BH-B106).

Sample locations are shown on Drawing AEC35-01, Appendix A. Borehole logs and test pit logs are provided in Appendix C.

For test pits and the hand auger borehole:

- Fill was encountered to depths ranging from 0.1 m to 0.5 m. Fill materials comprised silty clay or gravelly silty clay, sandy clay and clayey sand. A trace of glass was noted in the fill at AEC35TP11, depth 0-0.1 m, and AEC35TP14, depth 0-0.2 m. Anthropogenic materials were otherwise not observed in fill; and
- Fill was underlain by clay and/or silty clay to test pit termination depths of between 0.9 m and 2.5 m.

No ACM was recovered from screening/sieving of fill samples from AEC35TP11, AECTP12 and AEC35TP14.

PID results were less than 5 ppm, indicating a low potential for the presence of volatile contaminants. No signs of gross contamination (e.g., odours, staining or potential asbestos-containing materials) were observed during sampling. No signs of animal waste were observed during sampling.

Free groundwater was observed at AEC35TP11 (depth 0.5 m) and AEC35TP4 (depth 0.45 m).

The stockpile (AEC35SP) was observed to comprise approximately 100 m^3 of medium to high plasticity, pale brown, pale grey and red-orange clay with rootlets and wood. The stockpile was covered in grass No signs of contamination or animal waste were observed in the sampled soil. The location of the stockpile is shown on Drawing AEC35-01, Appendix A.

Piles of waste materials were observed on the ground surface at two locations as shown on Drawing AEC35-01, Appendix A. Waste materials included gas cylinders, metals, wood, plastics and glass bottles.

For boreholes for groundwater monitoring wells installation:

- Fill was encountered to depths ranging from 0.15 m to 0.6 m. Fill materials comprised silty sand. No anthropogenic materials were observed in the fill;
- Fill was underlain by silty clay to depths of up to 5.09 m; and
- Silty clay was underlain by siltstone from a depth of 4.5 m to a depth of 7.5 m at AEC35BH01.

No signs of contamination were noted whilst drilling for monitoring well installation. Water seepage was observed at each borehole whilst drilling including at a depth of 6.5 m at AEC35BH01, 3.7 m at AEC35BH02, and 2.5 m at AEC35BH03.

Measured groundwater levels at the four groundwater monitoring wells on 8 September 2022 ranged between depths of 0.5 m bgl and 2.09 m bgl. Groundwater levels indicated that groundwater flows to the northwest.

Selected soil samples (including stockpile samples) were analysed for metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH, BTEX, PAH, OCP, OPP, PCB, phenols and asbestos. A summary of analytical results is provided in Tables I1 and I3, Appendix D. Concentrations of chemicals for all analysed soil samples were below the site assessment criteria adopted for the DSI. Asbestos was not detected in any analysed sample.

Groundwater samples were analysed for (filtered) metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), PAH, TRH, BTEX, VOC, OCP, OPP, PCB, phenols and ammonia. Concentrations of metals were below the site assessment criteria except for:

- Concentrations of copper in samples from SMGW-BH-B106 (7 µg/L), AEC35BH01 (2 µg/L and 3 µg/L) and AEC35BH02 (28 µg/L) which exceeded the DGV (1.4 µg/L). These concentrations were considered likely to be representative of background copper concentrations in groundwater, particularly given that copper concentrations in tested fill / soil samples were low;
- The concentration of nickel in the sample from AEC35BH02 (220 µg/L) which exceeded the health guideline for recreational water (200 µg/L). This concentration was considered likely to be representative of background nickel concentrations in groundwater particularly given that nickel concentrations in tested fill / soil samples were low; and
- The concentration of zinc in the sample from AEC35BH02 (710 µg/L) which exceeded the DGV (256 µg/L). This concentration was considered likely to be representative of background zinc concentrations in groundwater particularly given that zinc concentrations in tested fill/soil samples were low.

Concentrations of PAH and VOC (including BTEX) in groundwater were below the site assessment criteria. Concentrations of OPP, OCP, PCB and phenols in groundwater were less than the practical quantitation limits and the site assessment criteria. Concentrations of TRH above the practical quantitation limits included:

- TRH $>C_{10}$-C_{16} (130 µg/L), TRH $>C_{16}$-C_{34} (6900 µg/L) and TRH $>C_{34}$-C_{40} (210 µg/L) in the sample from SMGW-BH-B106. A fill sample from this location (depth 0.2 m) was recorded to contain TRH $>C_{16}$-C_{34} and TRH $>C_{34}$-C_{40}. A natural soil sample (depth 4-4.45 m) from this location was recorded to contain detectable TRH $>C_{10}$-C_{16}. It was considered that the likely source of TRH in groundwater at SMGW-BH-B106 was from the fill containing waste materials at this location, particularly as the monitoring well screen (1 m to 4 m depth) was installed within the fill profile (which meant that water entering the well was directly from the fill profile rather than the surrounding natural soil profile); and
- TRH $>C_{10}$-C_{16} (70 µg/L) and TRH $>C_{16}$-C_{34} (200 µg/L) in the replicate sample (BD2/20220908) from AEC35BH03. It is noted that concentrations of TRH in the primary sample from AEC35BH03 were less than the practical quantitation limits. It is also noted that TRH $>C_{10}$-C_{16} and TRH $>C_{16}$-C_{34} was not identified in soil at nearby soil sampling locations. The detected TRH concentrations, albeit low concentrations, in groundwater at AEC35BH03 may be as a result of an off-site source. The recorded concentrations of TRH $>C_{10}$-C_{16} and TRH $>C_{16}$-C_{34} at AEC35BH03 were considered to present a low risk to human receptors.

Concentrations of ammonia in groundwater were below the SAC except for:

- The concentration of ammonia (as N) in the sample from SMGW-BH-B106 (650 µg/L) which exceeded the recreational aesthetic guideline (382 µg/L); and
- The concentrations of ammonia (as N) in the samples from AEC35BH01 (1500 µg/L) which exceeded the recreational aesthetic guideline and the freshwater DGV for pH 8 (900 µg/L). Concentrations of ammonia were, however, below the freshwater trigger value for pH 6.5 (2460 µg/L) which was the measured pH.

It was noted that it is possible (but not known) that the fill containing waste materials at SMGW-BH-B106 is contributing to the above-listed ammonia concentrations at SMGW-BH-B106 and AEC35BH01.

The position of SMGW-BH-B106 is on the proposed rail alignment where excavation is required (to an approximate depth of 2 m). It was understood that, as the fill (identified to a depth of 3.95 m) at SMGW-BH-B106 is uncontrolled fill, it will need to be excavated (i.e., it cannot remain *in situ*) as it is not geotechnically suitable for the proposed development. Given this and the detected TRH in soil and groundwater at SMGW-BH-B106, it was recommended that:

- Once the material is excavated and stockpiled (and sorted, if required), an environmental consultant is to assess the material by inspection, sampling and analysis. A geotechnical engineer should assess and confirm that the uncontrolled fill has been removed (and provide written documentation confirming the removal);
- Following this assessment, material that is considered as not suitable for reuse for SCAW is to be given a waste classification for off-site disposal by the environmental consultant;
- Materials designated for off-site disposal will need to be disposed at a licensed landfill;

- Any liquid / water emanating from the fill (either at its original location or from the stockpile) is to be collected and assessed for disposal purposes; and
- Records of the excavation and waste tracking (of solid and liquid waste) are to be documented.

It was recommended that the plan for the above-listed recommendations, including validation, should be documented. An unexpected finds protocol is to be in place for suspected contamination finds encountered during the excavation works. Waste materials (such as gas cylinders, metals, wood and plastic) observed on the ground surface should be appropriately disposed to a licenced landfill. It was considered that the site can be made suitable for the proposed development subject to the above recommendations.

6. Conceptual Site Model

The data collected during investigations generally confirmed that for certain potential contaminant sources outlined in the preliminary CSM in the DSI, potentially complete pathways to the identified receptors exist, whereas for others, they do not. The source, pathway and receptor linkages are summarised in Table 4.

Potential Sources

Based on the investigations (Section 5), the following sources of contamination have been identified:

- Fill with buried waste materials (identified at SMGW-BH-B106 to a depth of 3.95 m). The concentration of TRH >C_{16}-C_{34} in the sample from SMGW-BH-B106, depth 0.2 m, exceeded site assessment criteria. TRH >C_{10}-C_{40} was identified in the groundwater in the fill profile at SMGW-BH-B106. It was considered in the DSI that the identified TRH at SMGW-BH-B106 was sourced from the fill containing waste materials. It was considered possible (but not known) that the fill containing waste materials is contributing to elevated ammonia concentrations at SMGW-BH-B106 and AEC35BH01.

Potential Receptors

The following potential receptors have been identified:

- Site users (e.g., construction workers, Metro workers, visitors, etc);
- Surface water bodies;
- Groundwater;
- Terrestrial ecosystems; and
- In ground structures.

Potential Pathways

The following potential pathways have been identified:

- Ingestion;

- Direct contact;
- Inhalation of vapours;
- Inhalation of dust;
- Surface run-off;
- Leaching of contaminants into groundwater; and
- Lateral migration of groundwater.

Table 4: Summary of Potentially Complete Exposure Pathways

Source	Transport Pathway	Receptors
Fill with buried waste materials (at SMGW-BH-B106)	Ingestion, inhalation of vapours, inhalation of dust and direct contact	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

7. Remediation Extent

Based on the investigations (Section 5), the extent of remediation comprises:

- Remediation Area 1: The area of fill containing buried waste materials at SMGW-BH-B106. Although the extent is not well understood, an initial (horizontal) extent of excavation, based on a review of logs and aerial photographs, is shown on Drawing AEC35-02, Appendix A and covers an area approximately 200 m^2. The vertical extent for the Remediation Area 1 is at least 3.95 m (depth of fill), however, is likely to vary based on the fill profile. The actual extent (the final remediation extent) will be established at the completion of the excavation of the area during remediation. Perched water within the subject fill is included as part of the fill within this remediation area.

Remediation Area 1 is shown on Drawing AEC35-02.

Although appropriate treatment/disposal of the perched water within the fill profile at Remediation Area 1 is required as part of the remediation process, remediation of groundwater beyond the fill at Remediation Area 1 is not considered to be warranted as TRH was not identified in the groundwater at AEC35BH01 which is the down-gradient monitoring well, and the site is not in close proximity to Blaxland Creek (the potential surface water discharge location for groundwater migrating from the site).

8. Remediation Options Assessment

Section 6 (16) of Volume 1 of NEPC (2013) lists the *preferred hierarchy of options for site clean-up and / or management* which is outlined as follows:

- *On-site treatment of the contamination so that it is destroyed, or the associated risk is reduced to an acceptable level; and*
- *Off-site treatment of excavated soil, so that the contamination is destroyed, or the associated risk is reduced to an acceptable level, after which soil is returned to the site; or*

if the above are not practicable:

- *Consolidation and isolation of the soil on-site by containment with a properly designed barrier; and*
- *Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material;*

or,

- *Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.*

Treatment of soil impacted with petroleum hydrocarbons may include landfarming. Landfarming is an above-ground, engineered process which involves the spreading of excavated contaminated soils in a thin layer (generally < 0.3 metres) on a suitably prepared surface, followed by the stimulation of aerobic microbial activity within the soils through aeration and / or the addition of minerals, nutrients and moisture (NSW EPA, 2014). Successfully treated soil from landfarming may reduce the concentrations of petroleum hydrocarbons in soil to the extent to which it can be reused on site. For the fill identified at SMGW-BH-B106, it is considered that landfarming is likely to be inappropriate for the following reasons:

- Landfarming requires significant land space which may not be made available for the SCAW project;
- Landfarming can require an extended time frame, possibly up to 24 months, which may not meet the scheduling requirements for the SCAW project;
- Other contaminants may be present in the fill matrix which may not be able to be treated using landfarming; and
- It is reasonably likely that the fill will contain bulk waste items and the fill is unlikely to be geotechnically suitable for the SCAW project, so reuse of the treated material is not likely to be an option from this standpoint.

Consolidation and isolation of the soil on-site by containment with a properly designed barrier is considered unlikely to be a feasible option as the TRH in fill at SMGW-BH-B106 has the potential to leach and contaminants may not be contained unless a suitably engineered containment system is established. Any retained contaminated soils would need to be subject to ongoing management, typically under an environmental management plan (EMP), which would need to be legally enforceable.

Removal of contaminated material to an approved site or facility is considered to be an appropriate option. The benefits of this option include that the potential exposure risk is removed and ongoing management is negated. The disadvantages of this option include that it does not follow the principal of sustainability as the soils are not subject to re-use at the site (or elsewhere) and the movement of trucks to and from the landfill can create traffic issues (which have other general environmental impacts).

Implementation of a management strategy without any form of remediation is considered to not be appropriate given that excavation of the fill at SMGW-BH-B106 is required for the proposed development.

9. Preferred Remediation Strategy

The preferred remediation strategy for Remediation Area 1, is to excavate and dispose of contaminated soil (and to reuse any excavated soil that is not deemed to be contaminated).

9.1 Sequence of Remediation

The general sequence of remediation shall be determined by the Contractor (CPBUI JV) with the aim of minimising the potential for cross contamination of ‘clean’ areas / soils with contaminated soils. This should include avoiding, wherever possible, transporting or placing contaminated soil over ‘clean’ areas, separating stockpiles of different origin / contamination profile, and validating the complete removal of any contaminated material placed on / potentially impacting ‘clean’ areas.

The general sequence of remediation at Remediation Area 1 is to be conducted as follows:

- Appointment of an appropriately qualified and experienced Remediation Contractor;
- Installation of all required environmental and WH&S controls. Any waste materials (e.g., gas cylinders, bottles, metals, etc.) on the ground surface at the site are to be appropriately disposed off-site to a licensed landfill/facility (depending on the classification of the waste);
- Excavation of all fill materials containing waste materials (or other signs of contamination) in the vicinity of SMGW-BH-B106 based on visual assessment and as directed by the Environmental Consultant. [As the excavation is anticipated to be deep (approximately 4 m), geotechnical advice regarding stability of the excavation is likely to be required]. The excavation depth should be extended (at least) to 0.1 m into underlying natural soil. The excavation is to be extended laterally and/or vertically until the walls and base of the excavation are free of signs of contamination (e.g., odours, waste materials, staining, etc);
- Stockpiling of excavated soil on an area covered with plastic to minimise the potential for contaminating soils beneath. Different fill materials (based on observation) may be stockpiled separately (for separate assessment). Some waste items (e.g., waste tyres) which are special waste or pre-classified in NSW EPA. (2014a) may need to be separated from other materials;
- If required, collection of seepage / perched water from the excavation (or emanating from the fill) in tanks;
- Collection of validation samples from the excavation by the Environmental Consultant (as per Section 11.4);

- Collection of samples from the stockpile soils for waste classification assessment by the Environmental Consultant (as per Section 12). Stockpile material deemed unsuitable for re-use for the SCAW project is to be disposed at an appropriately licensed landfill / facility according to its waste classification assigned by the Environmental Consultant. Advice will be provided by the Environmental Consultant for stockpiled material deemed suitable for reuse at the SCAW project;
- Sampling of collected (or pooled) seepage water (if any) by the Environmental Consultant. The number of water samples to be collected will depend on how the water has been collected (e.g., the number of holding tanks) and are to be collected at a frequency that is considered by the Environmental Consultant to be representative of the water to be disposed (see Section 12 for testing and assessment of liquid waste). Advice is to be provided by the Environmental Consultant for its disposal (as liquid waste), (or treatment or potential reuse, if considered appropriate);
- Expansion of the excavation under the direction of the Environmental Consultant where test results of validation samples do not meet the remediation acceptance criteria. Validation sampling of the expanded excavation is to be undertaken by the Environmental Consultant. Additional waste classification testing of the excavated soil may be required. This process may need to be repeated (until all results meet the remediation acceptance criteria); and
- Where required, backfilling of the excavation with suitable material (deemed suitable by the Environmental Consultant and geotechnical engineer).

Roles and responsibilities are outlined in the site management plan (Appendix H).

10. Assessment Criteria

10.1 Remediation Acceptance Criteria

The overarching remediation acceptance criterion (RAC) to be adopted for the project is for ‘no unacceptable risks posed by the relevant media (i.e., soils, groundwater or soil vapour) to human health or the environment’. In addition, soil is not to present aesthetic issues for the SCAW project.

The remediation works are to be validated as meeting the RAC by the Environmental Consultant by means of visual inspection, field screening, recovery and analysis of samples and review of any available plans as set out in this report.

The fill (waste) at SMGW-BH-B106 is likely to have waste materials that have not been previously identified. Although TRH >C_{10}-C_{40} was identified as a contaminant at SMGW-BH-B106, given the potential unidentified waste, Tables 5 and 6 summarise the RAC for total petroleum hydrocarbons (TPH), BTEXN, (8) metals, PAH, OCP, OPP, PCB and asbestos which are to be the analytes used for assessing contamination at Remediation Area 1. With regard to TRH >C_{10}-C_{40}, analysis of soil samples is to be initially for TRH >C_{10}-C_{40} (to compare to the RAC), followed by TRH >C_{10}-C_{40} after silica gel clean up (i.e., TPH) where non-petroleum hydrocarbons are suspected to be contributing to recorded TRH concentrations (above RAC). The source and application of these RAC is outlined in Appendix F.

Table 6: RAC for Metals, PAH, OCP, OPP, PCB, TPH & BTEXN

	Health-based criteria for passive open space (mg/kg)	Health-based criteria for rail corridor (mg/kg)	Ecological criteria for passive open space (mg/kg)	Ecological criteria for rail corridor (mg/kg)	Management Limit for passive open space (mg/kg)	Management Limit for rail corridor (mg/kg)
Metals						
Arsenic	300	3000	100	160		
Cadmium	90	900				
Chromium (VI)	300	3600				
Chromium (III)			410	670		
Copper	17 000	240 000	160	230		
Lead	600	1500	1100	1800		
Mercury (inorganic)	80	730				
Nickel	1200	6000	110	180		
Zinc	30 000	400 000	350	510		
PAH						
Benzo(a)pyrene TEQ	3	40				
Benzo(a)pyrene			33*	172*		
Naphthalene	1900	11 000	170	370		
Total PAH	300	4000				
OCP						
DDT			180	640		
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				
OPP						
Chlorpyrifos	250	2000				
PCB						
Total PCB	1	7				
BTEX						
Benzene	120	4 for vapour intrusion, or 430 for direct contact	65	95		
Toluene	18 000	99 000	105	135		
Ethylbenzene	5300	27 000	105	135		
Xylenes	15 000	81 000	45	95		
TPH						
TPH C6-C10					800	800
TPH C6-C10 less BTEX	5100	310 for vapour intrusion, or 26 000 for direct contact	180	215		
TPH >C10-C16			120	170	1000	1000
TPH >C10-C16 less naphthalene	3800	20 000				
TPH >C16-C34	5300	27 000	1300	2500	3500	5000
TPH >C34-C40	7400	38 000	5600	6600	10 000	10 000

Notes: * Tier 2 criteria adopted for RAC

Table 7: RAC for Asbestos

	Health-based criteria for passive open space	Health-based criteria 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

10.2 Site Assessment Criteria

Additional area(s) of contamination encountered beyond those outlined in Section 7, during the course of the remediation and site redevelopment will be subject to the contingency plan or unexpected find protocol (Appendix E) and assessed using the site assessment criteria (SAC) in Appendix F. This is on the provision that other considerations such as risks to groundwater are also taken into account. The SAC were adopted for the DSI and are also shown on the analytical results summary tables in Appendix D.

The SAC should also be used as part of the assessment framework for imported soils.

SAC for the assessment of water are provided in Appendix F.

11. Validation Plan

11.1 Data Quality Objectives

The data quality objectives (DQO) for the validation plan are included in Appendix G.

11.2 Validation Assessment Requirements

The following site validation work will be required:

- Field assessment by the Environmental Consultant comprising:
    - Visual inspection, including taking photographs for record purposes;
    - Collecting validation samples from excavations resulting from the removal of contaminated soils, including contaminated soil stockpile footprints (if relevant); and
    - Collecting validation / characterisation samples for materials to be re-used on-site.
- Laboratory analysis of validation samples at a NATA accredited laboratory for:
    - The contaminant of concern relevant to the remediation area; and

  - Quality control (QC) samples in accordance with Section 14;
- Comparison by the Environmental Consultant of the laboratory results with the SAC and / or RAC as appropriate (refer to Section 10); and
- Preparation by the Environmental Consultant of a validation report detailing the methods and results of the remediation works and validation assessment.

11.3 Visual Inspections

All areas to be assessed and validated will first be subject to a visual inspection by the Environmental Consultant. This includes visual inspection of remediation excavations and ground surfaces across the site following waste removal. Photographs of the base and walls remediation excavations are to be taken for validation reporting.

11.4 Validation Sampling

The sampling frequency will depend on the volume or area to be assessed and the previous results. The following approximate sampling frequencies will be adopted but may be modified by the Environmental Consultant to take into account previous results, where applicable, and findings from the visual inspections.

For small to medium excavations (base <500 m^2), samples will be collected at the following frequencies:

- Base of excavation: one sample per 25 m^2 or part thereof or a minimum of three; and
- Sides of excavation: one sample per 5 m length or part thereof with a minimum of one sample per 1.5 m depth of wall. Samples will be collected at depths of concern (where identified).

For large excavations (base ≥500 m^2), samples will be collected at the following frequencies:

- Base of excavation: sampling on a grid at a density in accordance with Table 2 in NSW EPA (2022) or a minimum of 10 samples. In sub-areas with any specific signs of concern, a higher sampling density may be required; and
- Sides of excavation: one sample per 10 m length or part thereof with a minimum of one sample 1.5 m depth of wall. Samples will be collected at depths of concern (where identified).

For stockpiles comprising similar materials, samples will be collected at the following frequencies:

- Volume up to 200 m^3: one sample per 25 m^3, with a minimum of three per stockpile (NSW EPA, 2022); or
- Volume greater than 200 m^3: a recommended minimum frequency of one sample per 250 m^3, with a minimum of 10 and calculation of the 95% upper confidence limit of the arithmetic mean for all applicable analytes (NSW EPA, 2022). Note that this does not apply to stockpiles impacted, or potentially impacted, by asbestos. For stockpiles greater than 200 m^3 which are impacted, or potentially impacted, by asbestos the Environmental Consultant shall provide guidance in accordance with NSW EPA (2022).

Where contaminated soils are stored or treated on bare soils, the footprint of the stockpile will require validation following removal of the contaminated soils. The sampling frequency will be one sample per 25 m^2 (or a minimum of three) on a general grid pattern across the stockpile footprint.

Validation samples will be analysed by a NATA accredited laboratory for the relevant contaminant of concern relevant to the remediation area.

Validation sample test results will be compared to the RAC, as per the DQO (Appendix G). Where the RAC are considered to have not been met, the remediation excavation(s) will be expanded to 'chase-out' impacted material, as instructed by the Environmental Consultant, with the validation sampling then continuing into the extended excavation. This process will continue until the impacted material has been fully chased out.

12. Waste Disposal

Disposal of waste must be to an appropriately licensed waste facility, as per *Protection of the Environment Operations Act 1997* NSW (POEO Act) and the *Protection of the Environment (Waste) Regulation 2014* NSW.

Any waste disposed off-site must be initially classified by the Environmental Consultant in accordance with:

- NSW EPA *Waste Classification Guidelines, Part 1: Classifying Waste* (NSW EPA, 2014a);
- NSW EPA *Waste Classification Guidelines, Part 2: Immobilisation of Waste* (NSW EPA, 2014b); and
- NSW EPA *Addendum to the Waste Classification Guidelines (2014) - Part 1: Classifying Waste* (NSW EPA, 2016) [addendum for per- and poly-fluoroalkyl substances (PFAS)].

Samples will be collected from stockpiles / *in situ* fill at various depths to characterise the full depth of the material. The frequency is to be determined by the Environmental Consultant based on the risk of contamination and heterogeneity of the material.

For stockpiles comprising similar materials and a:

- Volume up to 200 m^3: a recommended minimum frequency of one sample per 25 m^3, with a minimum of three per stockpile (NSW EPA, 2022); or
- Volume greater than 200 m^3: a recommended minimum frequency of one sample per 250 m^3, with a minimum of 10 and calculation of the 95% upper confidence limit of the arithmetic mean for all applicable analytes (NSW EPA, 2022). Note that this does not apply to stockpiles impacted, or potentially impacted, by asbestos. For stockpiles greater than 200 m^3 which are impacted, or potentially impacted, by asbestos the Environmental Consultant shall provide guidance in accordance with NSW EPA (2022).

Laboratory analysis of soil samples for waste classification will be determined by the Environmental Consultant following a review of any applicable previous results. The general analytical suite will likely comprise metals (arsenic, cadmium, chromium, lead, mercury and nickel), TRH, BTEX, PAH, OCP, OPP, PCB, phenols and asbestos. Analysis will be undertaken at NATA accredited laboratories.

It may be possible to classify excavated soil / fill for reuse on another site under a relevant NSW EPA resource recovery order (RRO) so that it can be used on other sites under the requirements of the corresponding NSW EPA resource recovery exemption (RRE). For this option, the frequency of sampling should be in accordance with the relevant RRO and the contaminants to be analysed will be determined by the Environmental Consultant. The Environmental Consult will provide a report confirming the suitability of the spoil for reuse under a RRO, or otherwise.

It is noted that in NSW EPA (2014a), liquid waste (other than special waste) does not require testing of contaminants to be classified as liquid waste, however, it is anticipated that the liquid waste disposal facility will want some quantitative analysis of the waste prior to accepting the waste. As a minimum, the analytical suite for collected water samples may include TRH, BTEX, VOC, PAH, ammonia, total metals, pH and hardness.

All waste must be tracked by the Remediation Contractor from ‘cradle to grave’. Copies of all consignment notes / disposal dockets (or similar) and Environment Protection Licences for receipt and disposal of the materials must be maintained by the Remediation Contractor as part of the site log and must be provided to the Environmental Consultant for inclusion in the validation report.

13. Imported Material

Any soil, aggregate, etc., imported for the remediation works must have contaminant concentrations that meet the relevant criteria outlined in Section 10 and have no aesthetic issues of concern. Imported materials will only be accepted for use at the site if:

- It can legally be accepted onto the site. For example:
    - The material is classified as virgin excavated natural material (VENM) and is accompanied by a report / certificate prepared by a qualified environmental consultant;
    - The material classified under a NSW EPA RRO, provided the material can be used on site in accordance with the corresponding RRE. This could include excavated natural material (ENM), classified under NSW EPA Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, *The excavated natural material order 2014* (NSW EPA, 2014d); and
    - It is permitted by a condition of the NSW EPA Environmental Protection Licence 21695 which is for the SCAW project. It is noted in the licence (dated 21 September 2022) *that excavated material suitable for re-use within the premises may be transported to another part of the premises or from the Sydney Metro Western Sydney Airport Project including on-airport sites, to the premises by road*. [The ‘premises’ is defined as the Sydney Metro Western Sydney Airport SCAW package footprint].
- Visual inspection of the imported soil confirms that the soil has no signs of concern and is consistent with those described in the supporting classification documentation;
- Have no aesthetic issues of concern; and

- The materials are validated (by inspection / sampling) by the Environmental Consultant as being suitable for use at the site.

The classification report / certificate for all material proposed for import (including quarried material) must be reviewed and approved in writing by the Environmental Consultant prior to import. Materials to be imported may need to meet geotechnical requirements which are to be assessed by others, as required.

