



**REPORT TO
NSW HEALTH INFRASTRUCTURE**

**ON
REMEDIATION ACTION PLAN**

**FOR
PROPOSED NEW WARRAWONG COMMUNITY
HEALTH CENTRE DEVELOPMENT**

**AT
85-91 COWPER STREET, WARRAWONG, NSW**

Date: 22 December 2023

Ref: E34300PT2rpt4-RAP

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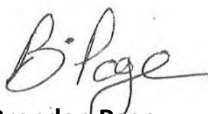
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Executive Summary

NSW Health Infrastructure ('the client') commissioned JK Environments (JKE) to prepare a Remediation Action Plan (RAP) for the proposed New Warrawong Community Health Centre at 85-91 Cowper Street, Warrawong, NSW. For the purpose of the RAP, the proposed development area is referred to as 'the site'. The site location is shown on Figure 1 in Appendix A.

The project scope for the Warrawong Community Health Centre includes:

- Demolition of existing Building D, Building E, and Building H, along with nearby retaining walls, gazebos and pathways;
- Construction of a new building (part single storey and part two storey) with a gross floor area of around 2,000m², to accommodate a number of community health related services;
- Alterations and additions to carparking and access, including expand the south carpark; and
- Ancillary infrastructure and works, including service connections, landscaping, and signage.

Previous investigations have identified bonded asbestos containing material (ACM) in soil at one location (BH12) at a concentration that exceeded the adopted health screening level (HSL) based site assessment criteria (SAC), and at the ground surface in one other location. The potential for additional occurrences of bonded ACM in/on soil has been acknowledged based on the fact that the fill/soil contains inclusions of demolition rubble. A summary of previous investigations is provided in Section 2.

This RAP has been prepared to demonstrate that the site can be made suitable for the proposed community health centre development via remediation, with regards to Chapter 4 of State Environmental Planning Policy (Resilience and Hazards) 2021. It is understood that the RAP will support the Review of Environmental Factors (REF) for the proposed development.

The proposed remediation strategy includes excavation of the asbestos-contaminated fill from an area at BH12, and disposal of the excavated material to a licensed landfill facility. Based on the available data, the nominated remediation area covers approximately 100m² and it is anticipated that approximately 30m³ of soil will be remediated via the excavation and off-site disposal method. In addition, as parts of the site have been inaccessible to date and further investigation is required when access becomes available (i.e. after demolition of buildings). Additional sampling around BH12 is also proposed under the provisions of the RAP in order to better assess the potential extent of asbestos in soil in this area. Data from this investigation will be used to establish whether any additional remediation is required. The pre-remediation (data gap) investigation requirements are outlined in Section 6.3 of this RAP.

A construction/remediation-phase Asbestos Management Plan (AMP) will be in place to manage potential asbestos risks to workers and adjacent land users.

The RAP also includes contingencies for addressing additional contamination should it be identified as an unexpected find or during the additional investigation work.

We are of the opinion that the site can be made suitable for the proposed development via remediation and the implementation of this RAP. A validation report is to be prepared on completion of remediation activities and submitted to the determining authority to demonstrate that the site is suitable for the proposed use following completion of remediation/validation. If contaminated material is capped on site (e.g. if the capping contingency needs to be implemented), a long-term Environmental Management Plan (EMP) will also be prepared as part of the validation documentation.

JKE has undertaken a preliminary assessment of the remediation Category with regards to the Category 1 remediation triggers in Clause 4.8 of SEPP Resilience and Hazards 2021. We consider that none of the Category 1 triggers have been met and therefore we have assessed that the remediation falls within Category 2. This should be confirmed by the client's expert planner.



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Abbreviations

Asbestos Fines/Fibrous Asbestos	AF/FA
Ambient Background Concentrations	ABC
Added Contaminant Limits	ACL
Asbestos Containing Material	ACM
Area of Environmental Concern	AEC
Australian Height Datum	AHD
Acid Sulfate Soil	ASS
Above-Ground Storage Tank	AST
Before You Dig Australia	BYDA
Below Ground Level	BGL
Benzene, Toluene, Ethylbenzene, Xylene	BTEX
Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene	BTEXN
Contaminated Land Management	CLM
Contaminant(s) of Potential Concern	CoPC
Chain of Custody	COC
Conceptual Site Model	CSM
Data Quality Indicator	DQI
Data Quality Objective	DQO
Detailed Site Investigation	DSI
Ecological Investigation Level	EIL
Ecological Screening Level	ESL
Environmental Management Plan	EMP
Excavated Natural Material	ENM
Environment Protection Authority	EPA
Environmental Site Assessment	ESA
Fibre Cement Fragment(s)	FCF
Health Investigation Level	HIL
Health Screening Level	HSL
JK Environments	JKE
JK Geotechnics	JKG
Lab Control Spike	LCS
Light Non-Aqueous Phase Liquid	LNAPL
Map Grid of Australia	MGA
National Association of Testing Authorities	NATA
National Environmental Protection Measure	NEPM
Organochlorine Pesticides	OCP
Organophosphate Pesticides	OPP
Polycyclic Aromatic Hydrocarbons	PAH
Photo-ionisation Detector	PID
Protection of the Environment Operations	POEO
Practical Quantitation Limit	PQL
Quality Assurance	QA
Quality Control	QC
Remediation Action Plan	RAP
Review of Environmental Factors	REF
Relative Percentage Difference	RPD
Site Assessment Criteria	SAC
Sampling, Analysis and Quality Plan	SAQP
State Environmental Planning Policy	SEPP
Site Specific Assessment	SSA
Source, Pathway, Receptor	SPR
Standing Water Level	SWL
Total Recoverable Hydrocarbons	TRH



Upper Confidence Limit	UCL
Underground Storage Tank	UST
Virgin Excavated Natural Material	VENM
Work Health and Safety	WHS

Units

Litres	L
Metres BGL	mBGL
Metres	m
Millilitres	ml or mL
Milligrams per Kilogram	mg/kg
Milligrams per Litre	mg/L
Parts Per Million	ppm
Percentage	%
Percentage weight for weight	%w/w

1 INTRODUCTION

NSW Health Infrastructure ('the client') commissioned JK Environments (JKE) to prepare a Remediation Action Plan (RAP) for the proposed New Warrawong Community Health Centre at 85-91 Cowper Street, Warrawong, NSW. For the purpose of the RAP, the proposed development area is referred to as 'the site'. The site location is shown on Figure 1 in Appendix A.

This RAP has been prepared to demonstrate that the site can be made suitable for the proposed community health centre development via remediation, with regards to Chapter 4 of State Environmental Planning Policy (Resilience and Hazards) 2021¹ (formerly known as SEPP55). It is understood that the RAP will support the Review of Environmental Factors (REF) for the proposed development.

JKE has previously undertaken several phases of investigation at the site and within the wider hospital property. The investigations identified bonded/non-friable asbestos containing material (ACM) in/on soil. Data gaps also exist due to access constraints associated with the existing buildings. A summary of relevant information from these investigations is included in Section 2.

Our geotechnical division, JK Geotechnics (JKG), has undertaken a geotechnical investigation for the proposed development and the geotechnical report should be read in conjunction with this RAP (JKG Project Ref: 34300LX).

1.1 Proposed Development Details

The project scope for the Warrawong Community Health Centre includes:

- Demolition of existing Building D, Building E, and Building H, along with nearby retaining walls, gazebos and pathways;
- Construction of a new building (part single storey and part two storey) with a gross floor area of around 2,000m², to accommodate a number of community health related services;
- Alterations and additions to carparking and access, including expand the south carpark; and
- Ancillary infrastructure and works, including service connections, landscaping, and signage.

There is an existing childcare centre operating in the northern part of the site. The supplied architectural drawings indicate that this childcare centre use will not continue as part of the proposed development.

1.2 Aims and Objectives

The goal of the remediation is to reduce contamination-related risks to human health and the environment, and to render the site suitable for the proposed development from a contamination viewpoint. The primary aim of the remediation is to mitigate risks from the occurrence of asbestos in soil.

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

The objectives of this RAP are to:

- Document the requirements for pre-remediation (data gap) investigation;
- Provide a rationale to support the extent of the proposed remediation and the remedial/site validation approach based on the current dataset;
- Document a methodology that is to be implemented to remediate and validate the site; and
- Document a strategy that can be implemented in the event of uncovering any unexpected, contamination-related finds, and provide other relevant contingency plans.

1.3 Scope of Work

The RAP was prepared generally in accordance with a JKE proposal (Ref: EP59630PT) of 3 November 2023 and written acceptance from Savills acting on behalf of the client of 7 November 2023. The scope of work included a review of the previous JKE reports, review of the available proposed development details, consultation with the client and their nominated project manager, and preparation of a RAP.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)², Consultants Reporting on Contaminated Land (2020)³ guidelines, other guidelines made under or with regards to the Contaminated Land Management Act (1997)⁴ and SEPP Resilience and Hazards 2021. A list of reference documents/guidelines is included in Appendix F.

² National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)*. (referred to as NEPM 2013)

³ NSW EPA, (2020). *Consultants reporting on contaminated land, Contaminated Land Guidelines*. (referred to as Consultants Reporting Guidelines)

⁴ Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

2 SITE INFORMATION

2.1 Previous Investigations

JKE has undertaken several phases of investigation on the wider hospital property, including at the site. Relevant information is summarised in the table below. Reference can also be made to Figure 1 in Appendix A which shows the various investigation boundaries, and to the Figures 2 and 3 for the investigation locations and notable contamination-related data.

Table 2-1: Summary of Previous Investigations and Relevant Findings

Investigation phase	Relevant findings to the site
PSI, JKE 2022 ⁵	JKE previously undertook a Preliminary Site Investigation (PSI) across the site and southern portion of the wider hospital property in 2022. The PSI 2022 included a review of site history information, a site inspection, soil sampling from 37 boreholes and groundwater sampling from three monitoring wells. Of these locations, 35 boreholes and three monitoring wells were located within the site. The following areas of environmental concern (AEC) were identified and are applicable to the site: fill material; use of pesticides; hazardous building materials in former and existing buildings; one above ground storage tank (AST) on site; and fuel storage just west of the site boundary, including two underground storage tanks (USTs) (see Figure 2). The USTs were understood to have been previously abandoned in-situ. The boreholes on the site encountered fill materials (i.e. historically imported/placed soils) to depths of approximately 0.3m below ground level (BGL) to 2.6mBGL, underlain by clayey residual soils and/or latite bedrock. The fill contained inclusions of igneous, ironstone, sandstone and siltstone gravel, shale fragments, slag, concrete, brick and metal fragments, coal, ash, and root fibres. There were no fibre cement fragments (FCF)/ asbestos containing materials (ACM) identified in any of the bulk asbestos quantification field screening samples. One surficial FCF was encountered on the site surface during the site inspection, however this was found not to contain asbestos. Asbestos as ACM was detected in one soil sample on the site (from BH12) at a concentration above the health screening level (HSL) site assessment criteria (SAC). The concentration exceeded the most sensitive HSL-A SAC of 0.01%w/w and the less sensitive HSL-C SAC of 0.02%w/w applicable to secondary schools and open spaces. Total recoverable hydrocarbons (TRH) were encountered in surficial fill/soil in BH34 in the southern end of the site and traces of TRH were also encountered in groundwater. The TRH detections were considered likely to be associated with a medium-heavy fuel source such as diesel or kerosene. Copper and zinc were reported above the ecological SAC in groundwater. The PSI 2022 recommended an asbestos management plan (AMP) be prepared and implemented for the current land use/operations, in addition to further investigation via a Detailed Site Investigation (DSI). The PSI also recommended the following: 1. Prepare a Sampling, Analysis and Quality Plan (SAQP) for the DSI; 2. Undertake a DSI in accordance with the SAQP; and 3. Develop and implement a RAP based on the combined findings of the PSI and DSI. Any requirements documented in a RAP are to be implemented and the site is to be remediated and validated.

⁵ JKE, (2022). *Report to Health Infrastructure on Preliminary Site Investigation for Proposed New Warrawong Community Health Centre Development at 85-91 Cowper Street, Warrawong, NSW.* (Ref: E34300PT2rpt DRAFT, dated 10 November 2022) (referred to as PSI 2022)

Investigation phase	Relevant findings to the site
PSI, JKE 2023a ⁶	JKE previously undertook a PSI across the western portion of the wider section of the hospital property in 2023. The PSI 2023 included a review of site history information, a site inspection, soil sampling from 15 boreholes and two monitoring wells across the western portion of the wider hospital property. The following AEC were identified: fill material; use of pesticides; hazardous building materials in former and existing buildings; and fuel storage in a down-gradient section of the wider hospital property (this is the same fuel storage as noted above for the PSI 2022). None of the PSI 2023 boreholes were positioned on the site. The boreholes encountered fill materials to depths of approximately 0.2mBGL to 4.5mBGL, underlain by clayey residual soils and/or latite bedrock. The fill contained inclusions of igneous, ironstone, sandstone and siltstone gravel, shale fragments, slag, concrete, brick and metal fragments, coal, ash, and root fibres. There was no FCF/ACM identified in any of the bulk asbestos quantification field screening samples. Asbestos (as asbestos fines/fibrous asbestos - AF/FA) was detected in surface fill/soil at one location, and in deeper fill at two other locations. All asbestos concentrations were below the SAC. Copper and zinc were reported above the ecological SAC in fill/soil, and in groundwater, copper and zinc were reported above the ecological SAC. As a duty of care, and to meet the requirements under Clause 429 of the Work Health and Safety Regulation (2017), an AMP (for asbestos in/on soil) was recommended to be prepared and implemented for the current land use/operations at the hospital property, in addition to further investigation via a DSI.
DSI, JKE 2023b ⁷	The DSI occurred over the central and northern portion of the site (and we note that the site boundary was revised following completion of the DSI). The DSI included a review of existing project information, a site inspection, soil sampling from 24 boreholes and groundwater sampling from five monitoring wells (three new and two existing). The following potential contamination sources were identified at the site: fill material; use of pesticides; hazardous building materials (former and existing buildings and structures); fuel storage onsite (AST); and off-site fuel storage (upgradient former USTs). The boreholes encountered fill materials to depths of approximately 0.2mBGL to 3mBGL, underlain by silty or clayey residual soils. The fill contained inclusions of igneous, ironstone, and sandstone gravel, latite and igneous cobbles, concrete and brick fragments, clay nodules, ash, slag, bark chips, tree roots, and root fibres. There was no fibre cement fragments/asbestos containing material (FCF/ACM) identified in any of the bulk asbestos quantification field screening samples during the DSI. However, the DSI acknowledged that previous investigations at the site have identified sporadic occurrences of ACM in/on soil. Potential health-based risks associated with asbestos in/on fill/soil was considered to be low, however further investigation and risk assessment was recommended following demolition. Ecological risks from fill soil were assessed to be low and acceptable. The DSI concluded that potential risks associated with groundwater at the site were low in the context of the proposed development and were not indicative of site contamination that warranted remediation. The elevated detections of TRH in groundwater were not repeated during the DSI.

⁶ JKE, (2023a). *Report to Health Infrastructure on Preliminary Site Investigation for Proposed New Warrawong Community Health Centre Development at 85-91 Cowper Street, Warrawong, NSW.* (Ref: E34300PT2rpt2 DRAFT, dated 20 March 2023) (referred to as PSI 2023)

⁷ JKE, (2023b). *Report to Health Infrastructure on Detailed Site Investigation for Proposed New Warrawong Community Health Centre Development at 85-91 Cowper Street, Warrawong, NSW.* (Ref: E34300PT2rpt3 DRAFT, dated 12 September 2023) (referred to as DSI)

Investigation phase	Relevant findings to the site
	Remediation of the site was not considered to be required based on the current dataset. However, given the identification of asbestos in/on fill/soil at the site, the sampling limitations (i.e. sampling from boreholes instead of test pits), and the spatial data gaps (i.e. sampling not undertaken beneath the buildings and structures), a RAP was recommended for the proposed development so that risks remain low and acceptable. We considered that it would be reasonable to include the requirements for further investigation within the RAP as a large portion of this work will need to occur after demolition. The report indicated that additional details of the proposed development will also be required to carry out the risk assessment (e.g. details of buildings/structures being retained or demolished, proposed building footprints and finished floor levels, earthworks levels, locations of car parks and landscaped areas etc). We were of the opinion that the site could be made suitable for the proposed hospital development provided the following recommendations were implemented: 1. Prepare an AMP to manage asbestos in soil risks in the context of the on-going use of the site as a hospital. This AMP will need to remain in force until the redevelopment occurs. Grass coverage across the site appears to currently be in good condition, and it is recommended that the grass coverage is maintained under provisions of the AMP; 2. Given ACM has been identified in the fill/soil and on the site surface, a Licensed Asbestos Assessor (LAA) should be engaged and complete a walkover surface clearance inspection. Upon successful completion of the walkover inspection, a surface clearance certificate should be provided for the site; 3. Preparation and implementation of a RAP. The RAP is to include requirements for a post-demolition investigation to adequately address the data gaps discussed in the DSI and outline a contingency for asbestos in/on fill if found at higher concentrations; 4. Should the post-demolition investigation identify additional contamination that requires remediation outlined in the RAP, an addendum RAP/Remedial work Plan (RWP) must be prepared and implemented; 5. Preparation and implementation of a construction-phase AMP; and 6. Preparation of a validation assessment report for the remediation works undertaken at the site. The DSI also recommend that a Hazardous Building Materials Assessment (HAZMAT) be undertaken for the existing buildings/structures at the site prior to the commencement of demolition work.