For the importation of quarried (virgin excavated) material, the imported material is to be inspected by the Environmental Consultant, however, validation sampling and analysis may not need to be undertaken where no signs of contamination are noted.

For VENM (not from a quarry) or ENM, the validation sampling and analysis undertaken by the environmental consultant will generally be:

- Inspection of the material at the source site;
- Check sampling at a rate of one sample per 200 m^3 to 1000 m^3, with a minimum of five samples for each source site, for material that has been imported to the site, depending on the risk of contamination at the source site; and
- Laboratory analysis of samples for potential contaminants based on source site history (from supplier documentation). This may include eight priority metals, PAH, TRH, BTEX, OPP, OCP, PCB, phenols, PFAS and asbestos.

For RRO materials other than ENM, the validation sampling and analysis will need to be determined by the Environmental Consultant and will depend on the source of the material and adequacy of the supporting documentation provided. Any recycled materials (such as recycled aggregates) must be sampled at a minimum frequency of one sample per 25 m^3 for imported material, with a minimum of three samples per imported batch. Analysis for recycled materials may generally be for asbestos, PCB, eight priority metals, TRH, OCP, PFAS and any other potential contaminants identified by the Environmental Consultant. The recycled material will not be permitted to be used on site until the results of the inspection and laboratory analysis have been approved in writing by the Environmental Consultant. Prior inspection of the material at the source site by the Environment Consultant is recommended where a batch (stockpile) has been designated for import to the site.

For material to be imported to site from other areas of the SCAW package, the requirement for check sampling by the environmental consultant will be determined based on the type of material and the supporting documentation (relating to the source of the material). Uncontaminated virgin excavated material (which has been tested and documented) may be subject to check sampling and analysis similar to that for VENM above. Fill (or topsoil) that has been or is to be imported from elsewhere (at SCAW) may need to be sampled at a rate of one sample per 25 m^3 (if there is insufficient supporting documentation). Laboratory analysis will depend on the potential contaminants associated with the source location (i.e., based on the source location history) and could include testing for some or all of the following: eight priority metals; PAH; TRH; BTEX; OPP; OCP; PCB; PFAS; phenols and asbestos.

14. Quality Assurance and Quality Control

The data quality objectives (DQO) for the validation plan are included in Appendix G.

Field quality assurance and quality control (QA / QC) testing will include the following:

- 10% replicate analysis; and
- Rinsate samples (where re-useable sampling equipment is used), analysed for the suite of analytes analysed by the majority of the primary samples.

Given the absence of volatile contaminants at the site (based on investigations), the use of trip spikes and trip blanks are not considered to be required.

The laboratory will undertake analysis in accordance with its NATA accreditation, including in-house QA / QC procedures.

The field QC analytical results will be assessed using the following criteria:

- Sampling location rationale met the sampling objective;
- Standard operating procedures (SOP) are followed;
- Appropriate QA / QC samples are collected / prepared and analysed;
- Samples are stored under secure, temperature-controlled conditions;
- Chain of custody documentation is employed for the handling, transport and delivery of samples to the selected laboratory;
- Conformance with specified holding times;
- Field and laboratory duplicate and replicate samples will have a precision average of +/- 30% relative percentage difference (RPD); and
- Rinsate samples will show that the sampling equipment (if used) is free of introduced contaminants, i.e., the analytes show that the rinsate sample is within the normal range for deionised water.

Limits for laboratory QA / QC samples will depend on the laboratories' internal QA / QC system. Typical laboratory limits for laboratory QA / QC samples are as follows:

- Blank: less than the PQL;
- Duplicate: for >10 x PQL, the RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range of 20 - 50%;
- Matrix Spike: generally 70-130% recovery for inorganics/metals and 60-140% recovery for organics;
- Laboratory Control Sample (LCS): generally 70-130% recovery for inorganics/metals and 60-140% recovery for organics; and
- Surrogate Spike: generally 70-130% recovery for inorganics/metals and 60-140% recovery for organics.

Field and laboratory test may be considered useable for the validation assessment after evaluation against the following data quality indicators (DQIs):

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

15. Management and Responsibilities

15.1 Site Management Plan

A general site management plan for the operational phase of site remediation is included in Appendix H. The management plan includes soil, noise, dust, work health safety (WHS), remediation schedule, hours of operation, incident response and community relations details. The Remediation Contractor is to implement the general site management plan for the duration of remedial works by incorporating the plan into their over-arching construction environmental management plan (CEMP).

15.2 Site Responsibilities

The site management plan (Appendix H) provides a summary of the general program management and associated responsibilities. Contact details for key utilities are also included in the event of needing to respond to any incidents.

15.3 Contingency Plan and Unexpected Finds Protocol

Plans for contingency situations along with an unexpected finds protocol for dealing with unexpected finds during remediation work / earthworks, are included in Appendix E. Specific requirements are included for the case that asbestos contamination is encountered as an unexpected find during site works.

16. Validation Reporting

16.1 Documentation

The following documents will need to be collated and reviewed by the Environmental Consultant as part of the validation assessment (including those items that are prepared by the Environmental Consultant):

- Any licences and approvals required for the remediation works;
- Waste classification report(s);
- Transportation Record: comprising a record of all truck-loads of soil (including aggregate) entering the site, including truck identification (e.g., registration number), date, time, source site, load characteristics (e.g., type of material, i.e., quarried aggregate, etc.), approximate volume, use (e.g., general site raising, service trenches, etc.);
- Disposal dockets: for any soil disposed off-site including transportation records, spoil source, spoil disposal location, receipt provided by the receiving waste facility / site. Note: A record of other waste materials disposed off-site is also be kept and provided to the Principal, on request;
- Imported materials records: records for any soil imported onto the site, including source site, classification reports, inspection records of soil upon receipt at site and transportation records;
- Records relating to any unexpected finds and contingency plans implemented;
- Laboratory certificates and chain-of-custody documentation;
- Inspections records from the Environmental Consultant; and
- Photographic records by all contractors and consultants of the works undertaken within their purview of responsibilities.

16.2 Reporting

A validation assessment report will be prepared by the Environmental Consultant in accordance with NSW EPA (2020).

The validation report shall describe the remediation approach adopted, methodology, results and conclusion of the assessment and make a statement regarding the suitability of the site for the proposed development.

17. Conclusions

It is considered that the site can be made suitable for the proposed development subject to implementation of this RAP.

18. References

CRC CARE. (2019a). *Remediation Action Plan: Development - Guideline on Establishing Remediation Objectives.* National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

CRC CARE. (2019b). *Remediation Action Plan: Development - Guideline on Performing Remediation Options Assessment.* National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

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NSW EPA. (2014). *Best Practice Note: Landfarming.* NSW Environment Protection Authority.

NSW EPA. (2014a). *Waste Classification Guidelines, Part 1: Classifying Waste.* NSW Environment Protection Authority.

NSW EPA. (2014b). *Waste Classification Guidelines, Part 2: Immobilisation of Waste.* NSW Environment Protection Authority.

NSW EPA. (2014c). *Waste Classification Guidelines, Part 4: Acid Sulfate Soils.* NSW Environment Protection Authority.

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NSW EPA. (2016). *Addendum to the Waste Classification Guidelines (2014) - Part 1: Classifying Waste.* NSW Environment Protection Authority.

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

NSW EPA. (2022). *Sampling Design, Part 1: Application; Part 2: Interpretation.* NSW Environment Protection Authority.

19. Limitations

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

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.

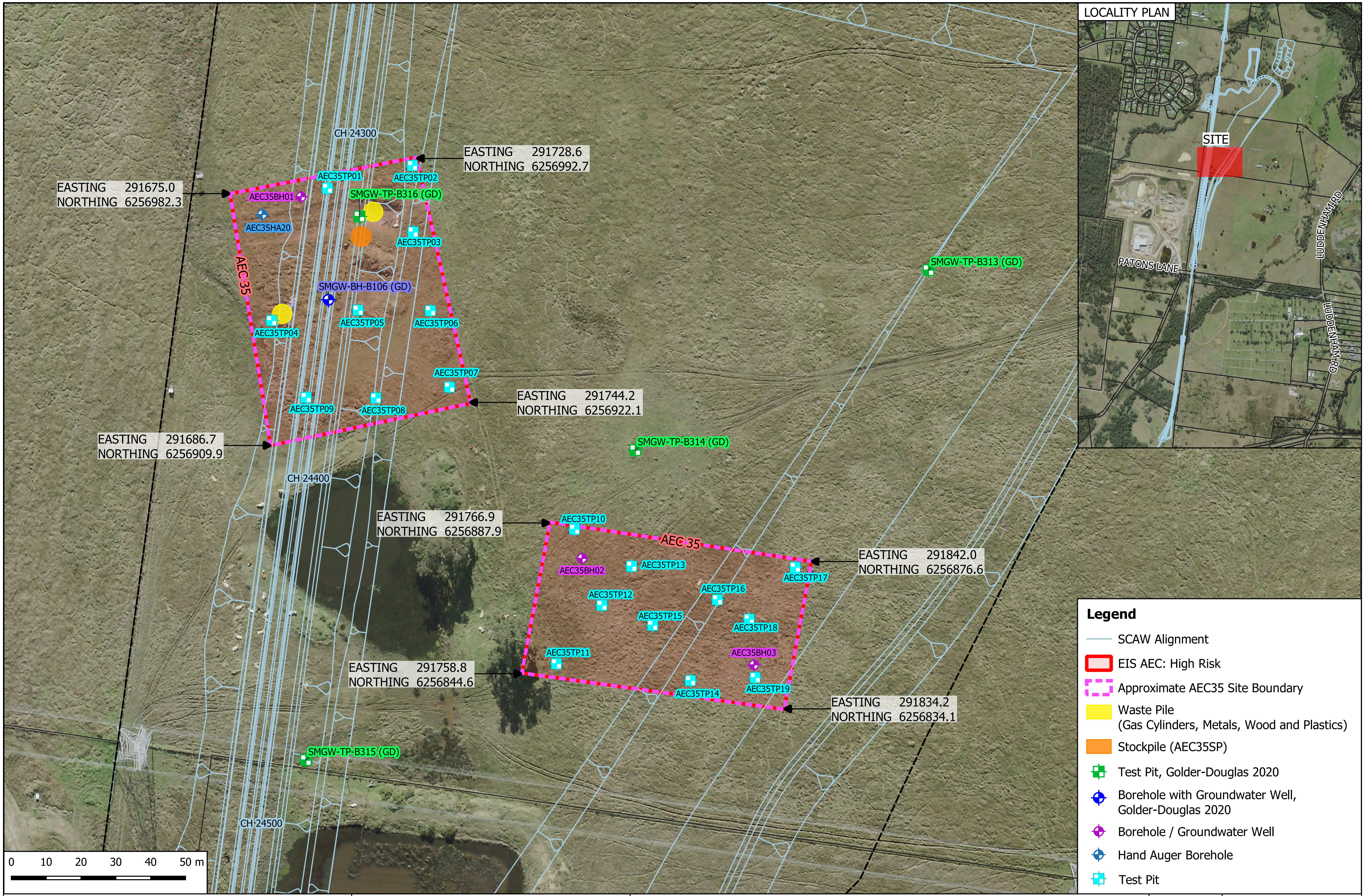
This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation,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

Drawings

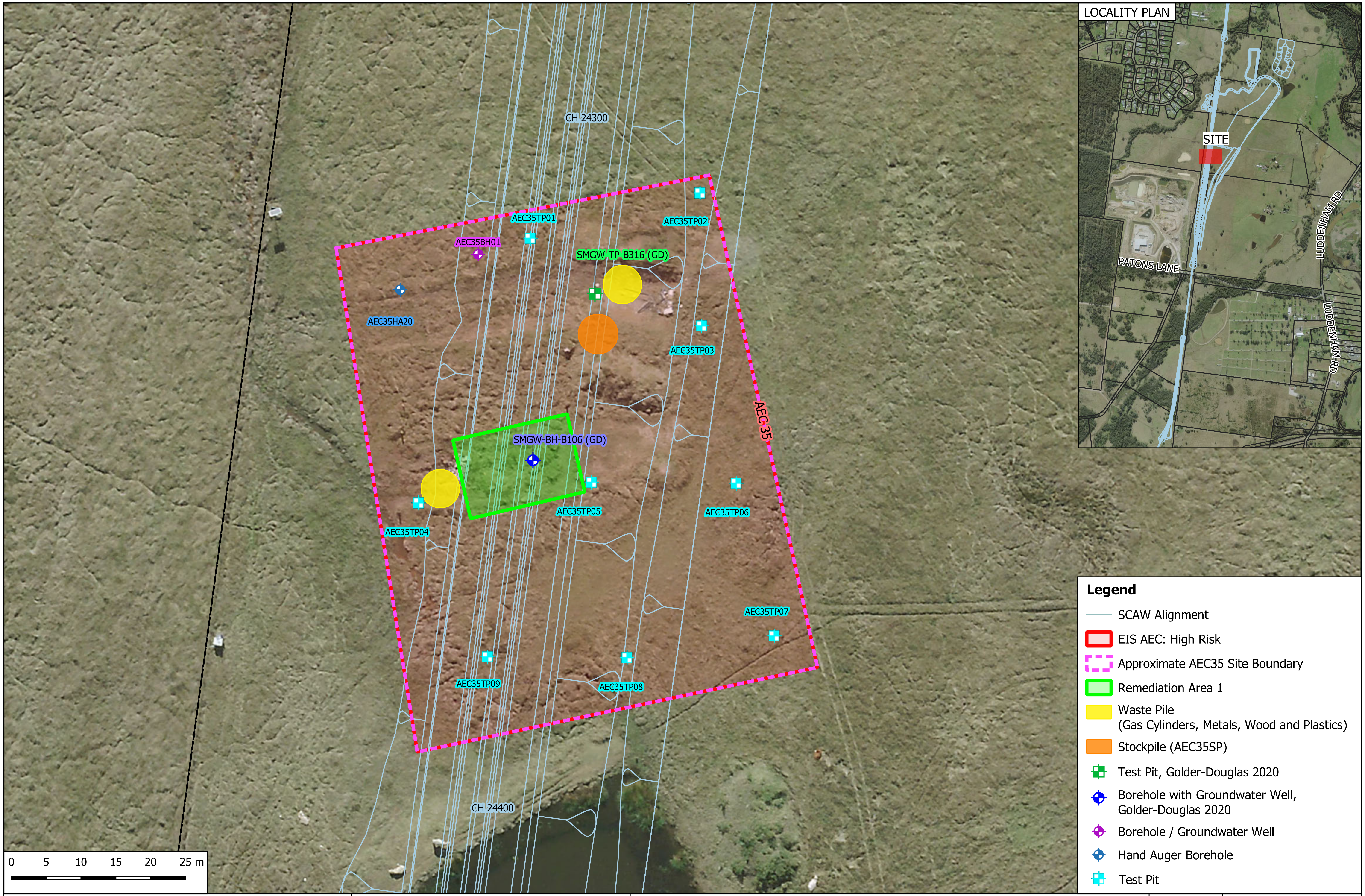


Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	CPBUI JV		
OFFICE:	Sydney	DRAWN BY:	MG
SCALE:	1:1000 @ A3	DATE:	09/12/2022

TITLE:
AEC35 Test Location Plan
Sydney Metro Western Sydney Airport - SCAW
Elizabeth Drive, Badgerys Creek

PROJECT No:	204814.01
DRAWING No:	AEC35-01
REVISION:	Rev 1



Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: CPBUI JV
OFFICE: Sydney
DRAWN BY: MG
SCALE: 1:500 @ A3
DATE: 11/01/2023

TITLE: **AEC35, Proposed Remediation Area**
Sydney Metro Western Sydney Airport - SCAW
43A Luddenham Road, Orchard Hills

N

PROJECT No: 204814.01
DRAWING No: AEC35-02
REVISION: Rev 0

Appendix B

Notes About this Report

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.

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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.

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 and Test Pit Logs from Previous Reports

PIEZOMETER CONSTRUCTION

HOLE NO : AEC35-BH01
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291695.4, N: 6256981.4 (56 MGA2020) SURFACE ELEVATION : 38.40 (mAHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Comacchio 305 MOUNTING : Track CONTRACTOR : Ground Test

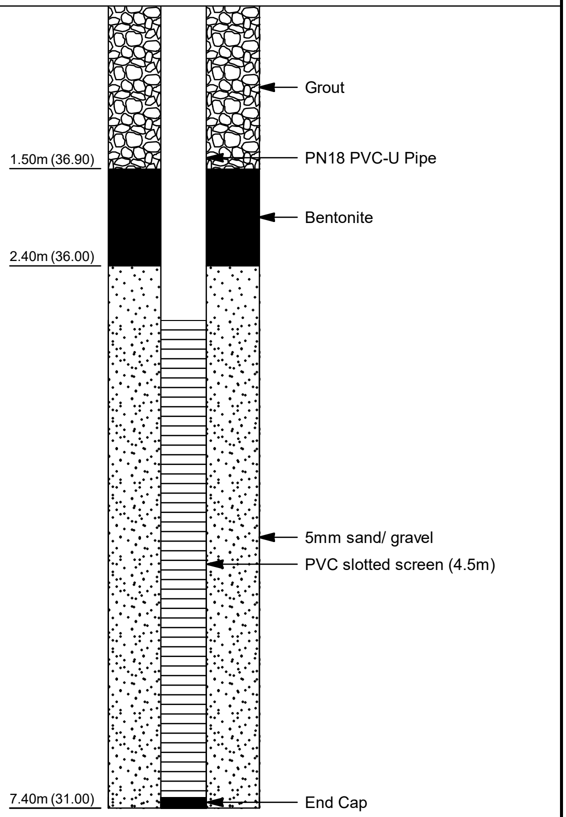
DATE STARTED : 22/08/22 DATE COMPLETED : 22/08/22 DATE LOGGED : 22/08/22 LOGGED BY : BY CHECKED BY : MB

DRILLING: PROGRESS – DRILLING & CASING: AD/T (0.0 m to 7.50 m); WATER LOSS; GROUND WATER LEVELS: Water Seepage

DEPTH (m)	CLASSIFICATION SYMBOL	MATERIAL (See geotechnical log for soil/rock detail)
0.0 – 0.60m		FILL: silty SAND: brown, fine to medium grained sand, trace fine to medium grained, angular to subangular gravel and rootlets Below 0.3m: with gravel, no rootlets
0.60m – 2.50m	CI-CH	Silty CLAY: medium to high plasticity, pale grey mottled orange-brown
2.50m – 3.50m	CI	Silty CLAY: medium plasticity, pale grey and red-brown, with fine to coarse grained, subangular to subrounded ironstone gravel and bands
3.50m – 4.50m	CL-CI	Silty CLAY: low to medium plasticity, grey and dark grey, extremely weathered siltstone
4.50m – 7.50m		SILTSTONE: grey and dark grey, apparently very low to low strength
7.50m		AEC35-BH01 TERMINATED AT 7.50 m Target depth

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
1		0.60 m 37.80 m mAHD	7.40 m 31.00 mAHD	22/08/2022	



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.

Douglas Partners
Geotechnics / Environment / Groundwater

PIEZOMETER CONSTRUCTION

HOLE NO : AEC35-BH02
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291776.1, N: 6256877.5 (56 MGA2020) SURFACE ELEVATION : 41.40 (mAHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Comacchio 305 MOUNTING : Track CONTRACTOR : Ground Test

DATE STARTED : 19/08/22 DATE COMPLETED : 19/08/22 DATE LOGGED : 19/08/22 LOGGED BY : BY CHECKED BY : MB

DRILLING

DRILLING & CASING	WATER LOSS	GROUND WATER LEVELS
AD/T (0.0 – 5.09 m)		22/08/22 07:45 (approx. 0.6 m) Water Seepage (approx. 3.7 m)

MATERIAL

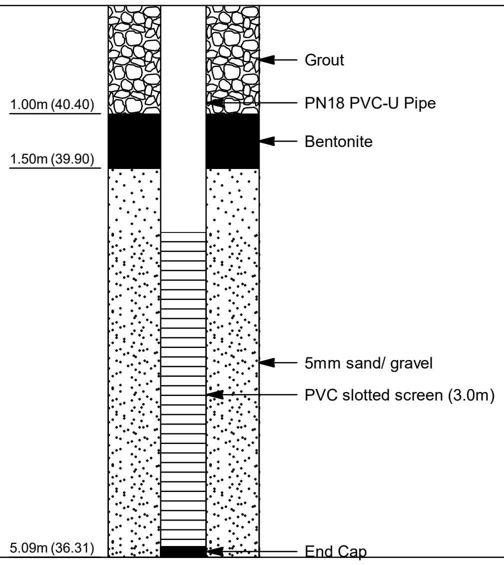
MATERIAL (See geotechnical log for soil/rock detail)

DEPTH (m)	CLASSIFICATION SYMBOL	MATERIAL
0.0 – 0.15m		FILL: silty SAND: brown, fine to medium grained sand, trace clay and rootlets
0.15m – 2.50m	CI-CH	Silty CLAY: medium to high plasticity, pale grey mottled orange-brown
2.50m – 4.50m	CI	Silty CLAY: medium plasticity, pale grey and red-brown, with fine to coarse grained, subangular to subrounded ironstone gravel and bands
4.50m – 5.09m	CL-CI	Silty CLAY: low to medium plasticity, grey and dark grey

AEC35-BH02 TERMINATED AT 5.09 m
Target depth

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
1		0.91 m 40.49 m mAHD	5.09 m 36.31 mAHD	19/08/2022	



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 : AEC35-BH03
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291825.5, N: 6256847.0 (56 MGA2020) SURFACE ELEVATION : 42.30 (mAHD) ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Comacchio 305 MOUNTING : Track CONTRACTOR : Ground Test

DATE STARTED : 19/08/22 DATE COMPLETED : 19/08/22 DATE LOGGED : 19/08/22 LOGGED BY : BY CHECKED BY : MB

DRILLING

PROGRESS: DRILLING & CASING: AD/T (0.0 – 3.80 m)

GROUND WATER LEVELS: 22/08/22 07:50; Water seepage

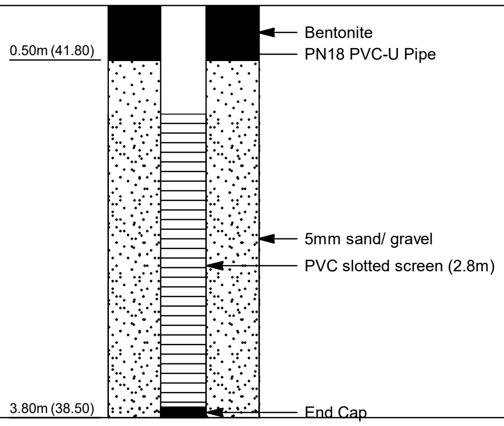
MATERIAL

MATERIAL
(See geotechnical log for soil/rock detail)

DEPTH	CLASSIFICATION SYMBOL	MATERIAL
0.20m		FILL: silty SAND: brown, fine to medium grained sand, trace clay and rootlets
2.30m	CI-CH	Silty CLAY: medium to high plasticity, pale grey mottled orange-brown
3.80m	CI	Silty CLAY: medium plasticity, pale grey and red-brown, with fine to coarse grained, subangular to subrounded ironstone gravel and bands
		AEC35-BH03 TERMINATED AT 3.80 m Target depth

PIEZOMETER CONSTRUCTION DETAILS

ID	Type	Stick Up & RL	Tip Depth & RL	Installation Date	Static Water Level
1		1.00 m 41.30 m mAHD	3.80 m 38.50 mAHD	19/08/2022	



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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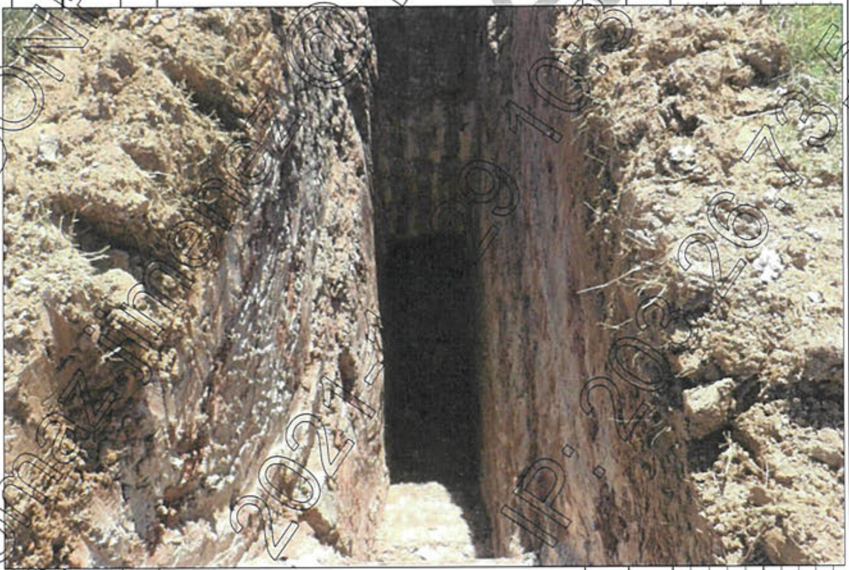
EXCAVATION - GEOLOGICAL LOG

PIT NO : SMGW-TP-B316
FILE / JOB NO : 00013/11180
SHEET : 1 OF 1

PROJECT : Sydney Metro Greater West
LOCATION : Orchard Hills - Luddenham Road
POSITION : E: 291712.2, N: 6256975.7 (56 MGA2020)
SURFACE ELEVATION : 38.17 (mAHD)
EQUIPMENT TYPE : 9T Excavator
METHOD : 600mm toothed bucket
DATE EXCAVATED : 9/12/20
LOGGED BY : JS
CHECKED BY : DEM
EXCAVATION DIMENSIONS : 4.00 m LONG 0.60 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 100 200 300 400	DCP TEST (AS 1289.6.3.2-1997) Blows/100 mm 5 10 15 20 25	STRUCTURE & Other Observations
	None	Not Encountered	ES 0.20m ES 0.30m 0.40m B 0.50m ES 0.50m D	0.0			FILL: silty CLAY: medium to high plasticity, brown mottled grey, with 0.30m	D			3 6	FILL
						CI-CH	Silty CLAY: medium to high plasticity, pale grey mottled brown and red-brown, with ironstone gravel, trace rootlets 0.80m			×	7 10 12 15	RESIDUAL SOIL 0.50: Non-calcareous 0.50: HP Samp =300 kPa
			1.00m B 1.10m ES 1.30m 1.40m D	1.0		CI-CH	Silty CLAY: medium to high plasticity, pale grey mottled red-brown 1.90m	w<PL	VSt	×	10 9 10 10 8 8 10	1.30: HP Samp =450 kPa 1.40: Non-calcareous
				2.0		CI-CH	CLAY: medium to high plasticity, pale grey mottled red-brown, shaly 2.20m		H		15 25 Refusal	WEATHERED MATERIAL
			2.50m B 2.60m ES 2.70m 2.80m 2.80m D				SILTSTONE: pale grey and brown, very low strenght, with ironstone and extremely weathered beds 3.00m			×		2.80: HP Samp >500 kPa 2.90: Non-calcareous
				3.0			EXCAVATION SMGW-TP-B316 TERMINATED AT 3.00 m Refusal on siltstone					
				8.0								



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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NON-CORE DRILL HOLE - GEOLOGICAL LOG