A copy of the soil and groundwater laboratory data summary tables from the DSI, which includes the PSI 2022 data, is attached in Appendix B.

2.2 Summary of Site History

A time line summary of the historical land uses and activities is presented in the table below. The information presented in the table is based on a weight of evidence assessment of the site history documentation and observations made by JKE during the previous investigations.

Table 2-2: Summary of Historical Land Uses/Activities

Year(s)	Potential Land Use/Activities
1926-1961	On-site: - Vacant land. Surrounding Area: - Predominantly vacant initially; and - Ongoing development for residential use
1961-onwards	On-site: - Ongoing development of site for hospital including construction of buildings, pathways and vehicle access (driveways and car parks); - Demolition of building in south of site circa 2012 to 2016 (where existing gravel covered car park exists); - Some filling of the site may have occurred for levelling purposes and around services; - Use of pesticides beneath buildings and around site; - Use of AST for diesel storage; and - Hazardous building materials (i.e. asbestos and lead in paint) may have been used in former and/or existing structures. Surrounding Area: - Ongoing development of surrounding area for residential and hospital property; - Hazardous building materials (i.e. asbestos and lead in paint) may have been used in former and existing structures. A building was demolished to the south of the site (existing car park location) between 2012 and 2016; - Installation of USTs on wider hospital property to the west of the site; and - Installation/abandonment of petrol USTs and infrastructure. The tanks were reportedly abandoned circa 2003.

2.3 Site Identification

Table 2-3: Site Identification

Current Site Owner (certificate of title):	Health Administration Board
Site Address:	85-91 Cowper Street, Warrawong, NSW
Lot & Deposited Plan:	Lots 21 to 33 & Lots 50 to 53 in DP23670, and part of Lots 34 to 42 in DP23670
Current Land Use:	Hospital, with a childcare centre
Proposed Land Use:	Continued use as a hospital/community health centre
Local Government Area (LGA):	Wollongong City Council
Current Zoning:	R2: Low density residential
Site Area (a) (approx.):	15,000
RL (AHD in m) (approx.):	21-30

Geographical Location (decimal degrees) (approx. centre of site):	Latitude: -34.4863511 Longitude: 150.8790082
Site Plans:	Appendix A

2.4 Summary of Site Setting and Description

The site is located in the eastern half of the existing Port Kembla Hospital, in a predominantly residential area of Warrawong, and is bound by Cowper Street to the north and Fairfax Road to the east. The site is located approximately 400m to the north-west of Kully Bay (on Lake Illawarra).

The regional topography is characterised by a south-east facing hillside that falls towards Kully Bay. The site is located mid slope, locally sloping to the south-east at approximately 10° to 15°. Parts of the site appear to have been levelled to account for the slope and accommodate the existing development.

JKE undertook a site walkover as part of the DSI on 17 August 2023. Key observations are summarised below:

- The site and wider hospital property was occupied by Port Kembla District Hospital and included buildings, car parks and internal access roads and footpaths as well as landscaped/garden areas;
- On site there were three interconnected buildings of one to three storeys. A childcare centre was located on the western side (ground floor) of the main site building and included a fenced off play area (generally grass covered with some paved pathways). The buildings were of an age indicative of housing hazardous building materials (i.e. asbestos and lead containing paint);
- On the north-east side of the main building was an asphaltic concrete car park and access driveway which led to Cowper Street in the centre of the northern boundary and to the south of the main building was a gravel covered car park access via the one way driveway through the site from south to east;
- A surficial FCF (sample FCF201 as shown on Figure 3) was identified on the ground surface in the southern section of the site. The FCF was assessed to be bonded ACM;
- The site was entirely unfenced. Surface scouring observed at the site indicated minimal erosion and appeared to be due to surface water and wash away of surface soils at the interface between paved and unpaved sections of the site;
- A 1,000L AST containing diesel was observed in the south-west of the site (refer to Figure 2). No odours or staining on the surrounding ground surface were noted in the vicinity of the AST during the inspection;
- On the wider hospital property to the west of the site boundary and west of the AST, the area where the abandoned USTs were inferred to be located was observed to comprise a section of asphaltic paved car park and no odours or staining on the surrounding ground surface were noted in this area during the inspection;
- Fill material (igneous gravels, concrete fragments, etc.) was observed at the site surface in areas of scouring indicating that some filling had likely occurred at the site for levelling purposes. In the east of the site, a narrow grass covered soil bund (approximately 0.5m in height) extended in a north-south direction;

- Surface water flows would be expected to flow to the east in keeping with the localised fall of the site. Excess surface water would either be expected to infiltrate the unpaved areas or into the stormwater pits observed across the site. These pits would be expected to discharge into the local stormwater system; and
- Outside of building footprints, carparks and paved areas the site was generally grass covered, with a number of medium to large trees in the south and north-east section of the site. No obvious signs of vegetation stress or dieback were observed.

During the site inspection, JKE observed the following land uses in the immediate surrounds:

- North – Residential properties beyond Cowper Street;
- South – The wider hospital property and residential properties beyond Fairfax Road;
- East – Residential properties beyond Fairfax Road;
- West – The wider hospital property, including USTs to the west.

3 SUMMARY OF GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology and Soil Landscapes

Regional geological information reviewed for the previous investigations indicated that the site is underlain by Dapto Latite Member, which typically consists of Mafic basaltic-textured latite, aphanitic to porphyritic with crystalline groundmass, vesicles mostly as elongated stringers parallel to flow, sporadically infilled with carbonate, and sporadic columnar jointing.

A summary of the subsurface conditions encountered during the DSI is presented in the following table:

Table 3-1: Summary of Subsurface Conditions - DSI

Profile	Description
Pavement	Asphaltic Concrete (AC) pavement was encountered at the surface in boreholes BH208, BH210, BH217, and BH224 and was approximately 100mm in thickness.
Fill	Fill was encountered at the surface or directly beneath the pavement in all boreholes and extended to depths of approximately 0.2mBGL to 3mBGL. Boreholes BH201, BH205, BH206, BH207, BH209 to BH215, and BH217 to BH222 were terminated in the fill at a maximum depth of approximately 2.7mBGL. A number of logs recorded this as being 'refusal on gravels' or 'obstruction in fill', however a number of boreholes terminated in the fill were recorded as being terminated at the base of the fill, on-top of the underlying bedrock. The fill typically comprised sandy silty clay, silty clay, silty sandy clay, clayey sand, sandy gravel and gravelly clay with inclusions of igneous, ironstone, and sandstone gravel, latite and igneous cobbles, concrete and brick fragments, clay nodules, ash, slag, bark chips, tree roots, and root fibres. No odours or staining were recorded in the fill material during field work. No FCF/ACM was encountered in the fill material during fieldwork.
Natural Soil	Natural silty sandy clay, silty clay, residual soils were encountered beneath the fill material in boreholes BH202, BH203, BH208, BH216, BH223 and BH224 and extended to depths of approximately 1.1mBGL to 4.2mBGL. Neither odours nor staining were recorded in the natural soil during fieldwork.
Bedrock	Latite bedrock was encountered beneath the fill material or natural soils in boreholes BH204, BH223 and BH224 at depths of approximately 1.8mBGL to 4.2mBGL. Neither odours nor staining were recorded in the bedrock during fieldwork.
Groundwater	Groundwater seepage was not encountered during drilling. All boreholes remained dry on completion of and a short time after drilling.

A summary of the subsurface conditions encountered during the PSI 2022 is presented in the following table:

Table 3-2: Summary of Subsurface Conditions – PSI 2022

Profile	Description
Pavement	Asphaltic Concrete (AC) pavement was encountered at the surface in boreholes BH6, BH32, and BH36, and was approximately 20mm to 100mm in thickness.
Fill	Fill was encountered at the surface or directly beneath the pavement in all boreholes and extended to depths of approximately 0.2mBGL to 2.6mBGL. Boreholes BH1, BH2, BH3, BH7, BH12, BH13, BH14, BH21, BH23, BH31, and BH33, were terminated in the fill at a maximum depth of approximately 1.6mBGL. The borehole logs recorded this as being 'refusal on obstruction in fill', however, it is possible that the refusal occurred at the base of the fill, on-top of the underlying bedrock. The fill typically comprised silty clay, sandy gravel, silty sandy clay and gravel with inclusions of igneous, ironstone, sandstone and latite gravel, sand, concrete, asphaltic concrete, terracotta, brick, plastic and metal fragments, geofabric, slag, ash, roots and root fibres. No odours or staining were recorded in the fill material during field work. FCF was encountered on the surface at BH26. No FCF/ACM was encountered in the fill material during fieldwork.
Natural Soil	Natural silty sandy clay and silty clay residual soils were encountered beneath the fill material in boreholes BH6, BH15 to BH20, BH22, BH24 to BH30, BH32, and BH34 to BH37, and extended to depths of approximately 0.4mBGL to 2.4mBGL. Neither odours nor staining were recorded in the natural soil during fieldwork.
Bedrock	Latite bedrock was encountered beneath the fill material or natural soils in boreholes BH4, BH5, BH8, BH9, BH10, and BH11 at depths of approximately 0.4mBGL to 2.6mBGL Neither odours nor staining were recorded in the bedrock during fieldwork.
Groundwater	Groundwater seepage was encountered in borehole BH7 during drilling at a depth of approximately 1.4mBGL. All other boreholes remained dry during and on completion of drilling.

A copy of the borehole logs from the PSI 2022 and the DSI is included in Appendix B.

3.2 Hydrogeology and Surface Water Bodies

Hydrogeological information presented in the PSI 2022 indicated that the regional aquifer on-site and in the areas immediately surrounding the site includes fractured or fissured, extensive aquifers of low to moderate productivity. There was a total of 74 registered bores within the search buffer of 1,000m. In summary:

- The nearest registered bore was located approximately 1,105m to the north-east of the site. This was utilised for monitoring purposes;
- The majority of the bores were registered for monitoring purposes;
- There were no nearby bores (i.e. within 1km) registered for domestic, water supply or irrigation uses; and

- The drillers log information from the closest registered bores typically identified fill and/or clay soil to depths of 12m-14m, underlain by sandstone and shale bedrock. Standing water levels (SWLs) in the bores ranged from 1.2mBGL to 12mBGL.

A summary of the groundwater conditions during the DSI is provided below:

Table 3-3: Summary of Groundwater Conditions - DSI

Aspect	Details																								
Groundwater Depth & Flow	SWLs measured in the monitoring wells installed at the site ranged from 1.1mBGL to 6.56mBGL during development and sampling. Survey levels and groundwater Relative Levels (RLs) measured in the wells on 30 August 2023 are presented in the table below:																								
	<table><tr><th>MW reference</th><th>Reduced Level (mAHD)</th><th>SWL (30 August 2023)</th><th>SWL (mAHD)</th></tr><tr><td>MW4</td><td>26.853</td><td>1.67</td><td>25.183</td></tr><tr><td>MW5</td><td>28.48</td><td>2.47</td><td>26.01</td></tr><tr><td>MW204</td><td>38.172</td><td>2.2</td><td>35.972</td></tr><tr><td>MW223</td><td>28.972</td><td>6.42</td><td>22.552</td></tr><tr><td>MW224</td><td>28.452</td><td>6.71</td><td>21.742</td></tr></table>	MW reference	Reduced Level (mAHD)	SWL (30 August 2023)	SWL (mAHD)	MW4	26.853	1.67	25.183	MW5	28.48	2.47	26.01	MW204	38.172	2.2	35.972	MW223	28.972	6.42	22.552	MW224	28.452	6.71	21.742
	MW reference	Reduced Level (mAHD)	SWL (30 August 2023)	SWL (mAHD)																					
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	MW204	38.172	2.2	35.972																					
	MW223	28.972	6.42	22.552																					
	MW224	28.452	6.71	21.742																					
A contour plot was prepared for the groundwater levels as shown on Figure 4 in Appendix A. Groundwater flow generally occurs in a down gradient direction perpendicular to the groundwater elevation contours. The contour plot indicates that groundwater generally flows towards the east. The contour plot indicates that groundwater generally flows towards the east and south-east which was broadly consistent with expectations based on the topography.																									
Groundwater Field Parameters	Field measurements recorded during sampling were as follows: - pH ranged from 6.01 to 7.95; - EC ranged from 305.7µS/cm to 1,333µS/cm; - Eh ranged from -223.7mV to -148.8mV; and - DO ranged from 0.8mg/L to 7.5mg/L. The PID readings in the monitoring well headspace recorded during sampling ranged from 0.1ppm in MW4 and MW5, to 1.1ppm in MW224.																								
Light Non-Aqueous Phase Liquids (LNAPL)	Phase separated product (i.e. LNAPL) was not detected using the interphase probe during groundwater sampling.																								

Surface water bodies were not identified in the immediate vicinity of the site. The closest surface water body is Kully Bay (on Lake Illawarra) located approximately 350m to the south-east of the site. The bay is considered to support a marine ecosystem and is down-gradient from the site. Groundwater-related risks were assessed as part of the DSI process.

4 CONCEPTUAL SITE MODEL / SITE CHARACTERISATION

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

4.1 Review of CSM and Data Gap Assessment

Table 4-1: Review of CSM and Data Gap Assessment

Source/AEC	Review of CSM and Data Gap Assessment
Fill material	Fill ranging in depth between approximately 0.2m to 3mBGL was encountered across the site. The fill contained anthropogenic inclusions such as concrete and brick fragments, sand, ash, and slag. Bonded ACM was identified in surficial fill in one location (BH12) during the PSI 2022. Bonded ACM was also identified at the ground surface in the southern section of the site during the DSI (FCF201). The CSM in relation to asbestos in/on soil is that bonded ACM is known to exist and there is a high potential for additional ACM occurrences, albeit we expect these would be at low concentrations based on the quantification data obtained to date. Due to the access constraints, probabilistic/grid-based sampling was not practicable on this site. It is also noted that sampling occurred from boreholes which poses limitations for identifying asbestos in fill, and sampling was not undertaken beneath the buildings/structures. Further investigation of the fill will be required following demolition of the buildings/structures and when access becomes available to assess the full extent of risks associated with fill. However, in our opinion, we consider it is likely that the fill conditions beneath the buildings will be consistent with those encountered in the PSI/DSI boreholes. Asbestos (as bonded ACM) is a contaminant of concern in fill. The following contaminants of potential concern (CoPC) also apply to fill in areas where data gaps remain due to access limitations: heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc); petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs); benzene, toluene, ethylbenzene and xylene (BTEX); polycyclic aromatic hydrocarbons (PAHs); organochlorine pesticides (OCPs); organophosphate pesticides (OPPs); and polychlorinated biphenyls (PCBs).
Use of Pesticides	Pesticides have not been detected to date. However, sampling has not occurred in the building footprints and further sampling/analysis of soils in these areas will be required. CoPC include: Heavy metals (primarily arsenic, lead and cadmium); OCPs; and OPPs.
Hazardous Building Materials	Previous identification of asbestos (as bonded ACM) in fill soils in the vicinity of BH12 and inclusions in fill soils were indicative of former demolition/construction activities (i.e. concrete and brick fragments). Bonded ACM was also identified at the ground surface in the southern section of the site during the DSI (FCF201). The buildings and structures on the site are of an age indicative of housing hazardous building materials (i.e. asbestos fibre cement and lead paint). JKE is not aware of a HAZMAT register for the site. Further investigation of the fill beneath the buildings/structures will be required to assess the full extent of contamination risks on site as noted above. Asbestos (as bonded ACM) is a contaminant of concern in/on fill. CoPC also includes lead in soil.

Source/AEC	Review of CSM and Data Gap Assessment
On-site Fuel Storage (AST)	Based on the reported results to date, and at the time of reporting for the DSI, risks associated with the AST were considered to be low. Provisions are to be built into the RAP for inspections should this AST be removed, and for the potential identification of unexpected finds. CoPC include: TRH; and BTEX and naphthalene (BTEXN).
Off-site fuel storage areas	Based on the reported results in the DSI, on-site risks associated with the abandoned USTs were considered to be low and did not require further assessment. There were no elevated TRH/BTEX detected in groundwater during the DSI. However, it is noted that the site boundary was revised following the DSI and now abuts the UST area. This is to be addressed under the RAP framework. CoPC include: TRH; and BTEXN.

The RAP includes provisions for a pre-remediation (data gap) investigation which is to occur after demolition. The outcome of these data gap investigation works will be used to reassess, and where required, identify the need for any further remediation. Notwithstanding, the remedial/management actions proposed in this RAP focus on the following:

- Localised excavation of surficial fill at location BH12 to remove the soil impacted by ACM at a concentration that exceeded the HSL; and
- Management of potential asbestos risks during construction based on the potential occurrence of additional asbestos in/on soil elsewhere on site (additional asbestos remediation may also be required depending on the outcome of the additional investigation).