HOLE NO : SMGW-BH-B106
FILE / JOB NO : 00013/11180
SHEET : 1 OF 5

PROJECT : Sydney Metro Greater West
LOCATION : Orchard Hills - Luddenham Road

POSITION : E: 291702.8, N: 6256950.4 (56 MGA94)
SURFACE ELEVATION : 39.43 (mAHD)
ANGLE FROM HORIZONTAL : 90°

RIG TYPE : Delta Base 520
MOUNTING : Track
CONTRACTOR : Hagstrom
DRILLER : DK

DATE STARTED : 15/2/20
DATE COMPLETED : 21/2/20
DATE LOGGED : 15/2/20
LOGGED BY : SL
CHECKED BY : DEM

DRILLING						MATERIAL					
PROGRESS: DRILLING & CASING	PROGRESS: WATER LOSS	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
HA HW Casing		H		0.20m D 0.30m	0.0 *39.4*			WASTE FILL: green substance and foam, metal cans, metal wire, fishing wire, plastic jerry can, glass fragments, garden hose and white fibres			FILL
				0.50m D 0.60m							
			▽ 19/02/20 08:50, after severe storm	1.00m D 1.10m	1.0 *38.4*						
				1.50m D 1.60m				From 1.5m: with brown, medium plasticity silty clay			
					2.0 *37.4*			At 2.0m: void based on zero drilling resistance			
					2.40m						
AD/T		F		2.50m SPT 0, 8, 13 N*=21				FILL: silty CLAY: medium plasticity, grey brown mottled red, with glass fragments, possibly reworked natural material with rubbish waste			2.50: SPT Recovery: 0.21 m
			▽ 20/02/20 07:30	2.95m							
				3.00m SPT 8, 17, 26 N*=43	3.0 *36.4*			From 3.0m: green substance			3.00: SPT Recovery: 0.28 m
				3.45m							
			▽ 21/02/20 08:00		3.95m						
				4.00m SPT 3, 22, 32 N*=54	4.0 *35.4*			CLAY: orange brown and grey, inferred extremely low strength and extremely weathered, (siltstone)	w-PL	H	WEATHERED MATERIAL 4.00: SPT Recovery: 0.28 m
				4.45m	4.45m			Continued as Cored Drill Hole			
					5.0 *34.4*						
					6.0 *33.4*						
					7.0 *32.4*						
					8.0 *31.4*						

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

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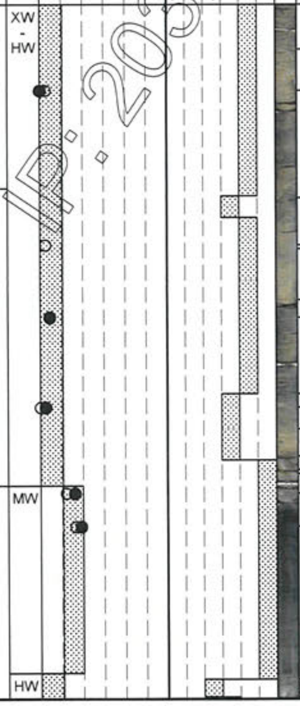
CORED DRILL HOLE LOG

HOLE NO : SMGW-BH-B106
FILE / JOB NO : 00013/11180
SHEET : 2 OF 5

PROJECT : Sydney Metro Greater West
LOCATION : Orchard Hills - Luddenham Road

POSITION : E: 291702.8, N: 6256950.4 (56 MGA94) SURFACE ELEVATION : 39.43 (mAHD) ANGLE FROM HORIZONTAL : 90°
RIG TYPE : Delta Base 520 MOUNTING : Track CONTRACTOR : Hagstrom DRILLER : DK
DATE STARTED : 15/2/20 DATE COMPLETED : 21/2/20 DATE LOGGED : 15/2/20 LOGGED BY : SL CHECKED BY : DEM
CASING DIAMETER : HW BARREL (Length) : 3.00 m BIT : 8 Step face BIT CONDITION : Good

DRILLING: DRILLING & CASING	DRILLING: WATER LOSS	DRILLING: (CORE LOSS RUN %) DRILL DEPTH	DRILLING: RQD (%)	DRILLING: SAMPLES & FIELD TESTS	DEPTH (m) RL (m AHD)	MATERIAL: DESCRIPTION ROCK TYPE : Grain size, Colour, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	MATERIAL: Weathering	FRACTURES: ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, apparent dip, infilling or coating, shape, roughness, thickness, other, [true dip, dip direction]
					0.0 39.4			
					1.0 38.4			
					2.0 37.4			
					3.0 36.4			
					4.0 35.4			
					4.45m	START CORING AT 4.45m		
HW Casing HQ3	50%	0% LOSS	0			CLAY: orange brown and grey, indistinct bedding at 0-5, with 5% fine grained sand and bioturbation (siltstone), iron-stained	XW - HW	4.68: JT 70-85° Fe Clay CT IR S (4.27-5.09) 4.89: Calcareous
		4.59 0% LOSS	0	Is(50) d=0.04 a=0.01	5.0 34.4			
				Is(50) d=0.04	5.39m	CLAY: orange brown and grey, indistinct bedding at 0-5, with 5% fine grained sand and bioturbation (siltstone)		5.44: JT 70-85° Fe Clay CT IR S (5.39-5.49) 5.68: Calcareous 5.70: JT 50-85° Fe Clay CT IR S tight (5.54-5.86) 5.96: JT 50-85° Fe Clay CT IR S tight (5.86-6.05) 6.05: Calcareous
				Is(50) d=0.05 a=0.05	6.0 33.4			
				Is(50) d=0.02 a=0.04		6.45-6.75m: grey with siltstone flecks, weathered to high plasticity clay		6.44: BP 5° Clay VNR PR S 6.51: Calcareous 6.62-6.76: XS 0° Clay PR S 40mm
		6.91			6.91m	6.77-6.91m: red ironstone		6.83-6.85: JT 60-85° Fe IR S 20mm gravel (6.78-6.87)
	100%	0% LOSS	44	Is(50) d=0.12 a=0.19 Is(50) d=0.2 a=0.27 UCS=[illegible] MPa	7.0 32.4	SILTSTONE: dark grey, indistinct to disturbed bedding dipping at 0-5, with bioturbation	MW	6.95: Calcareous 7.12: Calcareous
							HW	7.90: BP 0° CN PR S
					8.0 31.4			



ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral VL 0.1 L 0.3 M 1 H 3 VH 10 EH
NATURAL FRACTURE (mm) 20 40 100 300 1000
CORE

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CORED DRILL HOLE LOG

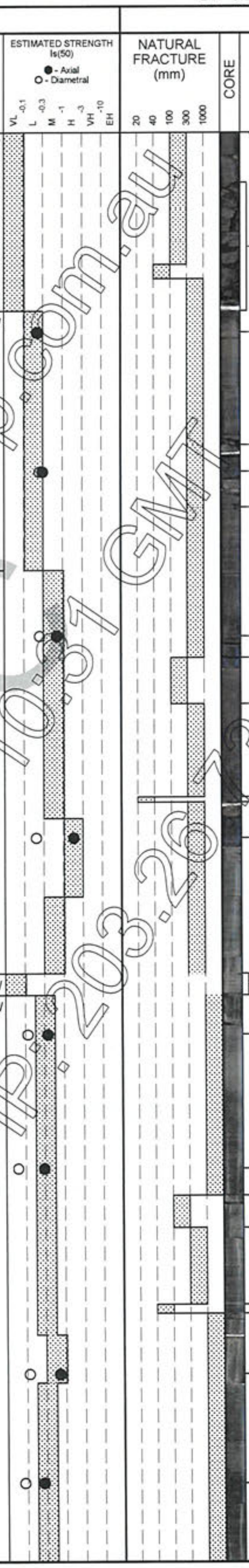
HOLE NO : SMGW-BH-B106
FILE / JOB NO : 00013/11180
SHEET : 3 OF 5

PROJECT : Sydney Metro Greater West
LOCATION : Orchard Hills - Luddenham Road

POSITION : E: 291702.8, N: 6256950.4 (56 MGA94)
SURFACE ELEVATION : 39.43 (mAHD)
ANGLE FROM HORIZONTAL : 90°
RIG TYPE : Delta Base 520
MOUNTING : Track
CONTRACTOR : Hagstrom
DRILLER : DK
DATE STARTED : 15/2/20
DATE COMPLETED : 21/2/20
DATE LOGGED : 15/2/20
LOGGED BY : SL
CHECKED BY : DEM
CASING DIAMETER : HW
BARREL (Length) : 3.00 m
BIT : 8 Step face
BIT CONDITION : Good

DRILLING: PROGRESS – DRILLING & CASING: HQ3; WATER LOSS: 100%

(CORE LOSS RUN %) DRILL DEPTH	RQD (%)	SAMPLES & FIELD TESTS	DEPTH (m) RL (m AHD)	Weathering	DESCRIPTION ROCK TYPE : Grain size, Colour, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, apparent dip, infilling or coating, shape, roughness, thickness, other, [true dip, dip direction]
0% LOSS	44	Packer Test =1uL	8.0 31.4	HW	SILTSTONE: dark grey, indistinct to disturbed bedding dipping at 0-5, with bioturbation *(continued)*	7.99: BP 0° CN PR S 8.28-9.00: SZ PR S 720mm gravel
9.00 0% LOSS	100	Is(50) d=0.23 a=0.21 UCS=2.7 MPa	9.0 30.4	MW	9.16-9.43m: grey with siltstone flecks	9.12: Calcareous 9.75: JT 50° Clay VNR PR S
9.81 0% LOSS	98	Is(50) d=0.24 a=0.29 UCS=2.6 MPa	10.0 29.4			9.90: Calcareous 10.10: JT 85° CN PR S
		Is(50) d=0.24 a=0.66	11.0 28.4	F		10.82: Calcareous 10.94: BP 0-10° CN IR S 11.20: BP 0° CN PR S 11.72: BP 5-10° CN IR S 11.75: JT 30° CN PR S
11.78 0% LOSS	94	Is(50) d=0.19 a=1.75	12.0 27.4		11.84-12.28m: fine to medium grained sandstone bed interlaminated with siltstone	11.95: Calcareous
				XW		12.71-12.83: XS 0° Clay PR S 120mm
		Is(50) d=0.11 a=0.36	13.0 26.4	MW	13.03-13.36m: grey with siltstone flecks	13.05: Calcareous
		Is(50) d=0.06 a=0.28	14.0 25.4		14.07-14.18m: fine to medium grained sandstone bed	13.80: Calcareous 13.95: BP 0° CN PR S 14.13: BP 5° CN PR S 14.56: BP 0° CN PR S 14.61: BP 0-10° CN IR S
14.73 10% LOSS	90	Packer Test <1uL Is(50) d=0.11 a=0.66	15.0 24.4		15.03m SILTSTONE: dark grey, indistinct to disturbed bedding dipping at 0-5, with bioturbation and sub-rounded clasts up to 20mm diameter 15.33-15.50m: grey with siltstone flecks	14.95: Calcareous
		Is(50) d=0.08 a=0.25	16.0 23.4			15.56: Calcareous



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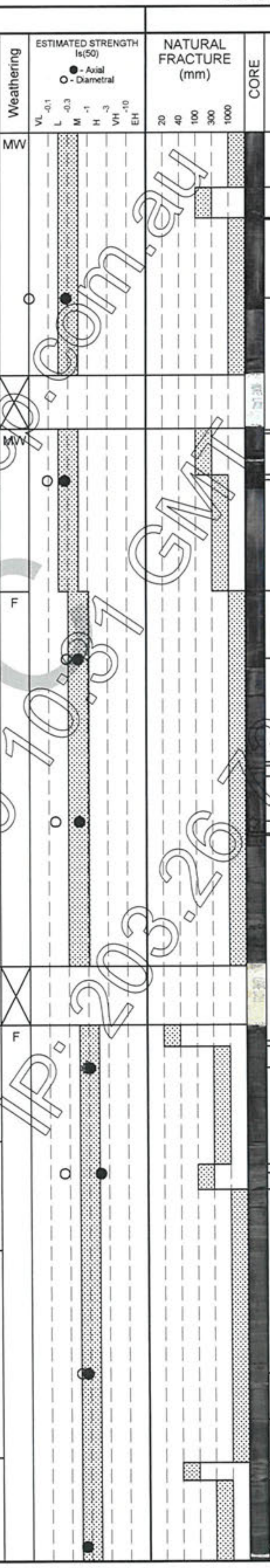
CORED DRILL HOLE LOG

HOLE NO : SMGW-BH-B106
FILE / JOB NO : 00013/11180
SHEET : 4 OF 5

PROJECT : Sydney Metro Greater West
LOCATION : Orchard Hills - Luddenham Road

POSITION : E: 291702.8, N: 6256950.4 (56 MGA94)   SURFACE ELEVATION : 39.43 (mAHD)   ANGLE FROM HORIZONTAL : 90°
RIG TYPE : Delta Base 520   MOUNTING : Track   CONTRACTOR : Hagstrom   DRILLER : DK
DATE STARTED : 15/2/20   DATE COMPLETED : 21/2/20   DATE LOGGED : 15/2/20   LOGGED BY : SL   CHECKED BY : DEM
CASING DIAMETER : HW   BARREL (Length) : 3.00 m   BIT : 8 Step face   BIT CONDITION : Good

DRILLING: PROGRESS: DRILLING & CASING	DRILLING: PROGRESS: WATER LOSS	(CORE LOSS RUN %) DRILL DEPTH	RQD (%)	SAMPLES & FIELD TESTS	DEPTH (m) RL (m AHD)	MATERIAL: DESCRIPTION ROCK TYPE : Grain size, Colour, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering
HQ3	100%	10% LOSS	90		16.0 23.4	SILTSTONE: dark grey, indistinct to disturbed bedding dipping at 0-5, with bioturbation and sub-rounded clasts up to 20mm diameter *(continued)*	MW
				Is(50) d=0.01 a=0.27	17.0 22.4		
						17.36m	
						CORE LOSS 0.30m (17.36-17.66)	
						17.66m	
						SILTSTONE: dark grey, indistinct to disturbed bedding dipping at 0-5, with bioturbation	MW
		17.84					
		11% LOSS	89	Is(50) d=0.09 a=0.25	18.0 21.4		
				Packer Test <1uL			
						18.55-18.60m: subrounded clasts up to 50mm wide	F
				Is(50) d=0.27 a=0.53	19.0 20.4		
						19.29-19.69m: fine to medium grained sandstone interlaminated with siltstone flecks, disturbed to irregular bedding, 1% carbonaceous laminations	
				Is(50) d=0.14 a=0.57	20.0 19.4		
						20.5-20.67m: carbonaceous rich	
						20.67m	
						CORE LOSS 0.33m (20.67-21.00)	
		21.00				21.00m	
		0% LOSS	95		21.0 18.4	SILTSTONE: dark grey, indistinct to disturbed bedding at 0-10, with sub-rounded clasts	F
				Is(50) d=0.85 a=1			
						21.65m	
						SILTSTONE: dark grey, irregular to disturbed at 0-20 with 15% fine to medium grained sandstone beddings up to 100mm thick, with sub-rounded clasts	
				Is(50) d=0.22 a=1.86	22.0 17.4		
				Packer Test =2uL			
						22.26m	
						SILTSTONE: dark grey, indistinct to disturbed bedding at 0-10, with sub-rounded clasts	
				Is(50) d=0.57 a=0.82	23.0 16.4		
						23.42m	
						INTERBEDDED AND INTERLAMINATED SANDSTONE AND SILTSTONE: pale grey fine to medium grained sandstone (60%) interbedded and interlaminated with dark grey siltstone (40%), siltstone beds up to 650mm and sandstone beds up to 670mm, disturbed to irregular bedding 0-20, with sub-rounded clasts to 30mm	
		23.97		Is(50) d=0.72 a=0.72	24.0 15.4		



FRACTURES

ADDITIONAL DATA

(joints, partings, seams, zones, etc)
Description, apparent dip, infilling or coating, shape, roughness, thickness, other, [true dip, dip direction]

16.31: BP 5° X VNR PR S
16.48-16.49: CS 5° PR S 10mm gravel
16.93: Calcareous
17.67-17.69: XS 5° Clay PR S 20mm
17.92: BP 5° CN PR S
17.95: Calcareous
18.57: BP 0° CN PR S
18.95: Calcareous
19.53: IS 5-10° CA CT
19.55: IS 5-15° CA CT
19.61: IS 0-5° CA CT
19.86: Calcareous
19.93-19.94: BP 0° Clay PR S 5mm
21.09: BP 10° CN PR S
21.12: BP 10° CN PR S
21.24: Calcareous
21.78: BP 5-10° CN PR S
21.83: Calcareous
21.92: BP 5-30° CN PR RF
22.95: Calcareous
23.21: IS 0° CA CT
23.45: BP 5-15° CN PR RF
23.50: BP 20° CN PR RF tight
23.55: BP 0-10° CN PR RF
23.92: Calcareous

RMS LIB 40.3.14.GLB Log RTA CORED DRILL HOLE 4 SMGW BH.GPJ <<DrawingFile>> 18/Jun/2020 21:50 10.01.00.01 Datgel Tools

GOLDER   **Douglas Partners** Geotechnics / Environment / Groundwater

CORED DRILL HOLE LOG

HOLE NO : SMGW-BH-B106
FILE / JOB NO : 00013/11180
SHEET : 5 OF 5

PROJECT : Sydney Metro Greater West
LOCATION : Orchard Hills - Luddenham Road

POSITION : E: 291702.8, N: 6256950.4 (56 MGA94)
SURFACE ELEVATION : 39.43 (mAHD)
ANGLE FROM HORIZONTAL : 90°
RIG TYPE : Delta Base 520
MOUNTING : Track
CONTRACTOR : Hagstrom
DRILLER : DK
DATE STARTED : 15/2/20
DATE COMPLETED : 21/2/20
DATE LOGGED : 15/2/20
LOGGED BY : SL
CHECKED BY : DEM
CASING DIAMETER : HW
BARREL (Length) : 3.00 m
BIT : 8 Step face
BIT CONDITION : Good

DRILLING						MATERIAL				FRACTURES		
PROGRESS												
DRILLING & CASING	WATER LOSS	(CORE LOSS RUN %) DRILL DEPTH	RQD (%)	SAMPLES & FIELD TESTS	DEPTH (m) RL (m AHD)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Grain size, Colour, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral VL 0.1 L 0.3 M 1 H 3 VH 10 EH	NATURAL FRACTURE (mm) 20 40 100 300 1000	CORE	ADDITIONAL DATA (joints, partings, seams, zones, etc) Description, apparent dip, infilling or coating, shape, roughness, thickness, other, [true dip, dip direction]
HQ3	100%	0% LOSS 25.00	100	Packer Test 2uL UCS=41.3 MPa Is(50) d=0.62 a=0.76	24.0 15.4		INTERBEDDED AND INTERLAMINATED SANDSTONE AND SILTSTONE: pale grey fine to medium grained sandstone (60%) interbedded and interlaminated with dark grey siltstone (40%), siltstone beds up to 650mm and sandstone beds up to 670mm, disturbed to irregular bedding 0-20, with sub-rounded clasts to 30mm *(continued)* 25.00m	F				24.13: BP 0-5° CN PR RF 24.69: JT 60-80° CN PR RF (24.62-24.75) 24.95: Carbonate
					25.0 14.4		BOREHOLE SMGW-BH-B106 TERMINATED AT 25.00 m Target depth Groundwater well installed					
					26.0 13.4							
					27.0 12.4							
					28.0 11.4							
					29.0 10.4							
					30.0 9.4							
					31.0 8.4							
					32.0 7.4							

GOLDER
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EXCAVATION - GEOLOGICAL LOG

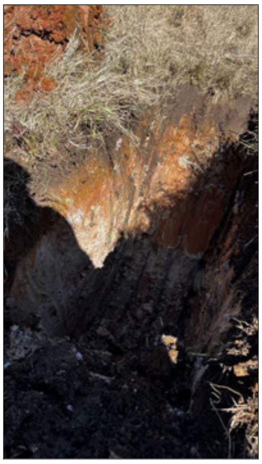
PIT NO : **AEC35TP01**
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291702.8, N: 6256983.5 (56 MGA2020)
SURFACE ELEVATION : 38.80 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

Depth (m)	Samples & Field Tests	Ground Water Levels	Classification Symbol	Material Description	Moisture Condition	Consistency / Relative Density	Structure & Other Observations
0.00–0.10	ES 0.10m	Not Observed		FILL: gravelly silty CLAY: low to medium plasticity, dark brown, angular to subangular gravel, rootlets and wood	w<PL		FILL 0.00: PID=0
0.10–0.30	0.20m ES 0.30m			FILL: silty CLAY: low to medium plasticity, red-orange, with angular to subangular gravel, rootlets and organic matter	w<PL		0.20: PID=0
0.30–2.50	0.80m ES 0.90m 1.50m ES 1.60m 2.10m ES 2.20m		CI-CH	CLAY: medium to high plasticity, pale grey and orange, trace organic matter, ironstone gravel and rootlets At 1.8m: extremely weathered ironstone gravel	w<PL	-	RESIDUAL SOIL 0.80: PID<1 1.50: PID<1 2.10: PID<1

EXCAVATION AEC35TP01 TERMINATED AT 2.50 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
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 : AEC35TP02
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291727.2, N: 6256990.0 (56 MGA2020)
SURFACE ELEVATION : 39.40 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0 – 0.10m			FILL: gravelly silty CLAY: low to medium plasticity, dark brown, angular to subangular gravel, rootlets and wood	w<PL			FILL 0.00: PID<1
			0.20m ES 0.30m	0.10 – 0.30m			FILL: silty CLAY: low to medium plasticity, red-orange, with angular to subangular gravel and rootlets, trace organic matter	w<PL			0.20: PID<1
			0.80m ES 0.90m 1.50m ES 1.60m 2.10m ES 2.20m	0.30 – 2.50m		CI-CH	CLAY: medium to high plasticity, pale grey and orange, with ironstone gravel, rootlets and organic matter At 1.8m: extremely weathered ironstone gravel	w<PL	-		RESIDUAL SOIL 0.80: PID<1 1.50: PID<1 2.10: PID<1
				2.50m			EXCAVATION AEC35TP02 TERMINATED AT 2.50 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
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

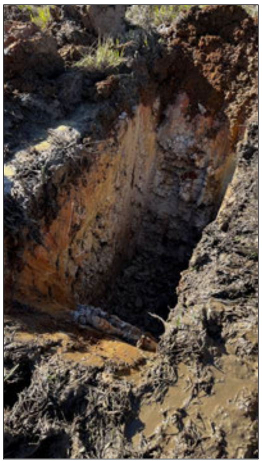
PIT NO : AEC35TP03
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291727.4, N: 6256971.0 (56 MGA2020)
SURFACE ELEVATION : 39.60 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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)	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0 – 0.10m		FILL: gravelly silty CLAY: low to medium plasticity, dark brown, angular to subangular gravel, rootlets	w<PL		FILL 0.00: PID<1
			0.50m ES 0.60m	0.10m – 1.00m	CI-CH	CLAY: medium to high plasticity, pale orange and grey, with shale and ironstone gravel, rootlets and decomposed wood	w<PL		RESIDUAL SOIL 0.50: PID<1
			1.20m ES 1.30m 2.20m ES 2.30m	1.00m – 2.50m	CL-CI	CLAY: low to medium plasticity, pale grey with mottled orange, with extremely weathered ironstone, trace rootlets and organic matter	w<PL	-	1.20: PID<1 2.20: PID<1

EXCAVATION AEC35TP03 TERMINATED AT 2.50 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
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 : AEC35TP04
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291686.7, N: 6256945.5 (56 MGA2020)
SURFACE ELEVATION : 38.00 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

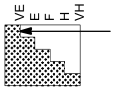
DRILLING					MATERIAL						
PENETRATION VE E F H	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	HAND PENETRO-METER kPa 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0 – 0.20m	▩		FILL: gravelly silty CLAY: low to medium plasticity, dark grey, with rootlets, trace fine to coarse sand	w<PL and M	-		FILL 0.00: PID=0
			0.50m ES 0.60m	0.20 – 1.10m	▨	CI-CH	CLAY: medium to high plasticity, pale grey and orange, with rootlets, ironstone and shale gravel	w<PL			RESIDUAL SOIL 0.50: PID=0
			1.20m ES 1.30m 1.80m ES 1.90m	1.10 – 2.10m	▨	CI-CH	CLAY: medium to high plasticity, pale grey and mottled yellow, with extremely weathered shale	w<PL			1.20: PID=0 1.80: PID=0
				2.10m			EXCAVATION AEC35TP04 TERMINATED AT 2.10 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
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 : **AEC35TP05**
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291711.6, N: 6256948.5 (56 MGA2020)
SURFACE ELEVATION : 39.70 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	0.10m ES 0.20m	0.0			FILL: gravelly silty CLAY: low to medium plasticity, pale grey, with rootlets, wood and decomposed wood 0.30m	w<PL			FILL 0.10: PID<1
			0.50m ES 0.60m	0.5		CI	Silty CLAY: medium plasticity, red-orange, with ironstone gravel and rootlets 0.90m	w<PL	-		RESIDUAL SOIL 0.50: PID<1 Field Replicate BD8/20220729 taken at 0.5-0.6m depth
			1.20m ES 1.30m	1.0		CL-CI	Silty CLAY: low to medium plasticity, pale grey and yellow, trace extremely weathered ironstone gravel and rootlets 1.50m	w<PL			1.20: PID<1
				1.5			EXCAVATION AEC35TP05 TERMINATED AT 1.50 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

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EXCAVATION - GEOLOGICAL LOG

PIT NO : **AEC35TP06**
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291732.4, N: 6256948.4 (56 MGA2020)
SURFACE ELEVATION : 40.00 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0 – 0.10m			FILL: silty CLAY: low plasticity, pale brown, with rootlets	w<PL			FILL 0.00: PID<1
			0.20m ES 0.30m 0.60m ES 0.70m	0.10m – 0.80m		CL-CI	Silty CLAY: low to medium plasticity, red-orange, with ironstone and shale gravel and rootlets At 0.2m: high plasticity, red-orange and grey, rootets	w<PL	-		RESIDUAL SOIL 0.20: PID<1 0.60: PID<1
			1.00m ES 1.10m	0.80m – 1.50m		CH	CLAY: high plasticity, pale grey and mottled orange, with ironstone and shale gravel	w<PL			1.00: PID<1
				1.5			EXCAVATION AEC35TP06 TERMINATED AT 1.50 m Target depth				

Depth scale (m): 0.0, 0.5, 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 : **AEC35TP07**
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291737.8, N: 6256926.4 (56 MGA2020)
SURFACE ELEVATION : 40.30 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DEPTH (m)	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	STRUCTURE & Other Observations
0.00–0.10m	Not Observed	ES 0.10m		FILL: sandy CLAY: low to medium plasticity, pale brown, fine to medium, with rootlets	M		FILL 0.00: PID<1
0.10m–1.30m		0.30m ES 0.40m 0.90m ES 1.00m	CI-CH	Silty CLAY: medium to high plasticity, red-brown and mottled grey, with ironstone and shale gravel At 0.55m: high plasticity, red-brown and mottled grey, with shale ironstone gravel	w<PL w<PL	-	RESIDUAL SOIL 0.30: PID<1 0.90: PID<1
1.30m–2.00m		1.40m ES 1.50m	CL-CI	Silty CLAY: low to medium plasticity, pale grey and mottled orange, with ironstone and shale gravel	w<PL		1.40: PID<1
2.00m				EXCAVATION AEC35TP07 TERMINATED AT 2.00 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
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 : AEC35TP08
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291716.7, N: 6256923.3 (56 MGA2020)
SURFACE ELEVATION : 40.10 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DEPTH (m)	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	STRUCTURE & Other Observations
0.0 – 0.30m	Not Observed	0.10m ES 0.20m		FILL: gravelly silty CLAY: low to medium plasticity, dark brown, angular to subangular gravel, rootlets	w<PL		FILL 0.10: PID<1 Field Replicate BD7/20220729 taken at 0.1-0.2 depth
0.30m – 0.90m		0.50m ES 0.60m	CI-CH	Silty CLAY: medium to high plasticity, red-orange and dark brown, with shale and ironstone gravel and coarse gravel	w<PL		RESIDUAL SOIL 0.50: PID<1
0.90m – 1.80m		1.30m ES 1.40m	CI-CH	Silty CLAY: medium to high plasticity, pale grey and mottled red-orange, with extremely weathered ironstone gravel and rootlets	w<PL	-	1.30: PID<1
1.80m – 2.30m		1.90m ES 2.00m	CI-CH	CLAY: medium to high plasticity, pale grey and yellow, with extremely weathered ironstone gravel and rootlets	w<PL		1.90: PID<1

EXCAVATION AEC35TP08 TERMINATED AT 2.30 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
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 : AEC35TP09
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291696.7, N: 6256923.4 (56 MGA2020)
SURFACE ELEVATION : 38.60 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 29/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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)	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 – 0.30m		FILL: gravelly silty CLAY: low to medium plasticity, dark brown, angular to subangular gravel, rootlets	w<PL			FILL 0.00: PID<1
			0.50m ES 0.60m	0.30m – 0.90m	CH	CLAY: high plasticity, pale grey and orange, rootlets	w<PL			RESIDUAL SOIL 0.50: PID<1
			1.20m ES 1.30m 2.00m ES 2.10m	0.90m – 2.30m	CL-CI	Silty CLAY: low to medium plasticity, red-orange, with extremely weathered ironstone and organic matter, trace rootlets	w<PL	-		1.20: PID<1 2.00: PID<1

EXCAVATION AEC35TP09 TERMINATED AT 2.30 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
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 : **AEC35TP10**
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291773.8, N: 6256885.6 (56 MGA2020)
SURFACE ELEVATION : 41.20 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m 0.05m	0.0			0.05m FILL: clayey SAND: fine to medium grained sand	M			FILL 0.00: PID<1 0.10: PID<1
			ES 0.20m				0.20m FILL: silty CLAY: low to medium plasticity, red-orange and brown				Field Replicate BD5/20220728 taken at 0.1-0.2m depth
			0.40m ES 0.50m 0.60m ES 0.70m	0.5		CL-CI	Silty CLAY: low to medium plasticity, red-orange and brown, ironstone gravel At 0.4m: becoming pale red-orange and mottled grey, with more ironstone gravel 0.90m	w<PL	-		RESIDUAL SOIL 0.60: PID<1
				1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0			EXCAVATION AEC35TP10 TERMINATED AT 0.90 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
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 : AEC35TP11
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291768.5, N: 6256847.0 (56 MGA2020)
SURFACE ELEVATION : 41.60 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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 100 200 300 400	STRUCTURE & Other Observations
▨			ES 0.10m	0.0 – 0.10m			FILL: clayey SAND: dark grey, fine to medium grained sand, with angular to subangular gravel and rootlets, trace glass	M			FILL 0.00: PID<1 Field Replicate BD6/20220728 taken at 0.0-0.1m depth
▨		28/07/22	0.40m ES 0.50m	0.10m – 0.70m		CL-CI	Silty CLAY: low to medium plasticity, red-orange and brown, angular to subangular gravel, shale gravel, wood and rootlets	w<PL	-		RESIDUAL SOIL 0.40: PID<1
▨			1.00m ES 1.10m	0.70m – 1.30m		CL-CI	Silty CLAY: low to medium plasticity, red-orange and mottled grey, shale and ironstone gravel, trace rootlets	w<PL			1.00: PID<1
				1.30m			EXCAVATION AEC35TP11 TERMINATED AT 1.30 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

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 : **AEC35TP12**
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291781.6, N: 6256863.8 (56 MGA2020)
SURFACE ELEVATION : 41.70 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DEPTH (m)	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY RELATIVE DENSITY	STRUCTURE & Other Observations
0.0 – 0.15m	Not Observed	ES 0.10m		FILL: clayey SAND: dark grey, fine to medium grained sand, angular to subangular gravel, rootlets and wood	M		FILL 0.00: PID<1
0.15m – 0.90m		0.20m ES 0.30m	CL-CI	Silty CLAY: low to medium plasticity, red-orange and brown, with ironstone gravel, trace rootlets	w<PL	-	RESIDUAL SOIL 0.20: PID<1
		0.60m ES 0.70m		At 0.45m: medium to high plasticity, becoming red-orange and mottled grey, ironstone gravel	w<PL		0.60: PID<1
0.90m				EXCAVATION AEC35TP12 TERMINATED AT 0.90 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
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 : **AEC35TP13**
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291790.1, N: 6256875.0 (56 MGA2020)
SURFACE ELEVATION : 41.70 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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 PENETROMETER kPa 100 200 300 400	STRUCTURE & Other Observations
			ES 0.10m	0.0			FILL: clayey SAND: dark brown, fine to medium grained sand, with clay, angular to subangular gravel and rootlets	M			FILL 0.00: PID<1
		Not Observed	0.30m ES 0.40m 0.70m ES 0.80m	0.20m		CL-CI	Silty CLAY: low to medium plasticity, red-orange, rootlets At 0.5m: medium to high plasticity, becoming red-orange and mottled grey	w<PL	-		RESIDUAL SOIL 0.30: PID<1 0.70: PID<1
				1.00m			EXCAVATION AEC35TP13 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

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 : AEC35TP14
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291807.0, N: 6256842.1 (56 MGA2020)
SURFACE ELEVATION : 42.40 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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 100 200 300 400	STRUCTURE & Other Observations
			ES 0.10m	0.0			FILL: clayey SAND: dark grey, fine to medium grained sand, with angular to subangular gravel and rootlets, trace glass	M			FILL 0.00: PID<1
				0.20m							
			0.30m ES 0.40m			CL-CI	Silty CLAY: low to medium plasticity, red-orange and brown, with rootlets	w<PL	-		RESIDUAL SOIL 0.30: PID<1
		28/07/22		0.5			At 0.45m: becoming high plasticity, red-orange, trace rootlets				
			0.70m ES 0.80m								0.70: PID<1
				1.0							
				1.40m							
			1.50m ES 1.60m	1.5		CL-CI	Silty CLAY: low to medium plasticity, pale grey and mottled orange, with ironstone gravel	w<PL			1.50: PID<1
				1.90m							
				2.0			EXCAVATION AEC35TP14 TERMINATED AT 1.90 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

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EXCAVATION - GEOLOGICAL LOG

PIT NO : AEC35TP15
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291796.2, N: 6256858.0 (56 MGA2020)
SURFACE ELEVATION : 42.00 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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 100 200 300 400	STRUCTURE & Other Observations
VE		Not Observed	ES 0.10m	0.0 – 0.20m			FILL: silty CLAY: low to medium plasticity, dark brown, with angular to subangular gravel and rootlets	w<PL			FILL 0.00: PID<1
			0.30m ES 0.40m	0.20m – 0.40m			FILL: silty SAND: pale grey and pale yellow, fine to medium grained sand, trace gravel	M			0.30: PID<1 Field Replicate BD4/20220728 taken at 0.3-0.4m depth
			0.60m ES 0.70m	0.40m – 1.00m		CI-CH	Silty CLAY: medium to high plasticity, red-orange and mottled grey	w<PL	-		RESIDUAL SOIL 0.60: PID<1

EXCAVATION AEC35TP15 TERMINATED AT 1.00 m
Target depth

DEPTH (m): 0.0, 0.5, 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 : **AEC35TP16**
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291814.8, N: 6256865.4 (56 MGA2020)
SURFACE ELEVATION : 42.10 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	0.20m ES 0.30m	0.0			FILL: silty CLAY: low to medium plasticity, dark brown, with fine to medium, pale grey sand, angular to subangular gravel and rootlets 0.40m	w<PL			FILL 0.20: PID<1 Field Replicate BD3/20220728 taken at 0.2-0.3m depth
			0.60m ES 0.70m	0.5		CI-CH	Silty CLAY: medium to high plasticity, red-orange and mottled grey, rootlets 1.00m	w<PL	-		RESIDUAL SOIL 0.60: PID<1
				1.0			EXCAVATION AEC35TP16 TERMINATED AT 1.00 m Target depth				

Depth scale: 0.0, 0.5, 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 : AEC35TP17
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291837.1, N: 6256874.7 (56 MGA2020)	SURFACE ELEVATION : 41.90 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator	METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22	LOGGED BY : SR
	CHECKED BY : MB/DEM
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)	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 0.15m	0.0 – 0.15m		FILL: silty CLAY: low to medium plasticity, dark brown, with fine to medium sand and rootlets	w<PL			FILL 0.00: PID<1
			0.20m ES 0.30m	0.15m – 0.30m		FILL: silty SAND: pale grey and pale yellow, fine to medium grained sand, trace angular to subangular gravel and rootlets	M			0.20: PID<1
			0.60m ES 0.70m	0.30m – 1.00m	CI-CH	Silty CLAY: medium to high plasticity, red-orange with mottled grey, trace rootlets	w<PL	-		RESIDUAL SOIL 0.60: PID<1
				1.0		EXCAVATION AEC35TP17 TERMINATED AT 1.00 m Target depth				

Depth scale: 0.0, 0.5, 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 : **AEC35TP18**
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291823.9, N: 6256859.8 (56 MGA2020)
SURFACE ELEVATION : 42.10 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.30m	0.0			FILL: silty CLAY: low to medium plasticity, dark brown, trace angular to subangular gravel, fine to medium sand and rootlets 0.30m	w<PL	-		FILL 0.10: PID<1
			0.40m ES 0.50m				FILL: silty SAND: pale grey, fine to medium grained sand, trace gravel and rootlets 0.50m	M			0.40: PID<1
			0.70m ES 0.80m	0.5		CL-CI	Silty CLAY: low to medium plasticity, red-orange, trace rootlets 1.00m	w<PL			RESIDUAL SOIL 0.70: PID<1 Field Replicate BD1/20220728 taken at 0.7-0.8m depth
				1.0			EXCAVATION AEC35TP18 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 : AEC35TP19
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291825.6, N: 6256843.0 (56 MGA2020)
SURFACE ELEVATION : 42.40 (mAHD)
EQUIPMENT TYPE : 14 tonne Excavator
METHOD : 800mm bucket
DATE EXCAVATED : 28/7/22
LOGGED BY : SR
CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS : 1.00 m LONG 0.80 m WIDE

DEPTH (m)	SUPPORT	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	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	0.10m ES 0.20m		FILL: silty CLAY: low to medium plasticity, dark brown, trace gravel and rootlets	w<PL			FILL 0.10: PID<1
			0.30m ES 0.40m		At 0.2m: becoming pale grey, trace gravel	w<PL			0.30: PID<1
0.40m			0.60m ES 0.70m	CL-CI	Silty CLAY: low to medium plasticity, red-orange and brown, trace rootlets	w<PL	-		RESIDUAL SOIL 0.60: PID<1
0.90m					EXCAVATION AEC35TP19 TERMINATED AT 0.90 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
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 : AEC35HA20
FILE / JOB NO : 204814.01
SHEET : 1 OF 1

PROJECT : Western Sydney Airport - Surface and Civil Alignment Works
LOCATION : SMF - Orchard Hills

POSITION : E: 291684.3, N: 6256976.3 (56 MGA2020)
SURFACE ELEVATION : 37.80 (mAHD)
EQUIPMENT TYPE : Hand Tools
METHOD :
DATE EXCAVATED : 21/9/22
LOGGED BY : PJ
CHECKED BY : MB/DEM
EXCAVATION DIMENSIONS :

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 100 200 300 400	STRUCTURE & Other Observations
		Not Observed	ES 0.10m	0.0			FILL: sandy CLAY: low to medium plasticity, dark brown, fine to medium sand, with silt, trace rootlets 0.20m	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 0.60m	w~PL	F to St		RESIDUAL SOIL 0.30: PID <5
			0.80m ES 0.90m			CH	Silty CLAY: high plasticity, pale grey mottled red-brown 0.90m	w~PL	St		0.80: PID <5
				1.0			EXCAVATION AEC35HA20 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.

Soil Descriptions

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 Descriptions

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:

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

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

Stratification Spacing

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

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

Symbols & Abbreviations

Introduction

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

Drilling or Excavation Methods

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

Water

▷	Water seep
▽	Water level

Sampling and Testing

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

Description of Defects in Rock

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

Defect Type

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

Orientation

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

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

Coating or Infilling Term

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

Coating Descriptor

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

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General

■	Asphalt
░	Road base
░	Concrete
▩	Filling

Soils

▨	Topsoil
░	Peat
▨	Clay
▨	Silty clay
▨	Sandy clay
▨	Gravelly clay
▨	Shaly clay
▥	Silt
▥	Clayey silt
▥	Sandy silt
░	Sand
▨	Clayey sand
▥	Silty sand
░	Gravel
░	Sandy gravel
░	Cobbles, boulders
░	Talus

Sedimentary Rocks

░	Boulder conglomerate
░	Conglomerate
░	Conglomeratic sandstone
░	Sandstone
▤	Siltstone
▤	Laminite
▤	Mudstone, claystone, shale
■	Coal
▦	Limestone

Metamorphic Rocks

░	Slate, phyllite, schist
░	Gneiss
░	Quartzite

Igneous Rocks

░	Granite
░	Dolerite, basalt, andesite
░	Dacite, epidote
░	Tuff, breccia
░	Porphyry

Appendix D

Summary of Results Tables

Table C1- Summary of Soil Results for SMGW-BH-B016

														Location_Code	B106	
														Field_ID	BH-B106/0.2-0.2	BH-B106/4.0-4.45
														Sample_Depth_Range	0.2-0.2	4-4.45
														Sample Date	17/02/2020	17/02/2020
Analyte	**Units**	**EQL**	**HIL C**	**HIL D**	**HSL for Vapour Intrusion D, Clay, 0 to <1m**	**HSL C Direct Contact**	**HSL D Direct Contact**	**EIL Public Open Space**	**EIL Industrial / Commercial**	**ESL Public Open Space**	**ESL Commerical / Industrial**	**Management Limits Public Open Space**	**Management Limits Commercial/ Industrial**			
Miscellaneous Parameters																
Moisture Content (dried @ 40°C)	%	0.1													27.6	13.5
TPHs																
TPH C6 - C9 Fraction F1	mg/kg	10													<10	<10
TPH C10-C36	mg/kg	50													10800	260
TRHs																
TRH C6 - C10 Fraction F1	mg/kg	10										800	800		<10	<10
TRH C6 - C10 Fraction Less BTEX F1	mg/kg	10			310	5100	26000			180	215				<10	<10
TRH >C10 - C16 Fraction F2	mg/kg	50								120	170	1000	1000		<50	<50
TRH >C10 - C16 Fraction Less Naphthalene (F2)	mg/kg	50			NL	3,800	20,000								<50	250
TRH >C16 - C34 Fraction F3	mg/kg	100				5,300	27,000			1300	2500	3500	5000		10,800	250
TRH >C34 - C40 Fraction F4	mg/kg	100				7,400	38,000			5600	6600	10,000	10,000		640	<100
TRH+C10 - C40 (Sum of total) (Lab Reported)	mg/kg	50													11400	250
BTEXN																
Benzene	mg/kg	0.2			4	120	430			65	95				<0.2	<0.2
Toluene	mg/kg	0.5			NL	18,000	99,000			105	135				<0.5	<0.5
Ethylbenzene	mg/kg	0.5			NL	5300	27,000			105	135				<0.5	<0.5
Xylenes (m & p)	mg/kg	0.5													<0.5	<0.5
Xylene (o)	mg/kg	0.5													<0.5	<0.5
Xylenes (Sum of total) (Lab Reported)	mg/kg	0.5			NL	15,000	81,000			45	95				<0.5	<0.5
Total BTEX	mg/kg	0.2													<0.2	<0.2
Naphthalene	mg/kg	0.1			NL	1900	11,000	170	370						<0.1	<0.1
Heavy Metals																
Arsenic	mg/kg	4	300	3000				100	160						12	<5
Cadmium	mg/kg	0.4	90	900											<1	<1
Chromium (III+VI)	mg/kg	1	300	3600				410	230						24	6
Copper	mg/kg	1	17,000	240,000				160	230						12	52
Lead	mg/kg	1	600	1500				1100	1800						16	15
Mercury	mg/kg	0.1	80	730											<0.1	<0.1
Nickel	mg/kg	1	1200	6000				110	180						<2	9
Zinc	mg/kg	1	30,000	400,000				350	510						157	57
Organochlorine Pesticides																
a-BHC	mg/kg	0.05													<0.25	<0.05
Aldrin	mg/kg	0.05													<0.25	<0.05
Dieldrin	mg/kg	0.05													<0.25	<0.05
Aldrin & Dieldrin (Sum of total) (Lab Reported)	mg/kg	0.05	10	45											<0.08	<0.05
b-BHC	mg/kg	0.05													<0.25	<0.05
cis-Chlordane	mg/kg	0.05													<0.25	<0.05
gamma-Chlordane	mg/kg	0.05													<0.08	<0.05
trans-Chlordane	mg/kg	0.05													<0.25	<0.05
Chlordane (Sum of Total)	mg/kg	0.05	70	530											<0.25	<0.05
d-BHC	mg/kg	0.05													<0.25	<0.05
4,4-DDD	mg/kg	0.05													<0.25	<0.05
4,4-DDE	mg/kg	0.05													<0.25	<0.05
4,4-DDT	mg/kg	0.1						180	640						<1	<0.2
DDT+DDE+DDD (Sum of total) (Lab Reported)	mg/kg	0.05	400	3600											<0.08	<0.05
Endosulfan	mg/kg	0.05	340	2000											<0.15	<0.05
Endosulfan I	mg/kg	0.05													<0.25	<0.05
Endosulfan II	mg/kg	0.05													<0.25	<0.05
Endosulfan sulphate	mg/kg	0.05													<0.25	<0.05
Endrin	mg/kg	0.05	20	100											<0.25	<0.05
Endrin aldehyde	mg/kg	0.05													<0.25	<0.05
Endrin ketone	mg/kg	0.05													<0.25	<0.05
g-BHC (Lindane)	mg/kg	0.05													<0.25	<0.05
Heptachlor	mg/kg	0.05	10	50											<0.25	<0.05

Table C1- Summary of Soil Results for SMGW-BH-B016

														Location_Code	B106	
														Field_ID	BH-B106/0.2-0.2	BH-B106/4.0-4.45
														Sample_Depth_Range	0.2-0.2	4-4.45
														Sample Date	17/02/2020	17/02/2020
Analyte	**Units**	**EQL**	**HIL C**	**HIL D**	**HSL for Vapour Intrusion D, Clay, 0 to <1m**	**HSL C Direct Contact**	**HSL D Direct Contact**	**EIL Public Open Space**	**EIL Industrial / Commercial**	**ESL Public Open Space**	**ESL Commerical / Industrial**	**Management Limits Public Open Space**	**Management Limits Commercial/ Industrial**			
Heptachlor epoxide	mg/kg	0.05													<0.25	<0.05
Hexachlorobenzene	mg/kg	0.05	10	80											<0.25	<0.05
Methoxychlor	mg/kg	0.1	400	2500											<1	<0.2
Organophosphorus Pesticides																
Azinophos methyl	mg/kg	0.05													<0.25	<0.05
Bromophos-ethyl	mg/kg	0.05													<0.25	<0.05
Carbophenothion	mg/kg	0.05													<0.25	<0.05
Chlorfenvinphos	mg/kg	0.05													<0.25	<0.05
Chlorpyrifos	mg/kg	0.05	250	2000											<0.25	<0.05
Chlorpyrifos-methyl	mg/kg	0.05													<0.25	<0.05
Demeton-S-methyl	mg/kg	0.05													<0.25	<0.05
Diazinon	mg/kg	0.05													<0.25	<0.05
Dichlorvos	mg/kg	0.05													<0.25	<0.05
Dimethoate	mg/kg	0.05													<0.25	<0.05
Ethion	mg/kg	0.05													<0.25	<0.05
Fenamiphos	mg/kg	0.05													<0.25	<0.05
Fenthion	mg/kg	0.05													<0.25	<0.05
Malathion	mg/kg	0.05													<0.25	<0.05
Methyl parathion	mg/kg	0.2													<1	<0.2
Monocrotophos	mg/kg	0.2													<1	<0.2
Parathion	mg/kg	0.1													<1	<0.2
Pirimphos-ethyl	mg/kg	0.05													<0.25	<0.05
Prothiofos	mg/kg	0.05													<0.25	<0.05
PAHs																
Acenaphthene	mg/kg	0.1													<0.5	<0.5
Acenaphthylene	mg/kg	0.1													<0.5	<0.5
Anthracene	mg/kg	0.1													<0.5	<0.5
Benz(a)anthracene	mg/kg	0.1													<0.5	<0.5
Benzo(a) pyrene	mg/kg	0.05								0.7	1.4				1.8	<0.5
Benzo(a)pyrene TEQ (lower bound)	mg/kg	0.5	3	40											1.9	<0.5
Benzo(a)pyrene TEQ (medium bound)	mg/kg	0.5	3	40											2.2	0.6
Benzo(a)pyrene TEQ (upper bound)	mg/kg	0.5	3	40											2.5	1.2
Benzo(a)pyrene TEQ (Calculated)	mg/kg		3	40											2.217	<1.21
Benzo[b+j]fluoranthene	mg/kg	0.5													<0.5	<0.5
Benzo(g,h,i)perylene	mg/kg	0.1													<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	0.5													0.5	<0.5
Chrysene	mg/kg	0.1													3.9	<0.5
Dibenz(a,h)anthracene	mg/kg	0.1													<0.5	<0.5
Fluoranthene	mg/kg	0.1													<0.5	<0.5
Fluorene	mg/kg	0.1													<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1													<0.5	<0.5
Naphthalene	mg/kg	0.1			NL	1900	11,000	170	370						<0.5	<0.5
Phenanthrene	mg/kg	0.1													<0.5	<0.5
Pyrene	mg/kg	0.1													0.6	<0.5
PAH (Sum of Common 16 PAHs - Lab Reported)	mg/kg	0.5	300	4000											6.8	<0.5

Table C2- Summary of Waste Classificaiton Results for SMGW-BH-B016

						LocCode	B106	B106
						Sample ID	BH-B106/0.2-0.3	BH-B106/4.0-4.45
						Sample_Depth_Range	0.2-0.3	4-4.45
						Sample Date	17/02/2020	17/02/2020
Analyte	**Units**	**EQL**	**CT1 General Solid Waste**	**CT2 Restricted Solid Waste**	**ENM (absolute maximum concentration)***	**ENM (maximum average concentration)***		
Miscellaneous Parameters								
Moisture Content (dried @ 40°C)	%	0.1					27.6	13.5
TRHs								
TRH C6 - C10 Fraction F1	mg/kg	10					<10	<10
TRH C6 - C10 Fraction Less BTEX F1	mg/kg	10					<10	<10
TRH >C10 - C16 Fraction F2	mg/kg	50					<50	<50
TRH >C10 - C16 Fraction Less Naphthalene (F2)	mg/kg	50					<50	<50
TRH >C16 - C34 Fraction F3	mg/kg	100					10800	250
TRH >C34 - C40 Fraction F4	mg/kg	100					640	<100
TRH+C10 - C40 (Sum of total) (Lab Reported)	mg/kg	50					11400	250
TPH Group - Waste Classification								
C6 - C9	mg/kg	10	650	2600			<10	<10
C10 - C14	mg/kg	50					<50	<50
C15 - C28	mg/kg	100					6760	150
C29-C36	mg/kg	100					4030	110
+C10 - C36 (Sum of total)	mg/kg	50	10000	40000	500	250	10,800	260
BTEXN								
Benzene	mg/kg	0.2	10	40	0.5	NA	<0.2	<0.2
Toluene	mg/kg	0.5	288	1152	65	NA	<0.5	<0.5
Ethylbenzene	mg/kg	0.5	600	2400	25	NA	<0.5	<0.5
Xylenes (m & p)	mg/kg	0.5					<0.5	<0.5
Xylene (o)	mg/kg	0.5					<0.5	<0.5
Xylenes (Sum of total) (Lab Reported)	mg/kg	0.5	1000	4000	15	NA	<0.5	<0.5
Total BTEX	mg/kg	0.2					<0.2	<0.2
Naphthalene	mg/kg	0.1					<0.5	<0.5
Heavy Metals								
Arsenic	mg/kg	4	100	400	40	20	12	<5
Cadmium	mg/kg	0.4	20	80	1	0.5	<1	<1
Chromium (III+VI)	mg/kg	1	100 $^{\#\#}$	400 $^{\#\#}$	150	75	24	6
Copper	mg/kg	1			200	100	12	52
Lead	mg/kg	1	100	400	100	50	16	15
Mercury	mg/kg	0.1	4	16	1	0.5	<0.1	<0.1
Nickel	mg/kg	1	40	160	60	30	<2	9
Zinc	mg/kg	1			300	150	**157**	57
Organochlorine Pesticides								
a-BHC	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Aldrin	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Dieldrin	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Aldrin & Dieldrin (Sum of total) (Lab Reported)	mg/kg	0.05	<50 **	<50 **			<0.08	<0.05
b-BHC	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
cis-Chlordane	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
gamma-Chlordane	mg/kg	0.05	<50 **	<50 **			<0.08	<0.05
trans-Chlordane	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Chlordane (Sum of Total)	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
d-BHC	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
4,4-DDD	mg/kg	0.1	<50 **	<50 **			<0.25	<0.05
4,4-DDE	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
4,4-DDT	mg/kg	0.05	<50 **	<50 **			<1	<0.2
DDT+DDE+DDD (Sum of total) (Lab Reported)	mg/kg	0.05	<50 **	<50 **			<0.08	<0.05
Endosulfan	mg/kg	0.05	60	240			<0.15	<0.05
Endosulfan I	mg/kg	0.05					<0.25	<0.05
Endosulfan II	mg/kg	0.05					<0.25	<0.05
Endosulfan sulphate	mg/kg	0.05					<0.25	<0.05
Endrin	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Endrin aldehyde	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Endrin ketone	mg/kg	0.05					<0.25	<0.05
g-BHC (Lindane)	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Heptachlor	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05
Heptachlor epoxide	mg/kg	0.1	<50 **	<50 **			<0.25	<0.05
Hexachlorobenzene	mg/kg	0.05	<50 **	<50 **			<0.25	<0.05