Based on the available data, we consider it likely that further occurrences of asbestos will be identified and the RAP includes contingencies to address this. However, at this stage the RAP has been prepared on the basis that fill containing asbestos concentrations in exceedance of the HSLs is localised at BH12.

The detection of TRH F2 in fill/soil in BH34 at the southern end of the site was only marginally above the HSL-A/B SAC and there are no buildings proposed in this area in which vapour intrusion could occur. Furthermore, TRH analysis with silica gel clean-up occurred on this sample during the DSI and the analysis reported a lower concentration of TRH F2 in the sample that was below the SAC. Therefore, remediation of this area is not currently proposed.

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

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

Table 4-2: CSM for RAP

Potential mechanism for contamination	The mechanisms for contamination include 'top-down' impacts and spills. There is a potential for subsurface release associated with the off-site USTs. However, unacceptable contamination impacts have not been identified in soil or groundwater to date.
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Affected media	Soil has been identified as affected medium in the context of the RAP. Asbestos fibres can also mobilise to air.
Receptor identification	Human receptors include site occupants/users (including adults and children), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users. Ecological receptors include terrestrial organisms and plants within unpaved areas (including any proposed landscaped areas).
Potential exposure pathways and mechanisms	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust, asbestos fibres and vapours. The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include primary contact and ingestion. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens/open space, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within enclosed spaces such as buildings. The following have been identified as potential exposure mechanisms in the context of the RAP: • Contact (dermal, ingestion or inhalation) with soils during construction or with exposed soils in landscaped areas and/or unpaved areas; and • Vapour intrusion and inhalation of vapours within the proposed buildings.
Presence of preferential pathways for contaminant movement	None identified. To be reviewed in the event mobile contamination impacts are encountered during the pre-remediation (data gap) investigation.

5 EXTENT OF REMEDIATION AND REMEDIATION OPTIONS

5.1 Extent of Remediation

As the RAP includes provisions for managing unexpected finds, completing further investigation, and managing and remediating asbestos, the RAP applies to the whole site and all proposed development works.

Based on the current dataset, the asbestos remediation area has been confined to a nominal 10m by 10m (100m²) area centred on BH12, as shown on Figure 5 in Appendix A. The remediation will extend to the depth of fill in this area, which is expected to be in the order of 0.3m deep. The extent of asbestos remediation will be confirmed as part of the pre-remediation (data gap) investigation process, and via validation.

A review of the remediation extent is to occur as part of the pre-remediation (data gap) investigation process. The RAP includes a suitable framework to address any additional risks that may be identified in this context.

5.2 Soil Remediation Options Assessment

The NSW EPA follows the hierarchy set out in NEPM 2013 for the remediation of contaminated sites. The preferred order for soil remediation and management is as follows:

1. On-site treatment of soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level;
2. Off-site treatment of excavated material so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site;

Or if the above are not practicable:

3. Consolidation and isolation of the soil by on-site containment within a properly designed barrier; and
4. Removal of contaminated material to an approved site or facility, followed where necessary by replacement with clean material; or
5. Where the assessment indicates that remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

For simplicity herein, the above hierarchy are respectively referred to as Option 1, Option 2, Option 3 etc.

The NEPM 2013 and the associated Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2021)⁸ prefer the following asbestos remediation hierarchy:

1. Minimisation of public risk;
2. Minimisation of contaminated soil disturbance; and
3. Minimisation of contaminated material/soil moved to landfill.

The NSW EPA Contaminated Land Management Guidelines for the NSW Site Auditor Scheme (3rd Edition) (2017)⁹ provides the following additional requirements to be taken into consideration:

⁸ Western Australian (WA) Department of Health (DoH), (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. (referred to as WA DoH 2021)

⁹ NSW EPA, (2017). *Contaminated land Management, Guidelines for the NSW Site Auditor Scheme (3rd ed.)*. (referred to as Site Auditor Guidelines 2017)

- Remediation should not proceed in the event that it is likely to cause a greater adverse effect than leaving the site undisturbed; and
- Where there are large quantities of soil with low levels of contamination, alternative strategies should be considered or developed.

The table below discusses a range of remediation options:

Table 5-1: Consideration of Soil Remediation Options

Option	Discussion	Applicability
<u>Option 1</u> On-site treatment of contaminated soil	On-site treatment can provide a mechanism to reuse the processed material, and in some instances, avoid the need for large scale earthworks. Treatment options are contaminant-specific and can include bio-remediation, soil washing, air sparging and soil vapour extraction and thermal desorption. Depending on the treatment option, licenses may be necessary for specific individual waste streams due to the potential for air pollution and the formation of harmful by-products during incineration processes. Licences for re-use of treated material/waste may also be required.	Treatment of soils impacted with bonded ACM is applicable for surficial impacts and may also be applicable for small quantities of soils, if such soils are to remain on site. This approach has been endorsed in the NSW EPA draft position statement¹⁰ relating to the WA DoH 2021 guidelines. The position statement indicates that the treatment of soils impacted by ACM above the HSL SAC may be remediate for use on the same site where: - They relate to remediation of historic or legacy contamination associated with past site uses, rather than illegal waste dumping activities; - The asbestos is not in a friable condition or defined as AF/FA; - The remediation has appropriate development consent and/or complies with relevant planning legislation; - Remediation is undertaken in accordance with a RAP that has been written or approved by an EPA-accredited site auditor, or a consultant certified under the EPA's Contaminated land consultant certification policy; and - It meets any other relevant requirements.

¹⁰ <https://www.epa.nsw.gov.au/your-environment/contaminated-land/other-contamination-issues/managing-asbestos-in-and-on-land/position-statement-wa-managment-of-asbestos-sites>

Option	Discussion	Applicability
Option 2 Off-site treatment of contaminated soil	Contaminated soils are excavated, transported to an approved/licensed treatment facility, treated to remove/stabilise the contaminants then returned to the subject site, transported to an alternative site or disposed to an approved landfill facility. This option is also contaminant-specific. The cost per tonne for transport to and from the site and for treatment is considered to be relatively high. The material would also have to be assessed in terms of suitability for reuse as part of the proposed development works under the waste and resource recovery regulatory framework.	Not applicable for asbestos in soil.
Option 3 Consolidation and isolation of impacted soil by cap and containment	This would include capping material in-situ beneath appropriate barriers, or the consolidation of contaminated soil within an appropriately designed cell, followed by the placement of an appropriate barrier over the material to reduce the potential for future disturbance. The capping and/or containment must be appropriate for the specific contaminants of concern. Depending on the concentrations of contaminants being encapsulated, an ongoing Environmental Management Plan (EMP) may be required and an EMP would need to be publicly notified and made to be legally enforceable (e.g. via listings in the Section 10.7 planning certificate and on the land title).	Applicable for asbestos where the asbestos concentrations exceed the HSLs, and also applicable for the other CoPC provided there is no migration risk to groundwater. Although this is not preferred if the contaminants are volatile. This is not the preferred method if relatively small quantities of contaminated soils are involved.
Option 4 Removal of contaminated material to an appropriate facility and reinstatement with clean material	Contaminated soils would be classified in accordance with NSW EPA guidelines for waste disposal, excavated and disposed of off-site to a licensed landfill. The material would have to meet the requirements for landfill disposal. Landfill gate fees would apply in addition to transport costs.	Applicable considering the relatively small quantities of soil expected to be remediated at BH12. This may not be viable for larger quantities of material and would not apply to soil with low asbestos concentrations (below the HSL).
Option 5 Implementation of management strategy	Contaminated soils would be managed in such a way to reduce risks to the receptors and monitor the conditions over time so that there is an on-going minimisation of risk. This may occur via the implementation of monitoring programs, potentially also involving capping systems.	Not considered to be applicable for the small-scale remediation at the site. This is a potential option for managing low concentrations of asbestos (below the HSL) in soil, or for managing capped contamination in conjunction with Option 4.

5.3 Rationale for the Preferred Option for Remediation

The preferred option for remediation of the ACM contaminated soil at BH12 is Option 4, excavation and off-site disposal to a licensed landfill facility. This option is preferred due to the relatively small quantity of soil within the nominated remediation area and because it will eliminate the need for long-term management of ACM in soil under an EMP (assuming no other contamination is identified on site).

In relation to the potential for additional occurrences of asbestos in fill, a management approach is to be implemented to manage risks to workers during construction. The findings of the pre-remediation (data gap) investigation will establish whether there are any asbestos concentrations in soil that exceed the HSL (or any other contaminants) that warrant remediation. Depending on the nature and extent of such remediation, we consider that Option 4 would most likely be applicable for small quantities of contaminated soils, and a combination of Options 3 and 5 would be applicable for larger quantities of contaminated soils, should further impacts be identified.