Table C2- Summary of Waste Classificaiton Results for SMGW-BH-B016

						LocCode	B106	B106
						Sample ID	BH-B106/0.2-0.3	BH-B106/4.0-4.45
						Sample_Depth_Range	0.2-0.3	4-4.45
						Sample Date	17/02/2020	17/02/2020
Analyte	**Units**	**EQL**	**CT1 General Solid Waste**	**CT2 Restricted Solid Waste**	**ENM (absolute maximum concentration)***	**ENM (maximum average concentration)***		
Methoxychlor	mg/kg	0.2					<1	<0.2
Organophosphorus Pesticides								
Azinophos methyl	mg/kg	0.05					<0.25	<0.05
Bromophos-ethyl	mg/kg	0.05					<0.25	<0.05
Carbophenothion	mg/kg	0.05					<0.25	<0.05
Chlorfenvinphos	mg/kg	0.05					<0.25	<0.05
Chlorpyrifos	mg/kg	0.05	4	16			<0.25	<0.05
Chlorpyrifos-methyl	mg/kg	0.05					<0.25	<0.05
Demeton-S-methyl	mg/kg	0.05					<0.25	<0.05
Diazinon	mg/kg	0.05					<0.25	<0.05
Dichlorvos	mg/kg	0.05	250[+]	1000[+]			<0.25	<0.05
Dimethoate	mg/kg	0.05	250[+]	1000[+]			<0.25	<0.05
Ethion	mg/kg	0.05	250[+]	1000[+]			<0.25	<0.05
Fenamiphos	mg/kg	0.05					<0.25	<0.05
Fenthion	mg/kg	0.05	250[+]	1000[+]			<0.25	<0.05
Malathion	mg/kg	0.05	250[+]	1000[+]			<0.25	<0.05
Methyl parathion	mg/kg	0.2	250[+]	1000[+]			<1	<0.2
Monocrotophos	mg/kg	0.2					<1	<0.2
Parathion	mg/kg	0.1					<1	<0.2
Pirimphos-ethyl	mg/kg	0.05					<0.25	<0.05
Prothiofos	mg/kg	0.05					<0.25	<0.05
PAHs								
Acenaphthene	mg/kg	0.1					<0.5	<0.5
Acenaphthylene	mg/kg	0.1					<0.5	<0.5
Anthracene	mg/kg	0.1					<0.5	<0.5
Benz(a)anthracene	mg/kg	0.1					<0.5	<0.5
Benzo(a) pyrene	mg/kg	0.05	0.8	3.2	1	0.5	1.8	<0.5
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5					2.2	0.6
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5					2.5	1.2
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5					1.9	<0.5
Carcinogenic PAHs (as BaP TEQ)	mg/kg						2.217	<1.21
Benzo[b+j]fluoranthene	mg/kg	0.5					<0.5	<0.5
Benzo(g,h,i)perylene	mg/kg	0.1					<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	0.5					0.5	<0.5
Chrysene	mg/kg	0.1					3.9	<0.5
Dibenz(a,h)anthracene	mg/kg	0.1					<0.5	<0.5
Fluoranthene	mg/kg	0.1					<0.5	<0.5
Fluorene	mg/kg	0.1					<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1					<0.5	<0.5
Naphthalene	mg/kg	0.1					<0.5	<0.5
Phenanthrene	mg/kg	0.1					<0.5	<0.5
Pyrene	mg/kg	0.1					0.6	<0.5
PAH (Sum of Common 16 PAHs - Lab Reported)	mg/kg	0.5	200	800	40	20	6.8	<0.5

Notes

*: Only criteria exceeding the absolute maximum concentration is highlighted

**: Criterion of <50 mg/kg for the sum of Scheduled Chemicals

+: CT1 criterion of 250 mg/kg and CT2 criterion of 1000 mg/kg for the sum of Moderately Harmful Pesticides

##: Criteria for chromium VI

Table C3- Summary of Soil Results for SMGW-TP-B316

															LocCode		SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
															Sample ID		SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
															Sample Depth Range		0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
															Sample Date		9/12/2020	9/12/2020	9/12/2020	9/12/2020
															Lab Report Number		ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	**HIL C**	**HIL D**	**HSL for Vapour Intrusion D, Clay, 0 to <1m**	**HSL C Direct Contact**	**HSL D Direct Contact**	**EIL Public Open Space**	**EIL Industrial / Commercial**	**ESL Public Open Space**	**ESL Commerical / Industrial**	**Ecological Guideline Direct Exposure**	**Ecological Guideline Indirect Esposure**	**Management Limits Public Open Space**	**Management Limits Commercial/ Industrial**					
Moisture Content	%	0.1															13.4	14.5	14.6	10.5
Other Paramters																				
pH (Lab)	pH_Units	0.1															5.5	4.9	5.1	5.6
Ammonia as N																	-	<20	-	-
Cyanide Total	mg/kg	1	240	1500													-	<1	-	-
Asbestos																				
Asbestos (1 = asbestos detected, 0 = no asbestos detected)	g/kg																0	0	-	-
Asbestos Fines (1 = asbestos detected, 0 = no asbestos detected)	Fibres	5															0	0	-	-
Sample weight (dry)	g	0.1															72.6	128	-	-
Metals/Metalloids																				
Arsenic	mg/kg	4	300	3000				100	160								13	<5	28	18
Cadmium	mg/kg	0.4	90	900													<1	<1	<1	<1
Chromium (III+VI)	mg/kg	1	300	3600				410	670								15	4	10	5
Copper	mg/kg	1	17,000	240000				160	230								14	9	28	66
Lead	mg/kg	1	600	1500				1100	1800								13	8	18	34
Mercury	mg/kg	0.1	80	730													<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	1200	6000				110	180								2	<2	6	37
Zinc	mg/kg	1	30,000	400,000				350	510								16	<5	18	141
Total Recoverable Hydrocarbons																				
C6-C10	mg/kg	10												800	800		<10	<10	<10	<10
C6-C10 less BTEX (F1)	mg/kg	10			310	5100	26,000	215 ^{6}		180	215						<10	<10	<10	<10
C10-C16	mg/kg	50								120	170			1000	1000		<50	<50	<50	<50
F2-NAPHTHALENE	mg/kg	50			NL	3800	20,000	170 ^{6}									<50	<50	<50	<50
C16-C34	mg/kg	100				5300	27,000	1700 ^{6}		1300	2500			3500	5000		<100	<100	<100	<100
C34-C40	mg/kg	100				7400	38,000	3300 ^{6}		5600	6600			10000	10000		<100	<100	<100	<100
C10 - C40 (Sum of total)	mg/kg	50															<50	<50	<50	<50
Total Petroleum Hydrocarbons (Waste Classification)																				
C6 - C9	mg/kg	10															<10	<10	<10	<10
C10 - C14	mg/kg	50															<50	<50	<50	<50
C15 - C28	mg/kg	100															<100	<100	<100	<100
C29-C36	mg/kg	100															<100	<100	<100	<100
+C10 - C36 (Sum of total)	mg/kg	50															<50	<50	<50	<50
BTEX																				
Benzene	mg/kg	0.2			4	120	430	75 ^{6}		65	95						<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	0.5			NL	18,000	99,000	135 ^{6}		105	135						<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	0.5			NL	5300	27,000	165 ^{6}		105	135						<0.5	<0.5	<0.5	<0.5
Xylene (m & p)	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Xylene (o)	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Xylene Total	mg/kg	0.5			NL	15,000	81,000	95 ^{7}		45	95						<0.5	<0.5	<0.5	<0.5
Total BTEX	mg/kg	0.2															<0.2	<0.2	<0.2	<0.2
Organochlorine Pesticides																				
4,4-DDE	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
a-BHC	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Aldrin	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Aldrin + Dieldrin	mg/kg	0.05	10	45													<0.05	<0.05	<0.05	<0.05
b-BHC	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
chlordane	mg/kg	0.05	70	530													<0.05	<0.05	<0.05	<0.05
Chlordane (cis)	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Chlordane (trans)	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
d-BHC	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
DDD	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
DDT	mg/kg	0.2						180	640								<0.2	<0.2	<0.2	<0.2
DDT+DDE+DDD	mg/kg	0.05	400	3600													<0.05	<0.05	<0.05	<0.05
Dieldrin	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Endosulfan	mg/kg	0.05	340	2000													<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Endosulfan II	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Endosulfan sulphate	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Endrin	mg/kg	0.05	20	100													<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Endrin ketone	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
g-BHC (Lindane)	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Heptachlor	mg/kg	0.05	10	50													<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Methoxychlor	mg/kg	0.2	400	2500													<0.2	<0.2	<0.2	<0.2
Organophosphorus Pesticides																				
Azinophos methyl	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Carbophenothion	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	mg/kg	0.05	250	2000													<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05

Table C3- Summary of Soil Results for SMGW-TP-B316

																LocCode	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
																Sample ID	SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
																Sample Depth Range	0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
																Sample Date	9/12/2020	9/12/2020	9/12/2020	9/12/2020
																Lab Report Number	ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	**HIL C**	**HIL D**	**HSL for Vapour Intrusion D, Clay, 0 to <1m**	**HSL C Direct Contact**	**HSL D Direct Contact**	**EIL Public Open Space**	**EIL Industrial / Commercial**	**ESL Public Open Space**	**ESL Commerical / Industrial**	**Ecological Guideline Direct Exposure**	**Ecological Guideline Indirect Esposure**	**Management Limits Public Open Space**	**Management Limits Commercial/ Industrial**					
Diazinon	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Dichlorvos	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Dimethoate	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Ethion	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Fenamiphos	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Fenthion	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Malathion	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Methyl parathion	mg/kg	0.2															<0.2	<0.2	<0.2	<0.2
Monocrotophos	mg/kg	0.2															<0.2	<0.2	<0.2	<0.2
Parathion	mg/kg	0.2															<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Prothiofos	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
Polycyclic Aromatic Hydrocarbons																				
Acenaphthene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Acenaphthylene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Anthracene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Benzo(a) pyrene	mg/kg	0.5								0.7	1.4						<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (medium bound)	mg/kg	0.5	3	40													0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound)	mg/kg	0.5	3	40													1.2	1.2	1.2	1.2
Benzo(a)pyrene TEQ (lower bound)	mg/kg	0.5	3	40													<0.5	<0.5	<0.5	<0.5
Carcinogenic PAHs (as BaP TEQ)	mg/kg		3	40													<1.21	<1.21	<1.21	<1.21
Benzo(g,h,i)perylene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Benzo[b+j]fluoranthene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Chrysene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Fluorene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Naphthalene	mg/kg	0.5			NL			170	370								<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
Pyrene	mg/kg	0.5															<0.5	<0.5	<0.5	<0.5
PAHs (Sum of total)	mg/kg	0.5	300	4000													<0.5	<0.5	<0.5	<0.5
Phenols																				
Phenolics Total	mg/kg	1															<1	-	-	-
Polychlorinated Biphenyls																				
PCBs (Sum of total)	mg/kg	0.1	1	7													<0.1	-	-	-
Volatile Organic Compounds																				
1,2,3-trichlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
1,2,4-trichlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
1,2-dichlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
1,3-dichlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
1,4-dichlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
2-chlorotoluene	mg/kg	0.5															<0.5	<0.5	-	-
4-chlorotoluene	mg/kg	0.5															<0.5	<0.5	-	-
Bromobenzene	mg/kg	0.5															<0.5	<0.5	-	-
Chlorobenzene	mg/kg	0.5															<0.5	<0.5	-	-
Hexachlorobenzene	mg/kg	0.05															<0.05	<0.05	<0.05	<0.05
1,2,4-trimethylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
1,3,5-trimethylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
Isopropylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
n-butylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
n-propylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
p-isopropyltoluene	mg/kg	0.5															<0.5	<0.5	-	-
sec-butylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
Styrene	mg/kg	0.5															<0.5	<0.5	-	-
tert-butylbenzene	mg/kg	0.5															<0.5	<0.5	-	-
2-hexanone (MBK)	mg/kg	5															<5	<5	-	-
Methyl Ethyl Ketone	mg/kg	5															<5	<5	-	-
4-Methyl-2-pentanone	mg/kg	5															<5	<5	-	-
Carbon disulfide	mg/kg	0.5															<0.5	<0.5	-	-
Vinyl acetate	mg/kg	5															<5	<5	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.5															<0.5	<0.5	-	-
1,1,1-trichloroethane	mg/kg	0.5															<0.5	<0.5	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.5															<0.5	<0.5	-	-
1,1,2-trichloroethane	mg/kg	0.5															<0.5	<0.5	-	-
1,1-dichloroethane	mg/kg	0.5															<0.5	<0.5	-	-
1,1-dichloroethene	mg/kg	0.5															<0.5	<0.5	-	-
1,1-dichloropropene	mg/kg	0.5															<0.5	<0.5	-	-
1,2,3-trichloropropane	mg/kg	0.5															<0.5	<0.5	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.5															<0.5	<0.5	-	-
1,2-dibromoethane	mg/kg	0.5															<0.5	<0.5	-	-

Table C3- Summary of Soil Results for SMGW-TP-B316

																LocCode	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
																Sample ID	SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
																Sample Depth Range	0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
																Sample Date	9/12/2020	9/12/2020	9/12/2020	9/12/2020
																Lab Report Number	ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	**HIL C**	**HIL D**	**HSL for Vapour Intrusion D, Clay, 0 to <1m**	**HSL C Direct Contact**	**HSL D Direct Contact**	**EIL Public Open Space**	**EIL Industrial / Commercial**	**ESL Public Open Space**	**ESL Commerical / Industrial**	**Ecological Guideline Direct Exposure**	**Ecological Guideline Indirect Esposure**	**Management Limits Public Open Space**	**Management Limits Commercial/ Industrial**					
1,2-dichloroethane	mg/kg	0.5															<0.5	<0.5	-	-
1,2-dichloropropane	mg/kg	0.5															<0.5	<0.5	-	-
1,3-dichloropropane	mg/kg	0.5															<0.5	<0.5	-	-
2,2-dichloropropane	mg/kg	0.5															<0.5	<0.5	-	-
Bromodichloromethane	mg/kg	0.5															<0.5	<0.5	-	-
Bromoform	mg/kg	0.5															<0.5	<0.5	-	-
Bromomethane	mg/kg	5															<5	<5	-	-
Carbon tetrachloride	mg/kg	0.5															<0.5	<0.5	-	-
Chlorodibromomethane	mg/kg	0.5															<0.5	<0.5	-	-
Chloroethane	mg/kg	5															<5	<5	-	-
Chloroform	mg/kg	0.5															<0.5	<0.5	-	-
Chloromethane	mg/kg	5															<5	<5	-	-
cis-1,2-dichloroethene	mg/kg	0.5															<0.5	<0.5	-	-
cis-1,3-dichloropropene	mg/kg	0.5															<0.5	<0.5	-	-
cis-1,4-Dichloro-2-butene	mg/kg	0.5															<0.5	<0.5	-	-
Dibromomethane	mg/kg	0.5															<0.5	<0.5	-	-
Dichlorodifluoromethane	mg/kg	5															<5	<5	-	-
Hexachlorobutadiene	mg/kg	0.5															<0.5	<0.5	-	-
Iodomethane	mg/kg	0.5															<0.5	<0.5	-	-
Pentachloroethane	mg/kg	0.5															<0.5	<0.5	-	-
Trichloroethene	mg/kg	0.5															<0.5	<0.5	-	-
Trichlorofluoromethane	mg/kg	5															<5	<5	-	-
Tetrachloroethene	mg/kg	0.5															<0.5	<0.5	-	-
trans-1,2-dichloroethene	mg/kg	0.5															<0.5	<0.5	-	-
trans-1,3-dichloropropene	mg/kg	0.5															<0.5	<0.5	-	-
trans-1,4-Dichloro-2-butene	mg/kg	0.5															<0.5	<0.5	-	-
Vinyl chloride	mg/kg	5															<5	<5	-	-
Per- and Polyfluoroalkyl Substances																				
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005															<0.0005	<0.0005	-	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FtS)	mg/kg	0.0005															<0.0005	<0.0005	-	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005															<0.0005	<0.0005	-	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005															<0.0005	<0.0005	-	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005															<0.0005	<0.0005	-	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005															<0.0005	<0.0005	-	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005															<0.0005	<0.0005	-	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE Alcohol)	mg/kg	0.0005															<0.0005	<0.0005	-	<0.0005
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002										1	0.01				<0.0002	<0.0002	-	<0.0002
Perfluorodecane sulfonic acid (PFDS)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluorobutanoic acid (PFBA)	mg/kg	0.001															<0.001	<0.001	-	<0.001
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluorooctanoate (PFOA)	mg/kg	0.0002	10	50								10					<0.0002	<0.0002	-	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005															<0.0005	<0.0005	-	<0.0005
Sum of PFAS	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002
Sum of PFHxS and PFOS	mg/kg	0.0002	1	20													<0.0002	<0.0002	-	<0.0002
Sum of PFAS (WA DER List)	mg/kg	0.0002															<0.0002	<0.0002	-	<0.0002

Notes:

-: Not analysed

Table C4 - Summary of Waste Classification Results for SMGW-TP-B316

									LocCode		SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
									Sample ID		SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
									Sample Depth Range		0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
									Sample Date		9/12/2020	9/12/2020	9/12/2020	9/12/2020
									Lab Report Number		ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	NSW EPA 2014 General Solid Waste (CT1)	NSW EPA 2014 General Solid Waste SCC1	TCLP1 General Solid Waste (µg/l or mg/l)^#	NSW EPA 2014 Restricted Solid Waste CT2	NSW EPA 2014 Restricted Solid Waste SCC2	TCLP2 Restricted Solid Waste (µg/l or mg/l)^#	NSW 2014 Excavated Natural Material (Absolute Max)	NSW 2014 Excavated Natural Material (Max Average)				
Moisture Content	%	0.1							-	-	13.4	14.5	14.6	10.5
Asbestos														
Asbestos (1 = asbestos detected, 0 = no asbestos detected)	Fibres	5									0	0	-	-
Asbestos Fines (1 = asbestos detected, 0 = no asbestos detected)	Fibres	5									0	0	-	-
Sample weight (dry)	--										72.6	128	-	-
Other Parameters														
pH (Lab)	pH_Units	0.1							4.5 to 10	5 to 9	5.5	4.9	5.1	5.6
Ammonia as N	mg/kg	20									-	<20	-	-
Cyanide Total	mg/kg	1	320	5900	16	1280	23600	64			-	<1	-	-
Metals/Metalloids														
Arsenic	mg/kg	4	100	500	5	400	2000	20	40	20	13	<5	28	18
Cadmium	mg/kg	0.4	20	100	1	80	400	4	1	0.5	<1	<1	<1	<1
Chromium (III+VI)	mg/kg	1	100~	1900~	5	400~	7600~	20	150	75	15	4	10	5
Copper	mg/kg	1	-	-	-	-	-	-	200	100	14	9	28	66
Lead	mg/kg	1	100	1500	5	400	6000	20	100	50	13	8	18	34
Mercury	mg/kg	0.1	4	50	0.2	16	200	0.8	1	0.5	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	40	1050	2	160	4200	8	60	30	2	<2	6	37
Zinc	mg/kg	1	-	-	-	-	-	-	300	150	16	<5	18	141
Total Recoverable Hydrocarbons														
C6-C10	mg/kg	10									<10	<10	<10	<10
C6-C10 less BTEX (F1)	mg/kg	10									<10	<10	<10	<10
C10-C16	mg/kg	50									<50	<50	<50	<50
F2-NAPHTHALENE	mg/kg	50									<50	<50	<50	<50
C16-C34	mg/kg	100									<100	<100	<100	<100
C34-C40	mg/kg	100									<100	<100	<100	<100
C10 - C40 (Sum of total)	mg/kg	50									<50	<50	<50	<50
Total Petroleum Hydrocarbons (Waste Classification)														
C6 - C9	mg/kg	10	650	650	N/A	2600	2600	N/A	-	-	<10	<10	<10	<10
C10 - C14	mg/kg	50							-	-	<50	<50	<50	<50
C15 - C28	mg/kg	100							-	-	<100	<100	<100	<100
C29-C36	mg/kg	100							-	-	<100	<100	<100	<100
+C10 - C36 (Sum of total)	mg/kg	50	10000	10000	N/A	40000	40000	N/A	500	250	<50	<50	<50	<50
BTEX														
Benzene	mg/kg	0.2	10	18	0.5	40	72	2	0.5	-	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	0.5	288	518	14.4	1152	2073	57.6	65	-	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	0.5	600	1080	30	2400	4320	120	25	-	<0.5	<0.5	<0.5	<0.5
Xylene (m & p)	mg/kg	0.5							-	-	<0.5	<0.5	<0.5	<0.5
Xylene (o)	mg/kg	0.5							-	-	<0.5	<0.5	<0.5	<0.5
Xylene Total	mg/kg	0.5	1000	1800	50	4000	7200	200	15	-	<0.5	<0.5	<0.5	<0.5
Total BTEX	mg/kg	0.2							-	-	<0.2	<0.2	<0.2	<0.2
Organochlorine Pesticides														
Scheduled chemicals (Waste Classification Guidelines)	mg/kg	-	50	50	N/A	50	50	N/A			<1.35	<1.35	<0.85	<0.85
4,4-DDE	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
a-BHC	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Aldrin	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Aldrin + Dieldrin	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
b-BHC	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
chlordane	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Chlordane (cis)	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Chlordane (trans)	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
d-BHC	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
DDD	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
DDT	mg/kg	0.1							-	-	<0.2	<0.2	<0.2	<0.2
DDT+DDE+DDD	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Dieldrin	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Endosulfan	mg/kg	0.05	60	108	3	240	432	12	-	-	<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Endosulfan II	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Endosulfan sulphate	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05

Table C4 - Summary of Waste Classification Results for SMGW-TP-B316

									LocCode		SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
									Sample ID		SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
									Sample Depth Range		0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
									Sample Date		9/12/2020	9/12/2020	9/12/2020	9/12/2020
									Lab Report Number		ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	NSW EPA 2014 General Solid Waste (CT1)	NSW EPA 2014 General Solid Waste SCC1	TCLP1 General Solid Waste (µg/l or mg/l)^#	NSW EPA 2014 Restricted Solid Waste CT2	NSW EPA 2014 Restricted Solid Waste SCC2	TCLP2 Restricted Solid Waste (µg/l or mg/l)^#	NSW 2014 Excavated Natural Material (Absolute Max)	NSW 2014 Excavated Natural Material (Max Average)				
Endrin	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Endrin ketone	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
g-BHC (Lindane)	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Heptachlor	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Methoxychlor	mg/kg	0.1							-	-	<0.2	<0.2	<0.2	<0.2
Organophosphorus Pesticides														
Moderately Harrmful Pesticides (Waste Classification Guidelines)	mg/kg	-	250	250	N/A	1000	1000	N/A	-	-	<0.5	<0.5	<0.5	<0.5
Azinophos methyl	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Carbophenothion	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	mg/kg	0.05	4	7.5	0.2	16	30	0.8	-	-	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Diazinon	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Dichlorvos	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Dimethoate	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Ethion	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Fenamiphos	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Fenthion	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Malathion	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Methyl parathion	mg/kg	0.2							-	-	<0.2	<0.2	<0.2	<0.2
Monocrotophos	mg/kg	0.2							-	-	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	mg/kg	0.1							-	-	<0.05	<0.05	<0.05	<0.05
Parathion	mg/kg	0.05							-	-	<0.2	<0.2	<0.2	<0.2
Prothiofos	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
Polycyclic Aromatic Hydrocarbons														
Acenaphthene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Anthracene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Benzo(a) pyrene	mg/kg	0.05	0.8	10	0.04	3.2	23	0.16	1	0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ	mg/kg	-							-	-	<1.21	<1.21	<1.21	<1.21
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5							-	-	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5							-	-	1.2	1.2	1.2	1.2
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5							-	-	<0.5	<0.5	<0.5	<0.5
Benzo[b+j]fluoranthene	mg/kg	0.5							-	-	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	0.5							-	-	<0.5	<0.5	<0.5	<0.5
Carcinogenic PAHs (as BaP TEQ)	mg/kg	-							-	-	<1.21	<1.21	<1.21	<1.21
Chrysene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Fluorene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Naphthalene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
Pyrene	mg/kg	0.1							-	-	<0.5	<0.5	<0.5	<0.5
PAHs (Sum of total)	mg/kg	0.5/0.05							40	20	<0.5	<0.5	<0.5	<0.5
PAH (total, NSW Waste 2014)	mg/kg	-	200	200	N/A	800	800	N/A	-	-	<7.5	<7.5	<7.5	<7.5
Phenols														
Phenolics Total	mg/kg	1							-	-	<1	-	-	-
Polychlorinated Biphenyls														
PCBs (Sum of total)	mg/kg	0.1	<50		N/A	<50		N/A	-	-	<0.1	-	-	-
Volatile Organic Compounds														
1,2,3-trichlorobenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,2,4-trichlorobenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-

Table C4 - Summary of Waste Classification Results for SMGW-TP-B316

									LocCode		SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
									Sample ID		SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
									Sample Depth Range		0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
									Sample Date		9/12/2020	9/12/2020	9/12/2020	9/12/2020
									Lab Report Number		ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	NSW EPA 2014 General Solid Waste (CT1)	NSW EPA 2014 General Solid Waste SCC1	TCLP1 General Solid Waste (µg/l or mg/l)^#	NSW EPA 2014 Restricted Solid Waste CT2	NSW EPA 2014 Restricted Solid Waste SCC2	TCLP2 Restricted Solid Waste (µg/l or mg/l)^#	NSW 2014 Excavated Natural Material (Absolute Max)	NSW 2014 Excavated Natural Material (Max Average)				
1,2-dichlorobenzene	mg/kg	0.5	86	155	4.3	344	620	17.2	-	-	<0.5	<0.5	-	-
1,3-dichlorobenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,4-dichlorobenzene	mg/kg	0.5	150	270	7.5	600	1080	30	-	-	<0.5	<0.5	-	-
2-chlorotoluene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
4-chlorotoluene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Bromobenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Chlorobenzene	mg/kg	0.5	2000	3600	100	8000	14400	400	-	-	<0.5	<0.5	-	-
Hexachlorobenzene	mg/kg	0.05							-	-	<0.05	<0.05	<0.05	<0.05
cis-1,4-Dichloro-2-butene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Pentachloroethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
trans-1,4-Dichloro-2-butene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,2,4-trimethylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,3,5-trimethylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Isopropylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
n-butylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
n-propylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
p-isopropyltoluene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
sec-butylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Styrene	mg/kg	0.5	60	108	3	240	432	12	-	-	<0.5	<0.5	-	-
tert-butylbenzene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
2-hexanone (MBK)	mg/kg	5							-	-	<5	<5	-	-
Methyl Ethyl Ketone	mg/kg	5	4000	7200	200	16000	28800	800	-	-	<5	<5	-	-
4-Methyl-2-pentanone	mg/kg	5							-	-	<5	<5	-	-
Carbon disulfide	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Vinyl acetate	mg/kg	5							-	-	<5	<5	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.5	200	360	10	800	1440	40	-	-	<0.5	<0.5	-	-
1,1,1-trichloroethane	mg/kg	0.5	600	1080	30	2400	4320	120	-	-	<0.5	<0.5	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.5	26	46.8	1.3	104	187.2	5.2	-	-	<0.5	<0.5	-	-
1,1,2-trichloroethane	mg/kg	0.5	24	43.2	1.2	96	172.8	4.8	-	-	<0.5	<0.5	-	-
1,2-dibromoethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,1-dichloroethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,1-dichloroethene	mg/kg	0.5	14	25	0.7	56	100	2.8	-	-	<0.5	<0.5	-	-
1,1-dichloropropene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,2,3-trichloropropane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,2-dichloroethane	mg/kg	0.5	10	18	0.5	40	72	2	-	-	<0.5	<0.5	-	-
1,2-dichloropropane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
1,3-dichloropropane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
2,2-dichloropropane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Bromodichloromethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Bromoform	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Bromomethane	mg/kg	5							-	-	<5	<5	-	-
Carbon tetrachloride	mg/kg	0.5	10	18	0.5	40	72	2	-	-	<0.5	<0.5	-	-
Chlorodibromomethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Chloroethane	mg/kg	5							-	-	<5	<5	-	-
Chloroform	mg/kg	0.5	120	216	6	480	864	24	-	-	<0.5	<0.5	-	-
Chloromethane	mg/kg	5							-	-	<5	<5	-	-
cis-1,2-dichloroethene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
cis-1,3-dichloropropene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Dibromomethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Dichlorodifluoromethane	mg/kg	5							-	-	<5	<5	-	-
Hexachlorobutadiene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Iodomethane	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Trichloroethene	mg/kg	0.5	10	18	0.5	40	72	2	-	-	<0.5	<0.5	-	-
Trichlorofluoromethane	mg/kg	5							-	-	<5	<5	-	-
Tetrachloroethene	mg/kg	0.5	14	25.2	0.7	56	100.8	2.8	-	-	<0.5	<0.5	-	-
trans-1,2-dichloroethene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
trans-1,3-dichloropropene	mg/kg	0.5							-	-	<0.5	<0.5	-	-
Vinyl chloride	mg/kg	5	4	7.2	0.2	16	28.8	0.8	-	-	<5	<5	-	-

Table C4 - Summary of Waste Classification Results for SMGW-TP-B316

									LocCode		SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316	SMGW-TP-B316
									Sample ID		SMGW-TP-B316_0-0.1	SMGW-TP-B316_0.4-0.5	SMGW-TP-B316_1.1-1.3	SMGW-TP-B316_2.6-2.7
									Sample Depth Range		0-0.1	0.4-0.5	1.1-1.3	2.6-2.7
									Sample Date		9/12/2020	9/12/2020	9/12/2020	9/12/2020
									Lab Report Number		ES2044077	ES2044077	ES2044077	ES2044077
Analyte	**Units**	**EQL**	NSW EPA 2014 General Solid Waste (CT1)	NSW EPA 2014 General Solid Waste SCC1	TCLP1 General Solid Waste (µg/l or mg/l)^#	NSW EPA 2014 Restricted Solid Waste CT2	NSW EPA 2014 Restricted Solid Waste SCC2	TCLP2 Restricted Solid Waste (µg/l or mg/l)^#	NSW 2014 Excavated Natural Material (Absolute Max)	NSW 2014 Excavated Natural Material (Max Average)				
Per- and Polyfluoroalkyl Substances														
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FtS)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE Alcohol)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorodecane sulfonic acid (PFDS)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorobutanoic acid (PFBA)	mg/kg	0.001							-	-	<0.001	<0.001	-	<0.001
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorooctanoate (PFOA)	mg/kg	0.0002		18	500		72	2000	-	-	<0.0002	<0.0002	-	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005							-	-	<0.0005	<0.0005	-	<0.0005
Sum of PFAS	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002
Sum of PFHxS and PFOS	mg/kg	0.0002		1.8	50		7.2	200	-	-	<0.0004	<0.0004	-	<0.0004
Sum of PFAS (WA DER List)	mg/kg	0.0002							-	-	<0.0002	<0.0002	-	<0.0002

Notes:
-: Not analysed
mg/kg: miligrams per kilogram
Sum of Scheduled Chemicals (SC) calculated by summing reported results (not all SC were included in the analytical suite)
Sum of Moderately Harmful Pesticides (MHP) calculated by summing reported results (not all MHP were included in the analytical suite)
~: Waste Classification criteria for chromium VI
^: Where TCLP testing has been undertaken, the SCC and TCLP values are adopted as opposed to CT values

Table C5 - Summary of Groundwater Results for SMGW-BH-B106

						19122621	**19122621**	**19122621**	**19122621**	**19122621**	**19122621**
						ES2014202	**ES2018302**	**ES2022565**	**ES2026610**	**ES2030053**	**ES2105242**
						SMGW-BH-B106	**SMGW-BH-B106**	**SMGW-BH-B106**	**SMGW-BH-B106**	**SMGW-BH-B106**	**SMGW_BH_B106**
						SMGW-BH-B106	**SMGW-BH-B106**	**SMGW-BH-B106**	**SMGW-BH-B106**	**SMGW-BH-B106**	**SMGW-BH-B106**
						27/04/2020	**27/05/2020**	**30/06/2020**	**31/07/2020**	**26/08/2020**	**15/02/2021**
	Unit	EQL	DGV	Drinking Water Health x10	Drinking Water Aesthetic						
EIL Parameters											
Electrical Conductivity @ 25°C	**µS/cm**	1				17,200	16,000	16,700	19,800	20,300	21,100
pH (Lab)	**pH_Units**	0				7.19	7.03	6.44	6.59	6.96	6.55
Total Dissolved Solids @180°C	**mg/L**	5				12,700	11,900	15,500	13,700	14,200	15,700
Total Dissolved Solids @180°C (filtered)	**mg/L**	5				-	-	-	-	-	-
Sodium (filtered)	**mg/L**	0.1			180	**2,310**	**2,370**	**3,050**	**2,510**	**2,950**	**3,270**
Potassium (filtered)	**mg/L**	0.1				20	19	20	19	16	17
Calcium (filtered)	**mg/L**	0.1				357	265	305	235	255	256
Magnesium (filtered)	**mg/L**	0.1				691	690	961	729	892	1,000
Chloride	**mg/L**	1			250	5,350	5,190	6,690	5,890	6,810	6,720
Sulphate (as SO4) (filtered)	**mg/L**	1		5,000	250	1,410	-	-	-	-	-
Sulfate as SO4 - Turbidimetric (filtered)	**mg/L**	1		5,000	250	-	1,330	1,580	1,520	1,550	1,650
Bicarbonate Alkalinity (as CaCO3)	**mg/L**	1				381	278	264	286	231	252
Carbonate Alkalinity (as CaCO3)	**mg/L**	1				<1	<1	<1	<1	<1	<1
Hydroxide Alkalinity (as CaCO3)	**mg/L**	1				<1	<1	<1	<1	<1	<1
Total Alkalinity (as CaCO3)	**mg/L**	1				381	278	264	286	231	252
Nitrate (as N)	**mg/L**	0.005		113		4.06	2.45	0.63	2.20	-	0.32
Nitrite (as N)	**mg/L**	0.005		6.8		0.03	0.01	<0.01	<0.01	-	<0.01
Ammonia (as N)	**mg/L**	0.005	0.9		0.38	0.67	0.80	1.31	1.23	-	0.84
Total Kjeldahl Nitrogen (as N)	**mg/L**	0.05				1.2	1.2	1.7	1.6	-	1.3
Nitrogen (Total)	**mg/L**	0.05				5.3	3.7	2.3	3.8	-	1.6
Fluoride	**mg/L**	0.1		15		0.4	0.3	0.3	0.3	0.2	0.2
Reactive Phosphorus (as P)	**mg/L**	0.005				<0.01	<0.01	<0.01	<0.01	-	<0.01
Total Phosphorus (as P)	**mg/L**	0.01				0.06	0.22	0.10	0.08	-	0.08
Total Suspended Solids	**mg/L**	5				65	2,430	3,310	792	3,100	560
Total Anions	**meq/L**	0.01				188	180	227	204	229	229
Total Cations	**meq/L**	0.01				176	174	227	181	215	238
Ionic Balance (Lab)	**%**	0.01				3.36	1.72	0.13	5.75	3.18	1.88
Hardness (as CaCO3)	**µg/L**	1,000				-	-	-	3,590,000	-	4,760,000
Hardness (as CaCO3) (filtered)	**µg/L**	1,000				3,740,000	3,500,000	4,720,000	-	4,310,000	-
Sample Quality Parameters											
Nitrate + Nitrite (as N)	**mg/L**	0.01				4.09	2.46	0.63	2.20	-	0.32
Microbiological											
Sulphate Reducing Bacteria Population Estimate	**pac/mL**	1				-	500,000	6,000	27,000	115,000	115,000
Other											
Methane	**µg/L**	5				19	-	-	-	-	-
Perfluorinated Compounds											
10:2 Fluorotelomer sulfonic acid	**µg/L**	0.01				<0.05	-	-	-	-	-
4:2 Fluorotelomer sulfonic acid	**µg/L**	0.0005				<0.05	-	-	-	-	-
8:2 Fluorotelomer sulfonate	**µg/L**	0.0005				<0.05	-	-	-	-	-
N-Et-FOSA	**µg/L**	0.0025				<0.05	-	-	-	-	-

Table C5 (continued)- Summary of Groundwater Results for SMGW-BH-B106

	Unit	EQL	DGV	Water Quality Guidelines	Drinking Water Health (x10)	Drinking Water Aesthetic	Recreational Water Quality Guidelines	HSL fo Vapour Intrusion, Clay 2 to<4m	19122621 ES2014202 SMGW-BH-B106 SMGW-BH-B106 27/04/2020	19122621 ES2018302 SMGW-BH-B106 SMGW-BH-B106 27/05/2020	19122621 ES2022565 SMGW-BH-B106 SMGW-BH-B106 30/06/2020	19122621 ES2026610 SMGW-BH-B106 SMGW-BH-B106 31/07/2020	19122621 ES2030053 SMGW-BH-B106 SMGW-BH-B106 26/08/2020	19122621 ES2105242 SMGW_BH_B106 SMGW-BH-B106 15/02/2021
N-Et-FOSE	µg/L	0.0025							<0.05	-	-	-	-	-
N-Me-FOSA	µg/L	0.0025							<0.05	-	-	-	-	-
N-Me-FOSE	µg/L	0.0025							<0.05	-	-	-	-	-
Perfluorobutanoic acid (PFBA)	µg/L	0.0005							<0.1	-	-	-	-	-
Perfluoroheptane sulfonic acid	µg/L	0.0002							<0.02	-	-	-	-	-
Perfluoro-n-hexadecanoic acid	µg/L	0.002							-	-	-	-	-	-
Perfluoro-n-pentanoic acid (PFPeA)	µg/L	0.0005							<0.02	-	-	-	-	-
Perfluoropentane sulfonic acid	µg/L	0.001							<0.02	-	-	-	-	-
Perfluoro-1-dodecanesulfonate	µg/L	0.0005							-	-	-	-	-	-
Perfluorononanesulfonic acid (PFNS)	ng/l	0.5							-	-	-	-	-	-
PFDcS	µg/L	0.0005							<0.02	-	-	-	-	-
Sum of PFAS (Swedish WQ Guideline plus 8	µg/L	0.01							-	-	-	-	-	-
N-methyl-perfluorooctanesulfonamidoacetic acid	µg/L	0.0025							<0.02	-	-	-	-	-
Sum of PFHxS and PFOS (lab reported)	µg/L	0.0002					2		<0.01	-	-	-	-	-
Sum of US EPA PFAS (PFOS + PFOA)	µg/L	0.01							-	-	-	-	-	-
Sum of WA DER PFAS (n=10)	µg/L	0.01							<0.01	-	-	-	-	-
Sum of PFASs (n=28)	µg/L	0.01							<0.01	-	-	-	-	-
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.001							<0.02	-	-	-	-	-
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							-	-	-	-	-	-
Perfluorodecanoic acid (PFDA)	µg/L	0.001							<0.02	-	-	-	-	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.001							<0.02	-	-	-	-	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005							<0.02	-	-	-	-	-
Perfluorooctanesulfonic acid (PFOS)3	µg/L	0.0002		0.00023					<0.01	-	-	-	-	-
Perfluorooctanoate (PFOA)	µg/L	0.0005		19			10		<0.01	-	-	-	-	-
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.0002							<0.02	-	-	-	-	-
Perfluorononanoic acid (PFNA)	µg/L	0.001							<0.02	-	-	-	-	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005							<0.02	-	-	-	-	-
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.0005							<0.05	-	-	-	-	-
N-ethyl-perfluorooctanesulfonamidoacetic acid	µg/L	0.0025							<0.02	-	-	-	-	-
Perfluorooctanesulfonamide (PFOSA)	µg/L	0.002							<0.02	-	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.001							<0.05	-	-	-	-	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.001							<0.02	-	-	-	-	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.001							<0.02	-	-	-	-	-
TRH - HSL														
TRH C6 - C10 Fraction F1	mg/L	0.01							<0.02	-	-	-	-	-
TRH C6 - C10 Fraction Less BTEX F1	mg/L	0.01						NL	<0.02	-	-	-	-	-
TRH >C10 - C16 Fraction F2	mg/L	0.05							<0.1	-	-	-	-	-
TRH >C10 - C16 Fraction Less Naphthalene (F2)	mg/L	0.05						NL	<0.1	-	-	-	-	-
TRH >C16 - C34 Fraction F3	mg/L	0.1							<0.1	-	-	-	-	-
TRH >C34 - C40 Fraction F4	mg/L	0.1							<0.1	-	-	-	-	-
TRH C37 - C40 Fraction	mg/L	0.2							-	-	-	-	-	-
TRH+C10 - C40 (Sum of total) (Lab Reported)	mg/L	0.1							<0.1	-	-	-	-	-
TPH Group - Waste Classification														
TRH C6 - C9 Fraction	mg/L	0.01							<0.02	-	-	-	-	-
TRH C10 - C14 Fraction	mg/L	0.05							<0.05	-	-	-	-	-
TRH C15 - C28 Fraction	mg/L	0.1							<0.1	-	-	-	-	-
TRH C29 - C36 Fraction	mg/L	0.05							<0.05	-	-	-	-	-
TRH+C10 - C36 (Sum of total) (Lab Reported)	mg/L	0.05							<0.05	-	-	-	-	-
BTEX														
Benzene	µg/L	0.5	950		10	-		30,000	<1	-	-	-	-	-
Toluene	µg/L	0.5	180		8,000	25		NL	<2	-	-	-	-	-
Ethylbenzene	µg/L	0.5	80		3,000	3		NL	<2	-	-	-	-	-
Xylenes (m & p)	µg/L	1	75+200						<2	-	-	-	-	-
Xylene (o)	µg/L	0.5	350						<2	-	-	-	-	-
Xylenes (Sum of total) (Lab Reported)	µg/L	1.5			6,000	20		NL	<2	-	-	-	-	-
Total BTEX	µg/L	1							<1	-	-	-	-	-
Heavy Metals														
Aluminium	µg/L	5	0.8			0.2			**880**	**5,800**	**960**	**1,500**	**2,380**	**2,940**
Aluminium (filtered)	µg/L	5	0.8			0.2			<10	<10	**20**	<10	**10**	**90**
Barium	µg/L	1			20,000				90	104	53	71	55	74
Barium (filtered)	µg/L	1			20,000				83	64	50	48	41	45
Beryllium	µg/L	0.5			600				<1	1	<1	<1	<1	1
Beryllium (filtered)	µg/L	0.5			600				<1	<1	<1	<1	<1	1
Boron	µg/L	5	940		40,000				<50	<50	<50	<50	<50	<50
Boron (filtered)	µg/L	5	940		40,000				<50	<50	<50	<50	<50	<50
Cobalt	µg/L	1	1.4						120	174	240	177	282	294
Cobalt (filtered)	µg/L	1	1.4						113	133	230	172	258	327
Iron	mg/L	0.005				0.3			3.27	13.7	12.8	2.29	16.0	22.4
Iron (filtered)	mg/L	0.005				0.3			2.23	2.08	10.6	0.62	13.2	17.5
Manganese	µg/L	1	1900		5,000				2,570	3,260	5,210	3,480	4,860	5,420
Manganese (filtered)	µg/L	1	1900		5,000				2,550	2,560	4,710	3,280	4,950	5,170
Molybdenum	µg/L	1	34		500				5	2	<1	1	<1	<1
Molybdenum (filtered)	µg/L	1	34		500				4	2	<1	<1	<1	<1
Selenium	µg/L	1	5		100				<10	<10	<10	<10	<10	<10
Selenium (filtered)	µg/L	1	5		100				<10	<10	<10	<10	<10	10
Strontium	µg/L	1							2,880	2,460	2,640	1,840	2,320	1,930
Strontium (filtered)	µg/L	1							2,820	2,200	2,640	1,860	2,310	2,100
Vanadium	µg/L	1	6						<10	20	<10	<10	<10	<10
Vanadium (filtered)	µg/L	1	6						<10	<10	<10	<10	<10	<10
Arsenic	µg/L	1	13 (As III)		100				<1	4	<1	<1	1	1
Arsenic (filtered)	µg/L	1	13 (As III)		100				<1	<1	2	<1	<1	<1
Cadmium	µg/L	0.1	7.5		20				0.7	0.8	0.4	0.8	0.4	0.5
Cadmium (filtered)	µg/L	0.1	7.5		20				0.6	0.8	0.4	0.7	0.4	0.3
Chromium	µg/L	1	94 for Cr (III) and 1 for Cr(VI)		500 for Cr(VI)				<1	14	3	2	4	4
Chromium (filtered)	µg/L	1	94 for Cr (III) and 1 for Cr(VI)		500 for Cr(VI)				<1	<1	<1	<1	<1	<1
Copper	µg/L	1	1.4		20,000	1,000			8	41	9	9	14	30
Copper (filtered)	µg/L	1	1.4		20,000	1,000			37	7	3	6	8	1

Table C5 (continued)- Summary of Groundwater Results for SMGW-BH-B106

						19122621	19122621	19122621	19122621	19122621	19122621
						ES2014202	ES2018302	ES2022565	ES2026610	ES2030053	ES2105242
						SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW_BH_B106
						SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106
						27/04/2020	27/05/2020	30/06/2020	31/07/2020	26/08/2020	15/02/2021
	Unit	EQL	DGV	Drinking Water Health (x10)	Drinking Water Aesthetic						
Lead	µg/L	1	603	100		<1	15	2	1	4	4
Lead (filtered)	µg/L	1	603	100		<1	<1	<1	<1	<1	<1
Mercury	µg/L	0.05	0.06	10		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury (filtered)	µg/L	0.05	0.06	10		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	µg/L	1	352	200		98	132	168	128	195	208
Nickel (filtered)	µg/L	1	352	200		97	106	163	128	175	223
Zinc	µg/L	1	256		3000	167	297	274	281	345	487
Zinc (filtered)	µg/L	1	256		3000	178	184	279	271	322	274
PAH											
Acenaphthene	µg/L	0.1				<1.0	-	-	-	-	-
Acenaphthylene	µg/L	0.1				<1.0	-	-	-	-	-
Anthracene	µg/L	0.1	0.01			<1.0	-	-	-	-	-
Benz(a)anthracene	µg/L	0.1				<1.0	-	-	-	-	-
Benzo(a)pyrene	µg/L	0.1	0.1	0.1		<0.5	-	-	-	-	-
Benzo(a)pyrene TEQ (lower bound)*	µg/L	0.5				<0.5	-	-	-	-	-
Benzo(b)&(j)fluoranthene	µg/L	0.1				<1.0	-	-	-	-	-
Benzo(g,h,i)perylene	µg/L	0.1				<1.0	-	-	-	-	-
Benzo(k)fluoranthene	µg/L	0.1				<1.0	-	-	-	-	-
Chrysene	µg/L	0.1				<1.0	-	-	-	-	-
Dibenz(a,h)anthracene	µg/L	0.1				<1.0	-	-	-	-	-
Fluoranthene	µg/L	0.1	1			<1.0	-	-	-	-	-
Fluorene	µg/L	0.1				<1.0	-	-	-	-	-

Table C5 (continued)- Summary of Groundwater Results for SMGW-BH-B106

					19122621	19122621	19122621	19122621	19122621	19122621
					ES2014202	ES2018302	ES2022565	ES2026610	ES2030053	ES2105242
					SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW_BH_B106
					SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106
					27/04/2020	27/05/2020	30/06/2020	31/07/2020	26/08/2020	15/02/2021
	Unit	EQL	DGV	HSL Vapour Intrusion D, clay, 2 to <4 m						
Indeno(1,2,3-c,d)pyrene	**µg/L**	0.1			<1.0	-	-	-	-	-
Naphthalene	**µg/L**	0.1	16	NL	<1.0	-	-	-	-	-
Phenanthrene	**µg/L**	0.1	0.6		<1.0	-	-	-	-	-
Pyrene	**µg/L**	0.1			<1.0	-	-	-	-	-
PAH (Sum of Common 16 PAHs - Lab Reported)	**µg/L**	0.5			<0.5	-	-	-	-	-

Table C5 (continued)- Summary of Groundwater Results for SMGW-BH-B106

						19122621	19122621	19122621	19122621	19122621	19122621
						ES2014202	ES2018302	ES2022565	ES2026610	ES2030053	ES2105242
						SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW_BH_B106
						SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106	SMGW-BH-B106
						27/04/2020	27/05/2020	30/06/2020	31/07/2020	26/08/2020	15/02/2021
	Unit	EQL	SMW 95% Protection of Species ANZG 2018	Drinking Water Health (x10)	Drinking Water Aesthetic						
Volatile Organic Compounds											
1,4-Dichlorobenzene	µg/L	0.3	60	400	0.3	<5	-	-	-	-	-
4-Chlorotoluene	µg/L	0.5				<5	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/L	0.5	3			<5	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/L	0.5	85			<5	-	-	-	-	-
1,2-Dichlorobenzene	µg/L	0.5	160	15,000	1	<5	-	-	-	-	-
1,3-Dichlorobenzene	µg/L	0.5	260		20	<5	-	-	-	-	-
2-Chlorotoluene	µg/L	0.5				<5	-	-	-	-	-
Bromobenzene	µg/L	0.5				<5	-	-	-	-	-
Chlorobenzene	µg/L	0.5	55	3,000	10	<5	-	-	-	-	-
1,2,4-trimethylbenzene	µg/L	0.5				<5	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/L	0.5				<5	-	-	-	-	-
Isopropylbenzene	µg/L	0.5	30			<5	-	-	-	-	-
n-Butylbenzene	µg/L	0.5				<5	-	-	-	-	-
n-Propylbenzene	µg/L	0.5				<5	-	-	-	-	-
p-Isopropyltoluene	µg/L	0.5				<5	-	-	-	-	-
sec-Butylbenzene	µg/L	0.5				<5	-	-	-	-	-
Styrene	µg/L	0.5		300		<5	-	-	-	-	-
tert-Butylbenzene	µg/L	0.5				<5	-	-	-	-	-
Methyl Ethyl Ketone	µg/L	10				<50	-	-	-	-	-
2-Hexanone	µg/L	5				<50	-	-	-	-	-
Methyl iso-butyl ketone	µg/L	5				<50	-	-	-	-	-
Vinyl acetate	µg/L	10				<50	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/L	0.5				<5	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/L	0.5	400			<5	-	-	-	-	-
1,1,1-Trichloroethane	µg/L	0.5	270			<5	-	-	-	-	-
1,1,2-Trichloroethane	µg/L	0.5	6,500			<5	-	-	-	-	-
1,2,3-Trichloropropane	µg/L	0.5				<5	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/L	0.5				<5	-	-	-	-	-
1,2-Dibromoethane	µg/L	0.5				<5	-	-	-	-	-
1,1-Dichloroethane	µg/L	0.5				<5	-	-	-	-	-
1,2-Dichloroethane	µg/L	0.5	1,900	30		<5	-	-	-	-	-
1,1-Dichloroethene	µg/L	0.5	700	300		<5	-	-	-	-	-
cis-1,2-Dichloroethene	µg/L	0.5				<5	-	-	-	-	-
trans-1,2-dichloroethene	µg/L	0.5				<5	-	-	-	-	-
1,2-Dichloropropane	µg/L	0.5	900			<5	-	-	-	-	-
1,3-Dichloropropane	µg/L	0.5	1,100			<5	-	-	-	-	-
2,2-Dichloropropane	µg/L	0.5				<5	-	-	-	-	-
1,1-Dichloropropene	µg/L	0.5				<5	-	-	-	-	-
cis-1,3-Dichloropropene	µg/L	0.5				<5	-	-	-	-	-
trans-1,3-dichloropropene	µg/L	0.5				<5	-	-	-	-	-
cis-1,4-Dichloro-2-butene	µg/L	1				<5	-	-	-	-	-
trans-1,4-Dichloro-2-butene	µg/L	1				<5	-	-	-	-	-
Bromodichloromethane	µg/L	0.5				<5	-	-	-	-	-
Bromoform	µg/L	0.5				<5	-	-	-	-	-
Bromomethane	µg/L	10				<50	-	-	-	-	-
Carbon disulfide	µg/L	2	20			<5	-	-	-	-	-
Carbon tetrachloride	µg/L	0.5	240	30		<5	-	-	-	-	-
Chlorodibromomethane	µg/L	0.5				<5	-	-	-	-	-
Chloroethane	µg/L	5				<50	-	-	-	-	-
Chloroform	µg/L	0.5	370			<5	-	-	-	-	-
Chloromethane	µg/L	5				<50	-	-	-	-	-
Dibromomethane	µg/L	0.5				<5	-	-	-	-	-
Dichlorodifluoromethane	µg/L	5				<50	-	-	-	-	-
Hexachlorobutadiene	µg/L	0.5		7		<5	-	-	-	-	-
Iodomethane	µg/L	5				<5	-	-	-	-	-
Pentachloroethane	µg/L	0.5	80			<5	-	-	-	-	-
Trichloroethene	µg/L	0.5	330			<5	-	-	-	-	-
Tetrachloroethene	µg/L	0.5	70	500		<5	-	-	-	-	-
Trichlorofluoromethane	µg/L	1				<50	-	-	-	-	-
Vinyl chloride	µg/L	0.3	100	3		<50	-	-	-	-	-

Statistics

* A Non Detect Multiplier of 0.5 has been applied.