We have considered the potential cost benefits of remediating the ACM in fill within the nominated BH12 remediation area via treatment. Whilst treatment may be possible, in our opinion it is not proffered due to the following:

- The estimated quantity of fill in the nominated BH12 remediation area is approximately 30m³ (this should be confirmed by the client's quantity surveyor), assuming that no further occurrences of ACM are identified that exceed the HSL. The cost benefit for treating and then validating the treatment process for such a small quantity of soil is not likely to be substantial in comparison to the preferred option of excavation and off-site disposal; and
- The fill in BH12 includes cohesive clayey soils. Treatment of ACM via physical removal (i.e. 'emu picking') in clayey soils is more difficult, time consuming and can be less effective compared to sandy soils.

6 REMEDIATION DETAILS

Prior to commencement of demolition and any soil disturbance, the client, project manager and remediation contractor must review and make arrangements to meet the remediation site management requirements for the project as outlined in Section 9 of this RAP.

The following general sequence of works is anticipated:

- Pre-commencement meeting;
- Site establishment and demolition;
- Pre-remediation (data gap) investigation and any additional associated reporting;
- Validation of remedial works and validation of imported soil materials. This includes materials imported to reinstate the remedial excavations, together with engineering material such as sub-base and drainage materials (e.g. recovered aggregate etc), landscaping materials or any other materials imported for service trenches etc, to the point in time that the validation report is issued.

Validation of the works will occur progressively throughout the remediation and construction program.

Details in relation to the above are outlined in the respective subsection below.

6.1 Roles and Responsibilities

Table 6-1: Roles and Responsibilities

Role	Responsibility
Developer/ client	NSW Health Infrastructure The client (or their nominated project manager) is required to appoint the project team for the remediation/validation and must provide all investigation reports including this RAP to the project manager, remediation contractor/principal contractor, and any other relevant parties involved in the project.
Project Manager	Savills Australia The project manager is required to review all documents prepared for the project and manage the implementation of the procedures outlined in this RAP. The project manager is to take reasonable steps so that the remediation contractor and others have understood the RAP and will implement it in its totality. The project manager will review the RAP and other documents and will update the parties involved of any changes to the development or remediation sequence (in consultation with the validation consultant).
Principal Contractor / Remediation Contractor	To be confirmed. The principal contractor is required to review all documents prepared for the project and manage the implementation of the procedures outlined in this RAP. The principal contractor is to take reasonable steps so that the remediation contractor and others have understood the RAP and will implement it in its totality. With regards to the need for a construction/remediation phase AMP, the principal contractor/remediation contractor must engage a (and/or engage with a) suitably qualified consultant to prepare the AMP required in accordance with Section 9.1 of this RAP.

Role	Responsibility
	The principal contractor will review the RAP and other documents and will update the parties involved of any changes to the development or remediation sequence (in consultation with the validation consultant).
Remediation Contractor	To be confirmed. The remediation contractor (this may be the same entity as the principal contractor) is required to review all relevant documents prepared for the project, apply for any relevant removal licences or permits and implement the remediation requirements and relevant validation requirements (that are the remediation contractor's responsibility) outlined in this RAP. The remediation contractor should be or must subcontract a Class B licensed asbestos removalist to manage and undertake any works associated with the removal/disturbance of asbestos. The Class B contractor will need to submit the required notification to SafeWork NSW for asbestos removal works, should removal of asbestos in soils occur. With regards to the need for a construction/remediation phase AMP, the remediation contractor must engage a (and/or engage with a) suitably qualified consultant to prepare the AMP required in accordance with Section 9.1 of this RAP, unless this responsibility is already addressed by the principal contractor as noted above. The remediation contractor is required to collect all documentation associated with the remediation activities and forward this documentation onto the principal contractor, client and project manager as they become available.
Validation Consultant	To be confirmed. The validation consultant¹¹ provides consulting advice and validation services in relation to the remediation. The validation consultant undertakes the pre-remediation (data gap) investigation(s) and prepares the validation report (and EMP where applicable), as required. The validation consultant is required to review any deviation to this RAP or any unexpected finds if and when encountered during the site work. The validation consultant should have a Licensed Asbestos Assessor (LAA) on staff. The validation consultant is required to liaise with the principal contractor, client, project manager and remediation contractor on all matters pertaining to the site contamination, remediation and validation, carry out the required pre-remediation (data gap) investigation, validation sampling and inspections.

6.2 Pre-commencement Meeting

The project team is to have a pre-commencement meeting to discuss the sequence of remediation, and the remediation and validation tasks. The site management plan for remediation works (see Section 9) must be reviewed by project manager and remediation contractor, and appropriate steps are to be taken to ensure the adequate implementation of the plan.

¹¹ The validation consultant must be a certified practitioner (specialising in site contamination), under one of the NSW EPA endorsed certification schemes, i.e. CEnvP SC or equivalent

6.3 Pre-remediation (Data Gap) Investigation and Reporting

Prior to the commencement of the pre-remediation (data gap) investigation, the validation consultant must prepare a detailed SAQP in accordance with the Consultants Reporting Guidelines and NEPM (2013). The SAQP is to include a review of the relevant earthworks plans and proposed development plans which we expect should be available at that time. The CSM must also be reviewed, and updated where necessary, as part of this process.

Reference is to be made to Figure 5 in Appendix A for the proposed investigation locations, and to Appendix C which includes the proposed test pit location coordinates.

The investigation(s) must include the following as a minimum:

- An initial inspection to assess the site conditions and any potential unexpected finds. The site conditions must be documented with photographs. The AST area must also be inspected;
- Preparation and implementation of a suitable Work Health and Safety (WHS) plan that considers the potential for identifying asbestos during the sampling;
- Soil sampling from test pits from the proposed locations presented on Figure 5 in Appendix A. The test pits must be excavated to the base of the fill and into the natural ground (where possible) so that the depth of fill is confirmed;
- Soil samples must be collected from each fill profile for laboratory analysis, and one sample from each location should be collected from the underlying natural soil/bedrock if possible. If there are any indicators of contamination in the natural soil (e.g. staining or odours) then deeper sampling should occur;
- Bulk (10L) field asbestos quantification must occur in accordance with the NEPM (2013) requirements;
- A sample from each fill profile is to be analysed for the CoPC for fill as nominated in the CSM. Any FCF identified in the bulk samples are also to be analysed for asbestos;
- If there is to be a surplus of materials on the project, or if waste is to be disposed off-site, additional analysis for waste classification purposes must occur. The waste classification must occur for the waste material to be generated in the BH12 remediation area;
- Appropriate QA/QC samples are to be obtained and analysed for soil and soil vapour, with regards to the NEPM (2013) requirements; and
- Use of appropriate SAC for the Tier 1 risk assessment.

On completion of the investigation, a report is to be prepared by the validation consultant in accordance with the Consultants Reporting Guidelines and is to include a Tier 1 risk assessment and review of the CSM.

In conjunction with the above, the validation consultant is to review the extent of remediation and confirm if the extent remains valid. If additional risks are identified that warrant remediation outside the scope of this RAP, then a revised (or addendum) RAP must be prepared by the validation consultant and submitted to the client/determining authority, project manager and remediation contractor etc (as applicable). The client/determining authority and project manager must then establish the appropriate course of action in relation to any additional planning/consent requirements prior to making arrangements to carry out the additional works.

The project team must factor the above requirements into the project timeline so that all of the above can be closed out/finalised prior to the commencement of earthworks/construction.

6.4 Site Establishment and Demolition

The remediation contractor is to establish on site as required to facilitate the remediation and validation works. Consideration must be given to the work sequence and extent of remediation/excavation so that the site establishment (e.g. site sheds, fencing, access points etc) does not inhibit the required works. Any soil/gravel-type materials imported during the site establishment (e.g. DGB, 40/70 etc) must be validated in accordance with Section 7 of this report.

The demolition of buildings/structures etc must occur with regards to the findings of the hazardous building materials survey report.

As part of the demolition process, all visible FCF/ACM must be removed from the ground surface across the entire site prior to any works that disturb the existing pavements. An asbestos surface clearance for the ground surface across the entire site must be provided by a LAA to demonstrate this has occurred. This ground surface clearance will be in addition to any specific clearances associated with the demolition works.

All waste from the demolition is to be disposed to facilities that are licenced by the NSW EPA to accept the waste. The demolition contractor is to maintain adequate records and retain all documentation for such activities including:

- A summary register including details such as waste disposal dates, waste materials descriptions, disposal locations (i.e. facility details) and reconciliation of this information with waste disposal docket numbers;
- Waste tracking records and transport certificates (where waste is required to be tracked/transported in accordance with the regulations); and
- Disposal dockets for the waste. Legible dockets are to be provided for all waste materials so they can be reconciled with the register.