Table I1: Summary of Laboratory Results for Soil – Metals, TRH, BTEX, PAH

				Metals								TRH						BTEX				PAH			
				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 (BaP)	Benzo(a)pyrene TEQ	Total PAHs
			PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	0.1	0.05	0.5	0.05
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
AEC35TP01	0 - 0.1 m	Fill	29/07/2022	13	<0.4	37	4	18	<0.1	6	12	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP02	0 - 0.1 m	Fill	29/07/2022	11	<0.4	32	10	17	<0.1	4	24	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP02	0.8 - 0.9 m	Natural	29/07/2022	5	<0.4	4	8	7	<0.1	<1	3	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP03	0.5 - 0.6 m	Natural	29/07/2022	10	<0.4	35	13	15	<0.1	3	7	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP04	0 - 0.1 m	Fill	29/07/2022	10	<0.4	14	12	13	<0.1	3	13	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP05	0.1 - 0.2 m	Fill	29/07/2022	8	<0.4	9	11	12	<0.1	2	9	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP05	0.5 - 0.6 m	Natural	29/07/2022	13	<0.4	24	13	12	<0.1	<1	5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
BD8/20220729	0.5 - 0.6 m	Natural	29/07/2022	10	<0.4	21	16	13	<0.1	<1	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP06	0 - 0.1 m	Fill	28/07/2022	12	<0.4	35	15	20	<0.1	4	18	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP07	0 - 0.1 m	Fill	28/07/2022	11	<0.4	31	11	18	<0.1	3	12	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP08	0.5 - 0.6 m	Natural	29/07/2022	6	<0.4	9	15	10	<0.1	<1	5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP08	1.9 - 2 m	Natural	29/07/2022	10	<0.4	5	8	13	<0.1	<1	3	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	480 180	NL -	- 1300	- 5600	6 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP09	0 - 0.1 m	Fill	29/07/2022	6	<0.4	24	10	62	<0.1	3	11	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP10	0.1 - 0.2 m	Fill	28/07/2022	6	<0.4	19	11	16	<0.1	2	12	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP11	0 - 0.1 m	Fill	28/07/2022	12	<0.4	25	11	14	<0.1	2	15	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP11	1 - 1.1 m	Natural	28/07/2022	12	<0.4	30	16	16	<0.1	3	16	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	480 180	NL -	- 1300	- 5600	6 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP12	0 - 0.1 m	Fill	28/07/2022	9	<0.4	26	8	14	<0.1	4	17	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP13	0 - 0.1 m	Fill	28/07/2022	12	<0.4	41	4	16	<0.1	3	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP14	0 - 0.1 m	Fill	28/07/2022	5	<0.4	15	6	12	<0.1	2	10	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP14	0.3 - 0.4 m	Natural	28/07/2022	7	<0.4	35	7	10	<0.1	2	3	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP15	0.3 - 0.4 m	Fill	28/07/2022	8	<0.4	27	5	9	<0.1	1	3	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
BD4/20220728	0.3 - 0.4 m	Fill	28/07/2022	12	<0.4	41	3	15	<0.1	2	3	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP16	0.2 - 0.3 m	Fill	28/07/2022	6	<0.4	21	4	11	<0.1	2	7	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
BD3/20220728	0.2 - 0.3 m	Fill	28/07/2022	18	<0.4	45	7	17	<0.1	<5	10	<20	<50	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP16 - [TRIPLICATE]	0.2 - 0.3 m	Fill	28/07/2022	9	<0.4	26	5	12	<0.1	2	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP17	0 - 0.15 m	Fill	28/07/2022	9	<0.4	29	3	12	<0.1	2	5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP18	0.1 - 0.2 m	Fill	28/07/2022	11	<0.4	44	3	15	<0.1	2	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP18	0.7 - 0.8 m	Natural	28/07/2022	7	<0.4	31	7	8	<0.1	2	3	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
BD1/20220728	0.7 - 0.8 m	Natural	28/07/2022	15	<0.4	55	12	13	<0.1	5.3	7.9	<20	<50	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35TP19	0.3 - 0.4 m	Fill	28/07/2022	8	<0.4	41	<1	11	<0.1	1	1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -

Table I1: Summary of Laboratory Results for Soil – Metals, TRH, BTEX, PAH

				Metals								TRH						BTEX				PAH			
				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 (BaP)	Benzo(a)pyrene TEQ	Total PAHs
			PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	0.1	0.05	0.5	0.05
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
AEC35HA20	0 - 0.1 m	Fill	21/09/2022	10	<0.4	27	10	16	<0.1	8	13	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35SP-1		stockpile	29/07/2022	11	<0.4	28	10	14	<0.1	3	9	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35SP-2		stockpile	29/07/2022	18	<0.4	15	12	14	<0.1	3	9	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35SP-3		stockpile	29/07/2022	9	<0.4	22	11	16	<0.1	4	10	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -
AEC35SP-4		stockpile	29/07/2022	8	<0.4	23	7	15	<0.1	5	16	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				300 100	90 -	300 410	17000 160	600 1100	80 -	1200 110	30000 350	- -	- 120	310 180	NL -	- 1300	- 5600	4 65	NL 105	NL 125	NL 45	NL 170	- 0.7	3 -	300 -

Lab result	
HIL/HSL value	EIL/ESL value

🟨 HIL/HSL exceedance 🟩 EIL/ESL exceedance 🟧 HIL/HSL and EIL/ESL exceedance ⬜ ML exceedance 🟥 ML and HIL/HSL or EIL/ESL exceedance

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

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

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

Notes:

a	QA/QC replicate of sample listed directly below the primary sample
b	Reported naphthalene laboratory result obtained from BTEXN suite
c	Criteria applies to DDT only

Site Assessment Criteria (SAC):

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

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

HIL C	Recreational / Open Space (NEPC, 2013)
HSL D	Commercial / Industrial (vapour intrusion) (NEPC, 2013)
DC HSL C	Direct contact HSL C Recreational /Open space (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

Table I1 (continued): Summary of Laboratory Results for Soil – Phenols, OCP, OPP, PCB, Asbestos

				Phenols	OCP												OPP		PCB	Asbestos			
				Total Phenols	DDD	DDT+DDE+DDD c	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Other OCP	Chlorpyriphos	Other OPP	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos ID in soil <0.1g/kg	FA and AF Estimation
			PQL	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				<0.001
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	-	-	-	%(w/w)
AEC35TP01	0 - 0.1 m	Fill	29/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP02	0 - 0.1 m	Fill	29/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP02	0.8 - 0.9 m	Natural	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP03	0.5 - 0.6 m	Natural	29/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP04	0 - 0.1 m	Fill	29/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP05	0.1 - 0.2 m	Fill	29/07/2022	-	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP05	0.5 - 0.6 m	Natural	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
BD8/20220729	0.5 - 0.6 m	Natural	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP06	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP07	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP08	0.5 - 0.6 m	Natural	29/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP08	1.9 - 2 m	Natural	29/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP09	0 - 0.1 m	Fill	29/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP10	0.1 - 0.2 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP11	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP11	1 - 1.1 m	Natural	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP12	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP13	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP14	0 - 0.1 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP14	0.3 - 0.4 m	Natural	28/07/2022	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP15	0.3 - 0.4 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
BD4/20220728	0.3 - 0.4 m	Fill	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP16	0.2 - 0.3 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
BD3/20220728	0.2 - 0.3 m	Fill	28 Jul 2022	<PQL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<PQL	<0.2	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP16 - [TRIPLICATE]	0.2 - 0.3 m	Fill	28/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP17	0 - 0.15 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP18	0.1 - 0.2 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				

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Table I1 (continued): Summary of Laboratory Results for Soil – Phenols, OCP, OPP, PCB, Asbestos

				Phenols	OCP												OPP		PCB	Asbestos			
				Total Phenols	DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Other OCP	Chlorpyriphos	Other OPP	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos ID in soil <0.1g/kg	FA and AF Estimation
			PQL	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				<0.001
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	-	-	-	%(w/w)
AEC35TP18	0.7 - 0.8 m	Natural	28/07/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<PQL	<0.1	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
BD1/20220728	0.7 - 0.8 m	Natural	28 Jul 2022	<PQL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<PQL	<0.2	<PQL	<0.1	-	-	-	-
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35TP19	0.3 - 0.4 m	Fill	28/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35HA20	0 - 0.1 m	Fill	21/09/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35SP-1	0 m	stockpile	29/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35SP-2	0 m	stockpile	29/07/2022	-	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35SP-3	0 m	stockpile	29/07/2022	<5	<0.1	<0.1	<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	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				
AEC35SP-4	0 m	stockpile	29/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	NAD	<0.001
				120 -	- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	- -	250 -	- -	1 -				

Lab result	
HIL/HSL value	EIL/ESL value

🟨 HIL/HSL exceedance 🟩 EIL/ESL exceedance 🟧 HIL/HSL and EIL/ESL exceedance ⬛ ML exceedance 🟥 ML and HIL/HSL or EIL/ESL exceedance

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

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

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

Notes:

a	QA/QC replicate of sample listed directly below the primary sample
b	Reported naphthalene laboratory result obtained from BTEXN suite
c	Criteria applies to DDT only

Site Assessment Criteria (SAC):

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

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

HIL C	Recreational / Open Space (NEPC, 2013)
HSL D	Commercial / Industrial (vapour intrusion) (NEPC, 2013)
DC HSL C	Direct contact HSL C Recreational /Open space (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

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

Sample Location / Identification (Borehole or Replicate)	Sample Date	Metals (dissolved)								Polycyclic Aromatic Hydrocarbons					
		Arsenic	Cadmium	Chromium (III + VI)	Copper	Lead	Mercury	Nickel	Zinc	Naphthalene	Anthracene	Fluoranthene	Benzo(a)pyrene	Phenanthrene	Other PAH
SMGW-BH-BH106 (from SMGW-BH-B106)	8/09/2022	1	0.2	<1	**7**	<1	<0.05	59	110	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL
AEC35BH01	8/09/2022	3	1	<1	**2**	<1	<0.05	64	74	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL
BD1/20220908	8/09/2022	2	0.9	<1	**3**	<1	<0.05	6	6	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL
AEC35BH02	8/09/2022	2	0.7	<1	**28**	7	<0.05	**220**	**710**	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL
AEC35BH03	8/09/2022	<1	<0.1	<1	<1	<1	<0.05	56	110	<0.2	<0.1	<0.1	<0.1	<0.1	<PQL
BD2/20220908	8/09/2022	<10	<2	<10	<10	<10	<1	53	97	0.01	<0.01	<0.01	<0.01	<0.01	<PQL
Assessment Criteria															
Freshwater DGV		24 for As(III) 13 for As(V)	7.5	94 for Cr(III) 1.0 for Cr(VI)	1.4	603	0.06	352	256	16	0.01	1	0.1	0.6	-
Guidelines for Recreational Water	Health	100	20	500 for Cr(VI)	20000	100	10	200	-	-	-	-	0.1	-	-
	Aesthetic	-	-	-	1000	-	-	-	3000	-	-	-	-	-	-
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		-	-	-	-	-	-	-	-	NL	-	-	-	-	-

Sample Location / Identification (Borehole or Replicate)	Sample Date	Total Recoverable Hydrocarbons, BTEX and Volatile Organic Compounds										
		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
SMGW-BH-BH106 (from SMGW-BH-B106)	8/09/2022	<10	**130**	<100	**130**	**6900**	**210**	<10	<10	<10	<10	<20
AEC35BH01	8/09/2022	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2
BD1/20220908	8/09/2022	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2
AEC35BH02	8/09/2022	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2
AEC35BH03	8/09/2022	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<2
BD2/20220908	8/09/2022	<20	**70**	<20	**70**	**200**	<100	<1	<1	<1	<1	<2
Assessment Criteria												
Freshwater DGV		-	-	-	-	-	-	950	180	80	350	75 for m-xylene 200 for p-xylene
Guidelines for Recreational Water	Health	-	-	-	-	-	-	10	8000	3000	6000	
	Aesthetic	-	-	-	-	-	-	-	25	3	20	
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		NL	NL	-	-	-	-	30000	NL	NL	NL	

Sample Location / Identification (Borehole or Replicate)	Sample Date	Total Recoverable Hydrocarbons, BTEX and Volatile Organic Compounds														
		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
SMGW-BH-BH106 (from SMGW-BH-B106)	8/09/2022	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10
AEC35BH01	8/09/2022	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1
BD1/20220908	8/09/2022	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1
AEC35BH02	8/09/2022	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1
AEC35BH03	8/09/2022	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1
BD2/20220908	8/09/2022	<1	<1	<1	<1	<1	<1	<5	<1	<1	-	-	<1	<1	<1	<1
Assessment Criteria																
Freshwater DGV		30	700	-	-	-		100	70	330	3	85	160	260	60	55
Guidelines for Recreational Water	Health	-	300	600		1000		3	500	-	300		15000	-	400	3000
	Aesthetic	-	-	-		-		-	-	-	5		1	20	0.3	10
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Location / Identification (Borehole or Replicate)	Sample Date	Total Recoverable Hydrocarbons, BTEX and Volatile Organic Compounds															
		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
SMGW-BH-BH106 (from SMGW-BH-B106)	8/09/2022	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	-	<PQL
AEC35BH01	8/09/2022	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
BD1/20220908	8/09/2022	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
AEC35BH02	8/09/2022	<1	<1	<1	<1	<1	4	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
AEC35BH03	8/09/2022	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<PQL
BD2/20220908	8/09/2022	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	-	<1	<5	<PQL
Assessment Criteria																	
Freshwater DGV		400	270	6500	1900	240	370	-	-	-	900	1100	-	-	20	-	-
Guidelines for Recreational Water	Health	-	-	-	30	30	2500				-	-	300	7	-	40	-
	Aesthetic	-	-	-	-	-	-				-	-	4	-	-	-	-
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

PQL	Practical Quantitation Limit
-	not defined/ not analysed/ not applicable
NL	Not Limiting
BD1/20220908	Blind replicate from AEC35BH01
BD2/20220908	Blind replicate from AEC35BH03
🟩	Exceedance of DGV
🟦	Exceedance of Drinking Water Guideline

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												Ammonia
		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	Ammonia as N
SMGW-BH-BH106 (from SMGW-BH-B106)	8/09/2022	<0.1	<0.1	<0.1	<0.1	-	<0.06	<0.1	<0.1	<0.1	<0.1	<0.1	-	<PQL	<0.04	<0.4	<0.02	-	<0.02	<0.4	<0.3	-	<0.4	-	<0.4	-	-	<0.1	-	-	-	<0.02	<0.4	-	-	-	-	<PQL	<0.1	<0.1	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	650
AEC35BH01	8/09/2022	<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	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	1500
BD1/20220908	8/09/2022	<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	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	1500
AEC35BH02	8/09/2022	<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	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	340
AEC35BH03	8/09/2022	<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	<PQL	<1	<1	<20	<20	<1	-	<5	<1	<1	<1	<1	<PQL	79
BD2/20220908	8/09/2022	<0.2	<0.2	-	-	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<PQL	<2	-	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<20	<2	<2	<2	<2	<2	<20	<PQL	<1	<1	<PQL	<3	<10	<30	<30	-	<30	<10	<3	<3	<3	<3	<PQL	40
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	-	900
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	-	-	382
HSL D for Vapour Intrusion, Clay (depth 2 m to <4 m)		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

PQL	Practical Quantitation Limit
-	not defined/ not analysed/ not applicable
BD1/20220908	Blind replicate from AEC35BH01
BD2/20220908	Blind replicate from AEC35BH03
🟧	Exceedance of DGV and Drinking Water Guideline
🟦	Exceedance of Drinking Water Guidelkine

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

				Metals								TRH		BTEX				PAH		Phenol						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 (BaP)	Total PAHs	2-Methylphenol (0-Cresol)	Cresol (total)	Total Phenols	2,4,5-trichlorophenol	2,4,6-trichlorophenol	Phenol (non-halogenated)	Total Endosulfan	Total Analysed OCP	Chlorpyriphos	Total Analysed OPP	Total PCB	Total Asbestos	pH
			PQL	4	0.4	1	1	1	0.1	1	1	25	50	0.2	0.5	1	1	0.05	0.05	0.2	0.5	5	1	1	0.5	0.1	0.1	0.1	0.1	0.1	0.001	
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	-	
AEC35TP01	0 - 0.1 m	Fill	29/07/2022	13	<0.4	37	4	18	<0.1	6	12	<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
AEC35TP02	0 - 0.1 m	Fill	29/07/2022	11	<0.4	32	10	17	<0.1	4	24	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP02	0.8 - 0.9 m	Natural	29/07/2022	5	<0.4	4	8	7	<0.1	<1	3	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP03	0.5 - 0.6 m	Natural	29/07/2022	10	<0.4	35	13	15	<0.1	3	7	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP04	0 - 0.1 m	Fill	29/07/2022	10	<0.4	14	12	13	<0.1	3	13	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP05	0.1 - 0.2 m	Fill	29/07/2022	8	<0.4	9	11	12	<0.1	2	9	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP05	0.5 - 0.6 m	Natural	29/07/2022	13	<0.4	24	13	12	<0.1	<1	5	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
BD8/20220729	0.5 - 0.6 m	Natural	29/07/2022	10	<0.4	21	16	13	<0.1	<1	6	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP06	0 - 0.2 m	Fill	28/07/2022	12	<0.4	35	15	20	<0.1	4	18	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP07	0 - 0.1 m	Fill	28/07/2022	11	<0.4	31	11	18	<0.1	3	12	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP08	0.5 - 0.6 m	Natural	29/07/2022	6	<0.4	9	15	10	<0.1	<1	5	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	5.2
AEC35TP08	1.9 - 2 m	Natural	29/07/2022	10	<0.4	5	8	13	<0.1	<1	3	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP09	0 - 0.1 m	Fill	29/07/2022	6	<0.4	24	10	62	<0.1	3	11	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP10	0.1 - 0.2 m	Fill	28/07/2022	6	<0.4	19	11	16	<0.1	2	12	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP11	0 - 0.1 m	Fill	28/07/2022	12	<0.4	25	11	14	<0.1	2	15	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP11	1 - 1.1 m	Natural	28/07/2022	12	<0.4	30	16	16	<0.1	3	16	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP12	0 - 0.1 m	Fill	28/07/2022	9	<0.4	26	8	14	<0.1	4	17	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP13	0 - 0.1 m	Fill	28/07/2022	12	<0.4	41	4	16	<0.1	3	6	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP14	0 - 0.1 m	Fill	28/07/2022	5	<0.4	15	6	12	<0.1	2	10	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP14	0.3 - 0.4 m	Natural	28/07/2022	7	<0.4	35	7	10	<0.1	2	3	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP15	0.3 - 0.4 m	Fill	28/07/2022	8	<0.4	27	5	9	<0.1	1	3	<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
BD4/20220728	0.3 - 0.4 m	Fill	28/07/2022	12	<0.4	41	3	15	<0.1	2	3	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
AEC35TP16	0.2 - 0.3 m	Fill	28/07/2022	6	<0.4	21	4	11	<0.1	2	7	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
BD3/20220728	0.2 - 0.3 m	Fill	28 Jul 2022	18	<0.4	45	7	17	<0.1	<5	10	<20	<50	<0.1	<0.1	<0.1	<0.3	<0.5	<0.5	<0.2	<0.5	<PQL	<1	<1	<0.5	<0.05	<0.05	<0.2	<0.2	<0.1	-	
AEC35TP16 - [TRIPLICATE]	0.2 - 0.3 m	Fill	28/07/2022	9	<0.4	26	5	12	<0.1	2	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
AEC35TP17	0 - 0.15 m	Fill	28/07/2022	9	<0.4	29	3	12	<0.1	2	5	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP18	0.1 - 0.2 m	Fill	28/07/2022	11	<0.4	44	3	15	<0.1	2	6	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35TP18	0.7 - 0.8 m	Natural	28/07/2022	7	<0.4	31	7	8	<0.1	2	3	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	
BD1/20220728	0.7 - 0.8 m	Natural	28 Jul 2022	15	<0.4	55	12	13	<0.1	5.3	7.9	<20	<50	<0.1	<0.1	<0.1	<0.3	<0.5	<0.5	<0.2	<0.5	<PQL	<1	<1	<0.5	<0.05	<0.05	<0.2	<0.2	<0.1	-	
AEC35TP19	0.3 - 0.4 m	Fill	28/07/2022	8	<0.4	41	<1	11	<0.1	1	1	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35HA20	0 - 0.1 m	Fill	21/09/2022	10	<0.4	27	10	16	<0.1	8	13	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35SP-1		stockpile	29/07/2022	11	<0.4	28	10	14	<0.1	3	9	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35SP-2		stockpile	29/07/2022	18	<0.4	15	12	14	<0.1	3	9	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35SP-3		stockpile	29/07/2022	9	<0.4	22	11	16	<0.1	4	10	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	<5	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	
AEC35SP-4		stockpile	29/07/2022	8	<0.4	23	7	15	<0.1	5	16	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	NAD	
Waste Classification Criteria [f]																																
CT1				100	20	100	NC	100	4	40	NC	650	10000	10	288	600	1000	0.8	200	4000	4000	-	8000	40	288	60	<50	4	-	<50	NC	
SCC1				500	100	1900	NC	1500	50	1050	NC	650	10000	18	518	1080	1800	10	200	7200	200	-	14400	72	518	108	<50	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	NC	
CT2				400	80	400	NC	400	16	160	NC	2600	40000	40	1152	2400	4000	3.2	800	16000	16000	-	32000	160	1152	240	<50	16	-	<50	NC	
SCC2				2000	400	7600	NC	6000	200	4200	NC	2600	40000	72	2073	4320	7200	23	800	28800	28800	-	57600	288	2073	432	<50	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	NC	
Excavated Natural Material (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	-	-	-	-	-	-	-	-	-	-	-	-	5 to 9
Absolute maximum concentration				40	1	150	200	100	1	60	300	NC	500	0.5	65	25	15	1	40	-	-	-	-	-	-	-	-	-	-	-	-	4.5 to 10

▨ CT1 exceedance 🟩 TCLP1 and/or SCC1 exceedance 🟨 CT2 exceedance 🟧 TCLP2 and/or SCC2 exceedance 🟥 Asbestos detection

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 E

Contingency Plan and Unexpected Finds Protocol

Contingency Plan and Unexpected Finds Protocol
RAP for AEC 35, 43A Luddenham Road, Orchard Hills
SCAW Package for SMWSA

1. General

Where the site conditions are found to be different than that anticipated during the remediation works, the proposed remediation approach may not be appropriate for the contamination encountered. In such cases the Environmental Consultant is to re-assess the contamination and remediation approach and inform the Site Auditor. Where necessary the Environmental Consultant will prepare an addendum to, or revision of, this RAP. Any addendum or revision is to be reviewed and agreed by the Site Auditor before its implementation.

2. Contingency Plan

This contingency plan has been developed to provide guidance on processes to follow if contamination (or indicators of contamination), other than that included in the remediation strategy (Section 9 of RAP), is encountered during the remediation works. Any such finds shall be surveyed, and the location documented.

Although the site has been subject to previous investigations, there remains a potential for soil contamination to be present between sampled locations. In the event that signs of soil contamination, other than that included in the remediation strategy, are encountered during remediation e.g., evidence of asbestos containing material (ACM), petroleum, or other chemical odours which weren’t previously identified the following protocols will apply:

- The Site Manager is to be notified and the affected area closed off by the use of barrier tape and warning signs;
- The Environmental Consultant is to be notified to inspect the area and assess the significance of the potential contamination and determine extent of remediation works (if deemed necessary) to be undertaken. An assessment report and management plan detailing this information will be compiled by the Environmental Consultant and provided to the Principal Contractor;
- The assessment results together with a suitable management plan shall be provided by the Principal Contractor to the Site Auditor (and Principal if required);
- The agreed management / remedial strategy, based on the RAP and relevant guidelines shall be implemented; and
- All details of the assessment and remedial works are to be included in the site validation report.

3. Unexpected Finds Protocol

This unexpected finds protocol (UFP) has been developed to provide guidance on processes to follow if any unexpected find is encountered during the remediation or future civil and construction works. Any unexpected finds should be surveyed and the location documented.

All site personnel are to be inducted into their responsibilities under this (UFP), which should be included or referenced in the Contractors Environmental Management Plan.

All site personnel are required to report unexpected signs of environmental concern to the Site Manager if observed during the course of their works e.g., presence of potential unexploded ordinance, unnatural staining, potential contamination sources (such as buried drums or tanks) or chemical spills.

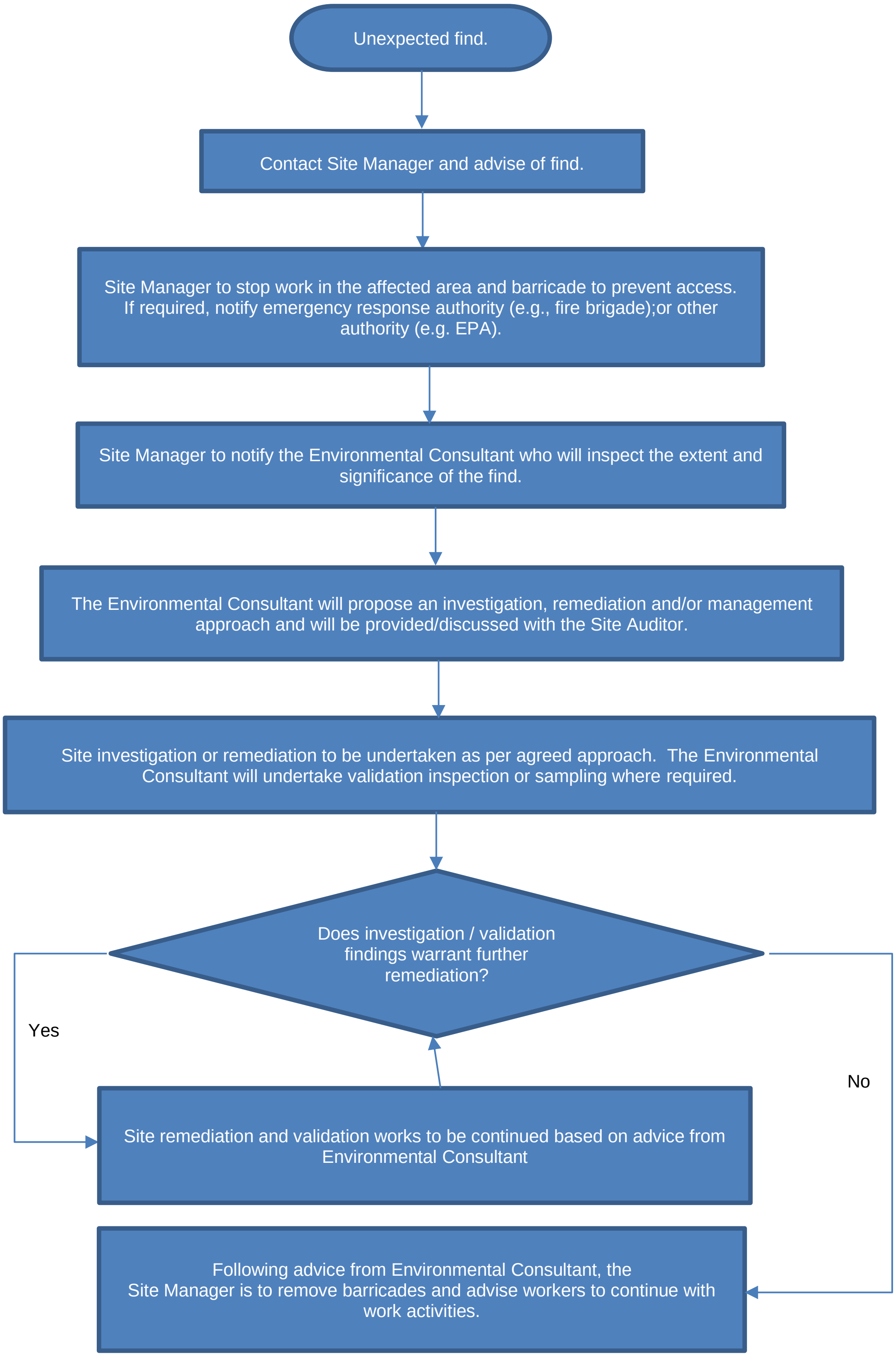
Should signs of concern be observed, the Site Manager, as soon as practical, will:

- Stop work in the affected area and ensure the area is barricaded to prevent unauthorised access;
- Notify authorities needed to obtain emergency response for any health or environmental concerns (e.g., fire brigade);
- Notify any of the authorities that the Contractor is legally/ contractually required to notify (e.g., EPA, Council); and
- Notify the Environmental Consultant.

The Environmental Consultant will assess the extent and significance of the find and develop an investigation, remediation or management approach using (where possible) the principles and procedures already outlined in the RAP. The proposed approach will be discussed and agreed with the Site Auditor prior to implementation.

A flow chart for the unexpected finds protocol is shown below.

Flow Chart for Unexpected Finds Protocol



4. Specific Requirements for Asbestos Contamination

The following specific (additional) requirements are to be adopted in the case that asbestos contamination is identified as an unexpected find during site works:

- An Asbestos Contractor is to be engaged and be responsible for undertaking all asbestos works involving any asbestos contaminated soil and will hold the appropriate licence for the removal of asbestos (issued by SafeWork NSW). A Class A licence will be required for friable asbestos removal work. (A minimum of) a Class B licence will be required for bonded asbestos removal work. The Asbestos Contractor can be the same entity as the Principal Contractor. An asbestos removal control plan (ARCP) is to be prepared for the asbestos removal work by the Asbestos Contractor;
- An Occupational Hygienist is to be engaged independently of the Asbestos Contractor. The Occupational Hygienist is to be a licensed Asbestos Assessor for friable asbestos removal work. The Occupation Hygienist will undertake the following:
  - Review and approve documentation prepared by the Asbestos Contractor;
  - Prepare any WHS plans and advice required by the Contractor;
  - Undertake airborne asbestos monitoring;
  - Undertake clearance inspections and issue clearance certificates;
  - Provide advice and recommendations arising from monitoring and / or inspections; and
  - Notify (the client of) results of any assessments and any observed non-conformances.
- SafeWork NSW is to be notified in writing at least five days before the licensed asbestos removal work commences.

Douglas Partners Pty Ltd

Appendix F

Site Assessment Criteria

Site Assessment Criteria for Soil for AEC35

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' site assessment criteria (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,* 2011 (CRC CARE, 2011).

Where Tier 1 SAC are exceeded, further assessment may be undertaken using other guidelines, as a 'Tier 2' assessment, such as:

- Cardno (NSW/ACT) Pty Ltd, *Human Health and Ecological Risk Assessment, Spoil Re-use Sydney Metro and Western Sydney Airport*, 80021888, Version 003 (HHERA) (Cardno, 2021); and
- CRC *CARE Risk-based Management and Remediation Guidance for Benzo(a)pyrene. Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment* (CRC CARE, 2017).

HHERA includes a set of criteria for a range of spoil-re-use scenarios for SMWSA. As discussed in the HHERA, particular considerations are required for use of criteria from HHERA (e.g., the presence of capping to prevent erosion and / or infiltration; the potential risk to groundwater and / or surface water; etc.). Given the considerations required for spoil reuse, the criteria from HHERA have not been listed herein and the HHERA should be referred to if it is to be used as a source of criteria for a Tier 2 assessment.

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 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
Cyanide (free)	240	1500
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

Contaminant	HIL C for Passive Open Space (mg/kg)	HIL D for Rail Corridor (mg/kg)
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)
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)
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

Contaminant	HSL D (mg/kg)	HSL D (mg/kg)	HSL D (mg/kg)	HSL D (mg/kg)
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 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 10). At the time of preparing this document, screening values were available only for PFOS and PFOA.

Tier 2 criteria comprise:

- Ecological guidelines from CRC CARE (2017) for benzo(a)pyrene (Table 9).

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

- A pH of 5.63;
- A Cation Exchange Capacity (CEC) of 8.17 meq/100g;
- Contamination is assumed to be ‘aged’ based on site history;
- A organic carbon content value of 1% has been used as a default value;
- A clay content of 10% has been used as a relatively conservative value; and
- The state is NSW and the traffic volume is ‘low’.

Clay soils were encountered during investigations, 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	160	230
Nickel	110	180
Chromium III	410	670
Lead	1100	1800
Zinc	350	510
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	105	135
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 Guidelines (Tier 2) from CRC CARE (2017)

Contaminant	Public Open Space Ecological Guideline for Passive Open Space (mg/kg)	Commercial and Industrial Ecological Guideline for Rail Corridor (mg/kg)
Benzo(a)pyrene	33	172

Table 10: 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 11. Predominantly clay soils were encountered during investigations and, so, management limits for fine soils have been adopted.

Table 11: 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

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Site Assessment Criteria for Groundwater for AEC35

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 local 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).
- Freshwater water quality guidelines from NEMP (Table 2). At the time of preparing this document, guideline values were available only for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). Guidelines are for 99% species protection to account for bioaccumulation in a slightly-to-moderately impacted system.

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 (Table 1) 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	
Aluminium	0.8 for pH<6.5
Arsenic (III)	24
Arsenic (V)	13
Boron	940
Cadmium	0.2 *
Chromium (III)	3.3 *
Chromium (VI)	1.0
Cobalt	1.4
Copper	1.4
Lead	3.4 *
Manganese	1900
Mercury (inorganic)	0.06
Molybdenum	34
Nickel	11 *
Selenium (total)	5
Vanadium	6
Zinc	8 *
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

Contaminant	Fresh Water DGV (µg/L)
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
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
Ammonia	
Ammonia (as total ammonia nitrogen)	900

Contaminant	Fresh Water DGV (µg/L)
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
1,4-dichlorobenzene	60
Chlorobenzene	55
1,1,1-Trichloroethane	270
Trichloroethene	330
1,1,2,2-Tetrachloroethane	400
Carbon disulfide	20
Pentachloroethane	80

Notes: * May be adjusted for hardness

Table 2: Water Quality Guidelines from NEMP

Contaminant	Freshwater Water Quality Guidelines (µg/L)
PFOS	0.00023 *
PFOA	19

Notes: * Guideline value around laboratory limit of reporting offered by commercial laboratories.

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 3 and 4). 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). Where groundwater levels are less than 2 m from the (proposed / final) ground surface, the laboratory practical quantitation limits will be adopted for initial screening purposes;
- Health-based guidelines for recreational waters (Table 5). 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 6) 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 5.

Table 3: 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 4: 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 5: 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		
Aluminium	-	200
Arsenic	100	-
Barium	20000	-
Beryllium	600	-
Boron	40 000	
Cadmium	20	-
Chromium (VI)	500	-
Copper	20 000	1000
Iron	-	300
Lead	100	-
Manganese	5000	-
Mercury	10	-
Molybdenum	500	-
Nickel	200	-
Selenium	100	-
Zinc	-	3000

Contaminant	Health-based Guideline Value (µg/L)	Aesthetic Guideline Value (µg/L)
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	-
Malathion	700	-
Methyl parathion	7	-
Mevinphos (Phosdrin)	50	-
Monocrotophos	20	-
Omethoate	10	-
Pyrazophos	200	-

Contaminant	Health-based Guideline Value (µg/L)	Aesthetic Guideline Value (µg/L)
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	-
Other Inorganics		
Fluoride	15000	-
Sulfate	5 000 000	250 000
Chloride	-	250 000
Ammonia (as NH3)	-	500
Sodium	-	180000
Nitrate (as nitrate)	500 000	-
Nitrite (as nitrite)	30 000	-

Table 6: 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

Data Quality Objectives

Data Quality Objectives
RAP for AEC 35, 43A Luddenham Road, Orchard Hills
SCAW Package for SMWSA

1. Introduction

The objective of the validation plan is to demonstrate that the site has been made suitable for the proposed development, and to provide information on any environmental impacts which may have resulted from the works.

The validation assessment will be conducted with reference to the seven step data quality objectives (DQO) as outlined in NEPC (2013), described below. The DQO in NEPC (2013) are in turn, based on the DQO process outlined in USEPA (2006), and associated guidelines.

2. Data Quality Objectives

Table 1: Data Quality Objectives

Step	Summary
1: State the problem	The site requires remediation and validation of remediation in order to render it suitable for the proposed land use. The objective of the validation plan is to confirm the successful implementation of this remediation action plan. A conceptual site model (CSM) for the proposed development has been prepared in the RAP.
2: Identify the decisions / goal of the study	The CSM identifies the contaminants of potential concern (CoPC) and the likely impacted media. The key CoPC that was found to be impacting the site is total recoverable hydrocarbons (TRH). The validation sampling results will be compared against the RAC. The preferred remediation strategy as outlined in the RAP is the excavation and disposal of contaminated soils (and to reuse any excavated soil that is not deemed to be contaminated). The success of the remediation and subsequent validation will be based on a comparison of the analytical results for all CoPC to the adopted RAC and, if necessary, compared to the 95% UCL of the mean concentrations.
3: Identify the information inputs	Relevant inputs to the decision include: • The CSM, identifying the CoPC and affected media; • Analysis using NATA accredited laboratories and methods, where possible; • Field and laboratory QA / QC data to assess the suitability of the environmental data for the validation assessment; and • Results compared with the RAC.

Step	Summary
4: Define the study boundaries	The lateral boundaries of the site are shown on Drawing AEC35-01. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment, site observations and previous investigations used to inform the RAP.
5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with RAC. Initial comparisons will be with individual results then, where required, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL)) to assess potential risks posed by the site contamination. Quality control results are to be assessed according to their relative percent difference (RPD) values. For field and laboratory duplicate results, RPDs should generally be below 30%; for field blanks, 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 exceed the RAC and pose a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Contaminants at the site and statistical analysis of data complies with the RAC 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.
7: Optimise the design for obtaining data	Sampling design and procedures to be implemented to optimise data collection for achieving the DQOs include the following: • Sampling frequencies in accordance with the RAP; • Analysis for the CoPC at NATA accredited laboratories using NATA endorsed methods will be used to perform laboratory analysis whenever possible; and • Adequately experienced environmental scientists / engineers will conduct field work and sample analysis interpretation.

3. 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.

USEPA. (2006). *Guidance on systematic planning using the data quality objectives process, EPA QA/G-4.* Washington DC.: United States Environmental Protection Agency, Office of Environmental Information.

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Appendix H

Site Management Plan

Site Management Plan
RAP for AEC35, 43A Luddenham Road, Orchard Hills
SCAW Package for SMWSA

1. Introduction

This general site management plan (SMP) has been developed to minimise potentially adverse impacts on the environment, and worker and public health as a result of the proposed remediation works.

The Contractor must have in place a construction environmental management plan (CEMP) (or similar) which is specific to the equipment used for the remediation and the proposed methods to be adopted by the Contractor. This SMP has been prepared to augment the Contractor's CEMP and contains general details for aspects of the work, as per reporting requirements for a remediation action plan (RAP) under NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

Works are to comply with the Environmental Protection Licence (21695) for the SCAW project.

Apart from the management principles outlined in this SMP, the Contractor must also ensure compliance with all relevant environmental legislation and regulations, including (but not limited to) the following:

- *Contaminated Land Management Act 1997* NSW (CLM Act);
- *Protection of the Environment Operations Act 1997* NSW (POEO Act);
- *Protection of the Environment Legislation Amendment Act 2011* NSW;
- *Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation 2008* NSW;
- *Environmentally Hazardous Chemicals Act 1985* NSW;
- *Environmental Offences and Penalties Act 1989* NSW;
- *Pesticide Act 1999* NSW and *Pesticides Regulation 2017*; and
- *Work Health and Safety Act 2011* NDSW (WHS Act) and *Work Health and Safety Regulations 2011* NSW.

2. Roles and Responsibilities

With respect to contamination land management at the site, Transport for NSW (TfNSW) is the Principal, CPBUI JV is the Principal Contractor; and Melissa Porter (of Senversa) is the Site Auditor accredited by NSW EPA under the CLM Act.

The Principal will retain the overall responsibility for ensuring this RAP is appropriately implemented, however, the actual implementation of the RAP will be conducted by the Principal Contractor. Roles and responsibilities for implementing this RAP are discussed below.

2.1 Principal Contractor

The Principal Contractor ('the Contractor') will be the party responsible for daily implementation of this RAP and shall fulfil the responsibilities of the Contractor as defined by SafeWork NSW. It is noted that the Contractor may appoint appropriately qualified sub-contractors or sub-consultants to assist in fulfilling the requirements of the procedures. The Contractor will appoint a Site Manager(s).

In addition to the implementation of the RAP it will be the Contractors responsibility to:

- Obtain / ensure relevant sub-contractors obtain specific related approvals as necessary to implement the earthworks including permits for removal of asbestos-containing material, SafeWork NSW notification etc.;
- Develop or request and review any site plans to manage the works to be conducted;
- Ensure that all remediation works and other related activities are undertaken in accordance with this RAP;
- Maintain all site records related to the implementation of this RAP;
- Ensure sufficient information is provided to engage or direct all required parties, including sub-contractors, to implement the requirements of the RAP other than those that are the direct responsibility of the Contractor;
- Manage the implementation of any recommendation made by those parties in relation to work undertaken in accordance with the RAP;
- Inform, if appropriate, the relevant regulatory authorities of any non-conformances with the procedures and requirements of the RAP in accordance with the procedures outlined in this document;
- Retain records of any contingency actions;
- On completion of the project, to review the RAP records for completeness and update as necessary; and
- Recommend any modification to general documentation which would further improve the environmental outcomes of this RAP.

The Principal Contractor will be responsible for ensuring the contamination testing and management is carried out in accordance with the Environmental Protection Licence (21695).

2.2 Sub-contractors

All sub-contractors will be inducted onto the site, informed of their responsibilities in relation to this RAP and sign their agreement to abide by the RAP requirements. Where necessary, sub-contractors will also be trained in accordance with the requirements of this document. All sub-contractors must conduct their operations in accordance with the RAP as well as all applicable regulatory requirements.

2.3 Environmental Consultant

The Environmental Consultant will provide advice on implementing the RAP. The Environmental Consultant will be responsible for:

- Undertaking any required assessments where applicable (e.g., waste classification, validation, etc.);
- Providing advice and recommendations arising from monitoring and/or inspections, including unexpected finds; and
- Notifying (the client of) any results of assessments, and any observed non-conformances.

2.4 Site Workers

All workers on the site are responsible for observing the requirements of this RAP and other management plans. These responsibilities include the following:

- Being inducted on the site and advised of the general nature of the remediation/environmental issues at the site;
- Being aware of the requirements of this plan;
- Wearing appropriate personal protective equipment (PPE);
- Only entering restricted areas when permitted; and
- Requesting clarification when unclear of requirements of this or any other plans (e.g., safe work method statements (SWMS)).

3. Water Management

3.1 Stormwater

Stormwater must be managed during the remediation works such that potential adverse impacts from surface runoff (e.g., cross contamination, mobilisation of contaminants in soil particles, etc.) are appropriately mitigated. Discharges of water must be in accordance with the Environmental Protection Licence (21695).

The Contractor will take appropriate measures which may include:

- Construction, where necessary, of stormwater diversion channels, bunding and linear drainage sumps with catch pits in and around the remediation areas to divert stormwater from the contaminated areas;
- Provision of appropriately located sediment traps including geotextiles; and
- Discharge of excess water in excavations / low points on a regular basis to limit the potential for flooding.

Where water is not suitable for discharge to the stormwater system, a liquid waste contractor may be required to remove the water for disposal in accordance with regulatory requirements.

3.2 Dewatering of Excavations

Any runoff or seepage water accumulated in site excavations that requires removal must initially be sampled and tested for suspended solids, pH and any contaminants of potential concern (CoPC) as identified by the Environmental Consultant. The options for management of excavation pump-out water, dependent upon the test results, are for disposal of the water as follows:

- Discharge to stormwater with prior approval from Council. Provided the test results comply with relevant ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018), or any other compliance requirements stipulated by Council. The Environmental Consultant must consider the most appropriate criteria to be used; or
- Discharge to sewer, as industrial trade wastewater, with prior approval from Sydney Water. This option would require the analysis of a larger list of analytes, and compliance with the Sydney Water acceptance standards and takes time to obtain relevant approvals; or
- Pumping by a liquid waste contractor for removal of the water off-site, in accordance with regulatory requirements.

Note that, depending on the type and scale of the dewatering required, a permit (water use approval) may need to be obtained through NSW Water.

4. Soil Management Plan

The Contractor will develop a plan to mitigate cross contamination as part of the CEMP to be implemented throughout the works.

4.1 Excavation and Stockpiling of Contaminated Material

Contaminated material shall be excavated and stockpiled at a suitably segregated location(s) away from sensitive areas (e.g., water bodies, drainage lines, stormwater pits, etc.) and ongoing excavations, and in a manner that will not cause nuisance to the neighbouring properties. Soil stockpiles are to be managed as follows:

- An impermeable membrane such as plastic sheeting should be provided at the surface by the Contractor prior to stockpiling. Plastic sheeting should be taped at joins, as necessary;
- All stockpiles of contaminated material shall be surrounded by star pickets and marking tape or other suitable material to clearly delineate their boundaries;
- Stockpiles shall be lightly conditioned by sprinkler or covered by geotextile or similar cover to prevent dust generation;
- Stockpiles impacted, or potentially impacted, with asbestos must be covered by geotextile;
- Any stockpile to remain on-site overnight should be adequately secured in order to reduce the risk of sediment runoff;
- Measures should be taken by the Contractor to prevent the migration of stockpile materials (i.e., perimeter bunds, hay bales, silt fences, etc.);

- Should the stockpile remain on-site for over 24 hours, geotextile silt fences must be erected to prevent losses by surface erosion; and
- A record of stockpile locations (stockpile register), dimensions, descriptions, environmental controls, etc. should be maintained by the Contractor.

All movement of soil within the site and off-site is to be tracked by the Contractor, from cradle to grave. Copies of tracking records must be provided to the Environmental Consultant upon request.

4.2 Loading and Transport of Contaminated Material

Transport of contaminated material from the site shall be via a clearly delineated haul route and this route shall be used exclusively for entry and egress of vehicles used to transport contaminated materials within and away from the site. The proposed waste transport route (to be determined by the Contractor) will be notified to Council and truck dispatch shall be logged and recorded by the Contractor for each load leaving the site. A record of the truck dispatch will be provided to the Environmental Consultant.

All haulage routes for trucks transporting soil, materials, equipment or machinery to and from the site should be selected to meet the following objectives:

- Comply with all road traffic rules;
- Minimise noise, vibration and dust to adjacent premises; and
- Utilise State roads and minimise use of local roads as far as practicable.

The remediation work will be conducted such that all vehicles:

- Conduct deliveries of soil, materials, equipment or machinery only during the specified hours of remediation;
- Have securely covered loads to prevent any dust or odour emissions during transportation; and
- Exit the site in a forward direction.

In addition, measures will be implemented to ensure no contaminated material is spilled onto public roadways or tracked off-site on vehicle wheels. Roadways will be kept clean throughout the remediation works and will be broomed, if necessary, to achieve a clean environment.

All loads will be securely covered and may be lightly wetted, if required, to ensure that no materials or dust are dropped or deposited outside or within the site. Prior to exiting the site each truck should be inspected by Contractor personnel and either noted as clean (wheels and chassis) or broomed prior to leaving the site. Any soil spilled onto surrounding streets will be cleaned by mechanical or hand methods, on a daily basis.

Removal of waste materials from the site shall only be carried out by contractors holding the appropriate license(s), consent or approvals to dispose the waste materials according to the waste classification and with the appropriate approvals obtained from the EPA, were required.

5. Noise and Vibration Control Plan

All equipment and machinery should be operated in an efficient manner to minimise the emission of noise. The use of any plant and/or machinery should not cause unacceptable vibrations to nearby properties and should meet Council requirements.

6. Dust Control Plan

Dust emissions must be confined within the site boundary as far as is practicable. The following example dust control procedures could be employed to comply with this requirement, as necessary:

- Erection of dust screens around the perimeter of the site (as applicable);
- Securely covering all loads entering or exiting the site;
- Use of water sprays across the site to suppress dust;
- Covering of all stockpiles of contaminated soil remaining on site more than 24 hours;
- Include wheel wash (if applicable); and
- Keeping excavation and stockpile surfaces moist.

Regular checking of the fugitive dust issues is to be undertaken. Remedial measures are to be undertaken to rectify any cases of excessive dust.

7. Odour Control Plan

No odours should be detected at any boundary of the site during remediation works by an authorised Council Officer relying solely on sense of smell. The following example procedures could be employed to comply with this requirement as required:

- Use of appropriate covering techniques such as plastic sheeting, polythene or geotextile membranes to cover excavation faces or stockpiles;
- Fine spray of water and/or hydrocarbon mitigating agent on the impacted areas/materials;
- The use of water spray, as and when appropriate;
- Use of sprays or sprinklers on stockpiles or loads to lightly condition the material;
- If required, restrict uncovered stockpiles to appropriate sizes to minimise odour generation;
- Ceasing works during periods of inclement weather such as high winds or heavy rain;
- Regular checking of the fugitive dust and odour issues to ensure compliance. Undertake immediate remediation measures to rectify any cases of excessive dust or odour (e.g., use of misting sprays or odour masking agent); and
- Adequate maintenance of equipment and machinery to minimise exhaust emissions.

8. Work Health and Safety Plan

8.1 General

It is the Remediation Contractor's responsibility to devise a SWMS[1] (or series thereof, for various respective tasks) and to implement proper controls that enable the personnel undertaking the remediation to work in a safe environment. This RAP and SMP does not relieve the Remediation Contractor or other contractors of their ultimate responsibility for occupational health and safety of their workforce and to prevent contamination of areas outside the ‘remediation’ workspace. This RAP and SMP sets out general procedures and the minimum standards and guidelines for remediation that will need to be used in preparing the safe work method statement.

This work health safety plan (WHSP) has been prepared with refence to CRC CARE *Remediation Action Plan: Implementation - Guideline on Health and Safety* (CRC CARE, 2019). The requirements of this WHSP must be incorporated into the Contractor’s SWMS.

All site work must be undertaken in a controlled and safe manner with due regard to potential hazards, training and safe work practices. To attain this the SWMS developed by the Contractor must comply with policies specified in the *Work Health and Safety Regulation 2011*.

All appropriate permits, licences and notifications required for the remediation activities must be obtained prior to the commencement of remediation works.

8.2 Site Access

Appropriate fencing and signage must be installed around and within the site to prevent unauthorised access and restrict access to remediation areas and/or excavations. Access restrictions and administrative arrangements for management of entry of workers or related personnel on site is the responsibility of the Contractor.

Any existing pits or unstable areas on site that may generate potential safety, or operational risk should be demarcated and taped off, with appropriate rectification action undertaken (e.g., backfilling of pits).

8.3 Personnel and Responsibilities

Before undertaking works on site, all personnel will be made aware of the officer responsible for implementing WHS procedures. All personnel must read and understand this WHSP and over-arching SWMS prior to commencing site works and sign a statement to that effect. Contractors employed at the site will be responsible for ensuring that their employees are aware of, and comply with, the requirements of this WHSP and Contractor’s SWMS.

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[1] Either a SWMS or construction environmental management plan (CEMP), or other equivalent document incorporating health and safety aspects of the proposed remedial works.

8.4 Chemical and Physical Hazards

The risks associated with chemical soil contaminants to site personnel and workers involved in the remediation are considered to be low due to the recorded soil and groundwater concentrations in the DSI.

The following physical hazards are associated with conditions that may be created during remediation works:

- Heat exposure;
- Excavations;
- Buried services;
- Noise;
- Dust;
- Electrical equipment;
- Heavy equipment and truck operation; and
- Asbestos.

Safe work practices must be employed to manage the physical risks identified above.

For the most part, the chemical and physical hazards can be managed through appropriate demarcation, access controls and the use of appropriate PPE.

8.5 Safe Work Practices

The appropriate safe work practices should be clearly defined by the Contractor in their SWMS. As a minimum, all personnel on site will be required to wear the following PPE:

- Steel-capped boots (mandatory);
- High visibility clothing / vest (mandatory);
- Safety glasses or safety goggles with side shields requirements (as necessary);
- Hard hat (as necessary);
- Appropriate respiratory and protective equipment for any works involving asbestos; and
- Hearing protection when working in the vicinity of machinery or plant equipment if noise levels exceed exposure standards (as necessary).

Each item of PPE should meet the corresponding relevant Australian Standard(s).

Specific safe work practices will be adopted when working with asbestos, in accordance with (but not limited to) the following codes of practice:

- SafeWork NSW *Code of Practice, How to Manage and Control Asbestos in the Workplace* (SafeWork NSW, 2019a)

- SafeWork NSW *Code of Practice, How to Safely Remove Asbestos* (SafeWork NSW, 2019b);
- WorkCover NSW *Managing Asbestos in or on Soil* (WorkCover NSW, 2014);
- NOHSC *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Ed* (NOHSC, 2005).

9. Remediation Schedule and Hours of Operation

The remediation works will be conducted within the days and hours specified the Environmental Protection Licence (21695).

10. Response to Incidents

The key to effective management of incidents is the timely action taken before any situation reaches a reportable or critical level. Therefore, surveillance activities are extremely important, and should be conducted for the measures prescribed herein and any other measures prescribed in any additional environmental management plan developed subsequently. During construction activities on the site, the following inspection or preventative actions should be performed by the Contractor:

- Regular inspection of works;
- Completion of routine environmental checklists and follow-up of non-compliance situations;
- Maintenance and supervision on-site; and
- An induction process for site personnel involved in the remediation works that includes relevant information on the contamination status of the site, the remediation works being undertaken, worker health and environmental protection requirements, and ensures that all site personnel are familiar with the site emergency procedures.

An emergency response plan will be in place for all aspects of site works. Any emergency will be reported immediately to the site office and / or the Site Manager (and Safety Officer), and the appropriate emergency assistance should be sought. The Site Manager should be responsible for initiating an immediate emergency response using the resources available on the site. Where external assistance is required, the relevant emergency services should be contacted. A table such as Table 1 below, containing contact details for key personnel who may be involved in an environmental emergency response should be completed and be readily available to personnel at all times. The table should be completed, and thereafter amended, as required. Contact details for key utilities are included in the event of needing to respond to incidents.

The Contractor will be responsible for ensuring that site personnel are aware of the emergency services available and the appropriate contact details. A site Safety Officer should be contactable, or available, on-site during remediation and development works.

Table 1: Summary of Roles and Contact Details

Role	Personnel / Contact	Phone Contact Details
Principal		
Principal’s Representative		
Site Manager		
Principal Contractor		
Site Office		
Environmental Consultant		
Regulator	NSW EPA (pollution line and general enquiries)	131 555
Utility Provider	Water (Sydney Water Corporation)	13 20 92
Utility Provider	Power (Ausgrid)	13 13 88
Utility Provider	Gas (Jemena Limited)	131 909
Utility Provider	Telecommunications (Telstra Corporation Limited)	13 22 03
Utility Provider	Telecommunications (Optus)	1800 505 777
Utility Provider	Telecommunications (NBN Co Limited)	1800 687 626

11. Community Relations

It is noted that Sydney Metro has undertaken, and will have ongoing, stakeholder and community consultation for the overall SMWSA project. An overview of this consultation is provided in Chapter 5 of the *Sydney Metro – Western Sydney Airport Environmental Impact Statement*.

For the SCAW project, the community are able to contact the project communications team through the following:

- Email: enquiries@cpbuijv.com.au;
- Website: sydneymetro.info;
- Phone: 1800 717 703. This phone number has been set up by Sydney Metro and phone calls relating to SCAW are sent to the SCAW project communication team; and
- Mail: PO Box K659, Haymarket NSW 1240.

12. References

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

CRC CARE. (2019). *Remediation Action Plan: Implementation - Guideline on Health and Safety.* National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

NOHSC. (2005). *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Ed.* Canberra, April 2005, NOHSC:3003: National Occupational Health and Safety Commission, Commonwealth of Australia.

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

SafeWork NSW. (2019a). *Code of Practice, How to Manage and Control Asbestos in the Workplace.* August 2019.

SafeWork NSW. (2019b). *Code of Practice, How to Safely Remove Asbestos.* August 2019: SafeWork NSW, NSW Government.

WorkCover NSW. (2014). *Managing Asbestos in or on Soil.* March 2014: WorkCover NSW, NSW Government.

Douglas Partners Pty Ltd