The above information is to be supplied to the validation consultant for assessment and inclusion in the site validation report.

6.5 Remedial Actions – Remediation of Asbestos in Soil BH12

Prior to commencement of excavation work, a waste classification must occur for the material to be excavated and removed from the remediation area (this should occur during the data gap investigation process as noted previously). The classification must occur with regards to the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014)¹² and the NSW EPA Sampling Design Part 1 – Application (2022)¹³. A waste classification report must be prepared and the receiving landfill facility should be contacted to obtain disposal approval. This waste classification documentation should be arranged at least 3-4 weeks prior to commencement of any excavation works in order to avoid unnecessary delays.

¹² NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste*. (referred to as Waste Classification Guidelines 2014)

¹³ NSW EPA, (2022). *Sampling design part 1 - application*. (referred to as EPA Sampling Design Guidelines 2022)

The procedure for excavation and disposal of asbestos-contaminated fill in the BH12 remediation is outlined in the following table:

Table 6-2: Remediation Details – Asbestos-Contaminated Fill in BH12 Remediation Area

Step	Primary Role/Responsibility	Procedure
1.	Remediation contractor	<u>Address Stability Issues and Underground Services:</u> Geotechnical advice must be sought regarding the stability of adjacent structures and/or adjacent areas prior to commencing remediation (as required). Stability issues are to be addressed to the satisfaction of a suitably qualified geotechnical engineer. This may require the installation of temporary shoring, if specified by the engineer. All underground services are to be appropriately disconnected or rerouted to facilitate the works.
2.	Remediation contractor (or nominated Class B licensed sub-contractor)	<u>Establish Asbestos Related Controls and Arrange Licenses and Tracking Requirements:</u> Prior to the commencement of any demolition of the retaining wall or excavation, asbestos related controls, licences and tracking requirements should be implemented as outlined in the AMP (refer to Section 9 of this RAP).
3.	Remediation contractor (or nominated Class B licensed sub-contractor) Validation consultant (inspections)	<u>Excavation and Disposal of Asbestos-Contaminated Fill:</u> Remediation will be undertaken as follows: • Submit an application to dispose of the fill (in accordance with the assigned waste classification) to a facility that is appropriately licensed by the NSW EPA to receive the waste, and obtain authorisation to dispose. Establish the required waste tracking using WasteLocate; • Contact the validation consultant to arrange for the consultant to be present to witness the remedial excavation works; • The excavation and removal of asbestos-contaminated soil must be completed in accordance with the remediation-phase AMP; • The area where fill is to be removed must be marked out using an appropriate method (i.e. star pickets), so the extent of remediation is clear to the excavator operator and other relevant parties; • Excavate the fill from the remediation area, down to the surface of the underlying soil/bedrock (whichever is shallower); • Load the fill directly into trucks and dispose of the soil to a facility licensed by the NSW EPA to receive the waste; and • All documents including landfill disposal dockets must be retained by the remediation contractor/asbestos removal contractor and forwarded to the client and validation consultant. This documentation forms a key part of the validation process and is to be included in the validation report.
4.	Validation consultant	<u>Validation of Excavation:</u> Once all fill is removed to required levels, the base and walls of the excavation are to be validated in accordance with the validation plan outlined in Section 7, which includes bulk field screening and completion of a surface asbestos clearance by a LAA.
5.	Remediation contractor and validation consultant	<u>Backfilling/Reinstatement of Excavation:</u> Where required, the remedial excavation is to be reinstated with clean (validated) materials, to meet the geotechnical and landscape requirements of the project. Imported materials must be validated in accordance with the validation plan outlined in Section 7.

Part 7 of the Protection of the Environment (POEO) Waste Regulation (2014)¹⁴ sets out the requirements for the transportation and management of asbestos waste and Clause 79 of the POEO Waste Regulation requires waste transporters to provide information to the NSW EPA regarding the movement of any load in NSW of more than 10m² of asbestos sheeting, or 100 kilograms of asbestos waste. To fulfil these legal obligations, asbestos waste transporters must use WasteLocate.

Clause 78 of the POEO Waste Regulation requires that a person who transports asbestos waste must ensure that:

- Any part of any vehicle in which the person transports the waste is covered, and leak-proof, during the transportation; and
- If the waste consists of bonded asbestos material—it is securely packaged during the transportation; and
- If the waste consists of friable asbestos material—it is kept in a sealed container during transportation; and
- If the waste consists of asbestos-contaminated soils—it is wetted down.

Asbestos waste cannot be re-used or recycled.

6.6 Remediation Documentation

The remediation contractor must retain all documentation associated with the site management and remediation, including but not limited to:

- Asbestos management documentation, including all relevant notifications and monitoring reports, and clearance certificates where applicable (additional details in this regard are to be outlined in the construction-phase AMP);
- Photographs of remediation works;
- Waste disposal dockets and waste tracking documentation (see below and the example waste tracking form in Appendix D); and
- Imported materials documentation (see below and the example imported material tracking form in Appendix D).

Copies of these documents must be forwarded to the project manager and the validation consultant for assessment and inclusion in the validation report.

6.6.1 Waste

All waste removed from the site is to be appropriately classified, tracked and managed in accordance with the relevant guidelines and regulations. The remediation contractor (and/or their nominated licensed asbestos removalist) is to maintain adequate records and retain all documentation for waste disposal activities including:

¹⁴ Protection of the Environment Operations (Waste) Regulation 2019 (NSW). (referred to as POEO Waste Regulation)

- A summary register (in Microsoft Excel format) including details such as waste disposal dates, waste materials descriptions, disposal locations (i.e. facility details) and reconciliation of this information with the associated waste classification documentation and the waste disposal docket numbers;
- Waste tracking records and transport certificates (where waste is required to be tracked/transported in accordance with the regulations). This includes consignment details via the WasteLocate system for asbestos waste; and
- Disposal dockets for the waste (i.e. weighbridge dockets for each load).

Any soil waste classification documentation is to be prepared in accordance with the reporting requirements specified by the NSW EPA.

A review of the disposal facility's Environment Protection Licence (EPL) issued under the Protection of the Environment Operations (POEO) Act (1997)¹⁵ is to be undertaken to assess whether the facility is appropriately licensed to receive the waste.

The above information is to be provided to the validation consultant for inclusion in the validation report. The register must be set up at the beginning of the project and provided to the validation consultant regularly so the details can be checked and any rectification of the record keeping process can occur in a timely manner.

6.6.2 Imported Materials Register

The remediation contractor (and/or their nominated construction contractor) is to maintain, for the duration of the project, an imported material register. This must include a register (in Microsoft Excel format) with details of each imported material type, supplier details, summary record of where the imported materials were placed on site, and importation docket numbers and a tally of quantities (separated for each import stream). Dockets for imported materials are to be provided electronically so these can be reconciled with the register.

Examples of imported materials for this project may include but would not be limited to: site preparation materials (e.g. DGB, 40/70, material to create the pavement base or piling platforms etc); clean capping or backfill material such as virgin excavated natural material (VENM); and landscaping materials such as topsoil garden mixes, mulches etc.

The above information is to be provided to the validation consultant for inclusion in the validation report. The register be set up at the beginning of the project and provided to the validation consultant regularly so the details can be checked and any rectification of the record keeping process can occur in a timely manner.

¹⁵NSW Government, (1997). *Protection of Environment Operations Act*. (referred to as POEO Act 1997)

7 VALIDATION PLAN

Validation is necessary to demonstrate that remedial measures described in the RAP have been successful and that the site is suitable for the intended land use. The sampling program for the validation is outlined in Section 7.1. This is the minimum requirement based on the remedial strategies provided. Additional validation sampling may be required based on observations made during remediation.

7.1 Validation Sampling and Documentation

The validation requirements for the site are outlined below:

7.1.1 Validation Requirements – Validation of Asbestos in Soil Remediation BH12

Table 7-1: Validation Requirements – BH12 Remediation Area

Aspect	Sampling	Analysis	Observations and Documentation
Validation sampling of BH12 remediation area, following removal of fill	No sampling required at the base of the excavation (visual validation only). Any exposed fill soil at the excavation walls must be sampled every 5m lineal, with samples collected from each distinct fill profile. The fill is expected to be shallower than 1m, however, if deeper fill is encountered, the fill on the excavation walls must have at least one sample per fill profile collected and per vertical metre on the wall (whichever is the greater). This does not apply to natural soil/bedrock. Based on the current extent of remediation at BH12, it is expected that each wall will have at least two wall sample locations, 5m apart. Sampling is to included bulk sampling (10L field screening) for asbestos in accordance with the NEPM (2013) procedures. Sampling/analysis of soils for AF/FA is not required.	Any FCF identified in the validation samples is to be analysed for asbestos.	Observations to be recorded by the validation consultant to document fill/soil lithology on the base and walls of the excavation. Each bulk sample is to be weighed (in kg) using an accurate scale to two decimal places. A sample location plan is to be prepared by the validation consultant, documenting the sample locations and final extent of the remediation area. Photographs are to be taken by the validation consultant. LAA to provide asbestos surface clearance for the base and walls of the remedial excavation. Air monitoring results to be reviewed (where air monitoring is specified under the AMP). Disposal dockets to be retained by the remediation contractor and forwarded to validation consultant for inclusion in the validation report.

7.1.2 Imported Materials

The table below outlines the validation requirements for material imported onto the site:

Table 7-2: Validation Requirements – Imported Materials

Aspect	Sampling	Analysis	Observations and Documentation
Imported VENM backfill (if required)	Minimum of three samples per source	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRHs, BTEX, PAHs, OCPs, PCBs and asbestos (500ml NEPM 2013 analysis). Additional analysis may be required depending on the site history of the source property.	Remediation contractor to supply existing VENM documentation/report (report to be prepared in accordance with the NSW EPA waste classification reporting requirements). A hold point remains until the validation consultant approves the material for importation or advises on the next steps. Material is to be inspected upon importation by the validation consultant to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation. Photographic documentation and an inspection log are to be maintained. Where check sampling occurs by the validation consultant due to deficiencies or irregularities in existing VENM documentation, the following is required: - Date of sampling and description of material sampled; - An estimate of the volume of material imported at the time of sampling; - Sample location plan; and - Analytical reports and tabulated results with comparison to the Validation Assessment Criteria (VAC).
Imported engineering materials such as recycled aggregate, road base etc	Minimum of three samples per source/material type. Except for coarse 40/70 materials which will only be visually inspected for FCF and other indicators of contamination.	Heavy metals (as above), TRHs, BTEX, PAHs, OCPs, PCBs and asbestos (500ml quantification).	Remediation contractor to provide product specification and documentation to confirm the material has been classified with reference to a relevant Resource Recovery Order/Exemption. A hold point remains until the validation consultant approves the material for importation or advises on the next steps. Review of the facility's EPL, where applicable.
Excavated Natural Material (ENM)	ENM testing must meet the specification within the ENM Order. If the analysis is not compliant, the validation consultant must carry out an ENM assessment and prepare a report in	As required in the ENM Order.	Material is to be inspected by the validation consultant upon importation to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation.

Aspect	Sampling	Analysis	Observations and Documentation
	accordance with the ENM Order/Exemption prior to material being imported.		Where check sampling occurs by the validation consultant due to deficiencies or irregularities in existing documentation, the following is required: - Date of sampling and description of material sampled; - An estimate of the volume of material imported at the time of sampling; - Sample location plan; and - Analytical reports and tabulated results with comparison to the VAC.
Imported engineering materials comprising only natural quarried products.	At the validation consultant's discretion based on robustness of supplier documentation.	At the validation consultant's discretion based on robustness of supplier documentation.	Remediation contractor to provide documentation from the supplier confirming the material is a product comprising only natural quarried material. A hold point remains until the validation consultant approves the material for importation or advises on the next steps. Review of the quarry's EPL. Material is to be inspected by the validation consultant upon importation to confirm it is free of anthropogenic materials, visible and olfactory indicators of contamination, and is consistent with documentation. Where check sampling occurs by the validation consultant due to deficiencies or irregularities in existing documentation, the following is required: - Date of sampling and description of material sampled; - An estimate of the volume of material imported at the time of sampling; - Sample location plan; and - Analytical reports and tabulated results with comparison to the VAC.
Imported garden mix/turf underlay/topsoil	Minimum of three samples per source.	Heavy metals (as above), TRHs, BTEX, PAHs, OCPs, PCBs and asbestos (500ml). Analysis of mulch can be limited to asbestos (500ml) and visual observations to confirm there are no anthropogenic materials.	Remediation contractor to provide documentation from the supplier confirming the product specification. This must include a description of the Australian Standard or other relevant product specification under which the material is produced, and the components. A hold point remains until the validation consultant approves the material for importation or advises on the next steps. Material is to be inspected by the validation consultant upon importation to confirm it is free of anthropogenic

Aspect	Sampling	Analysis	Observations and Documentation
			materials, visible and olfactory indicators of contamination, and is consistent with documentation. The validation consultant is to review any existing/available analysis results for the materials. A minimum of one batch for each imported material type (from each individual supplier) must be inspected by the validation consultant. This inspection must be repeated for each material type from each supplier, a minimum of once per month thereafter. Where check sampling occurs by the validation consultant due to deficiencies or irregularities in existing documentation, the following is required: - Date of sampling and description of material sampled; - An estimate of the volume of material imported at the time of sampling; - Sample location plan; and - Analytical reports and tabulated results with comparison to the VAC.
Mulch	Minimum of three samples per source.	Asbestos (500ml).	As above.

7.2 Validation Assessment Criteria and Data Assessment

The VAC to be adopted for the validation assessment are outlined in the table below:

Table 7-3: Validation Assessment Criteria (VAC)

Validation Aspect	VAC
BH12 Remediation Area	Quantitative – Asbestos/ACM concentrations in bulk soil validation samples collected from the excavation walls must be below 0.02%w/w. This VAC is based on the HSL-C criterion in Schedule B1 of NEPM 2013. We consider this criterion is reasonable and is suitably protective of the receptors in a hospital land use scenario where there is no continued childcare centre use. Qualitative/visual – base and walls of excavation must be free of visible FCF/ACM, verified by the LAA asbestos clearance certificate. The base of the excavation must also be confirmed to include only natural soil or bedrock (no remnant fill or debris).
Imported materials	The validation of imported materials is two-fold: the validation is to demonstrate that the imported material will not pose a risk in the context of the proposed land use; and also, that the imported material meets the requirements where applicable under a relevant resource recovery exemption/order under which they are produced ENM and recycled materials are to meet the criteria of the relevant exemption/order under which they are produced.

	Analytical results for VENM and other imported materials will need to be consistent with expectations for those materials. For VENM, it is expected that: - Heavy metal concentrations are to be less than the most conservative Added Contaminant Limit (ACL) concentrations for an 'urban residential and public open space' (URPOS) exposure setting presented in Schedule B1 of the NEPM 2013, except for lead which should be nominally less than 100mg/kg; and - Organic compounds are to be less than the laboratory PQLs and asbestos to be absent. The lower lead VAC nominated above is based on the fact that the lead ACL is quite high and is not consistent with expectations for natural material in the area. The concentration of 100mg/kg is nominal and is considered to be protective of human health and the environment in the proposed land use setting. Whilst a lead concentration of 100mg/kg may still be relatively high for natural material from some areas, it is well below the Health Investigation Level (HIL-A) criteria applicable to sensitive land uses and is deemed to be appropriate considering the other validation requirements for imported materials. All materials imported onto the site must also be adequately assessed as being appropriate for the final use of the site. A risk-based assessment approach is to be adopted with regards to the tier 1 screening criteria presented in Schedule B1 of NEPM 2013, consistent with the approach taken for the DSI. Aesthetics: all imported materials are to be free of staining and odours.
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Laboratory data are to be assessed as above or below the VAC. Statistical analysis is not proposed. Notwithstanding, statistical analysis can be applied by the validation consultant if deemed appropriate and if the analysis occurs with regards to the relevant guidelines.

7.3 Validation Sampling, Analysis and Quality Plan (SAQP)

Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs) should be clearly outlined and assessed as part of the validation process. A framework for the DQO and DQI process is outlined below and should be reflected in the validation report. These relate to the remediation only and it is anticipated that the SAQP(s) for the pre-remediation (data gap) investigation(s) will include this information in the context of those works.

DQOs have been broadly established for the validation with regards to the seven-step process outlined NEPM (2013). The seven steps include the following which are detailed further in the following subsections:

- State the problem;
- Identify the decisions/goal of the study;
- Identify information inputs;
- Define the study boundary;
- Develop the analytical approach/decision rule;
- Specify the performance/acceptance criteria; and
- Optimise the design for obtaining the data.

DQIs are to be assessed based on field and laboratory considerations for precision, accuracy, representativeness, completeness and comparability.

7.3.1 Step 1 - State the Problem

Validation data is required to demonstrate that the remediation is successful and that the site is suitable for the proposed land use described in Section 1.1.

7.3.2 Step 2 - Identify the Decisions of the Study

The remediation goal, aims and objectives are defined in Section 1.2. The decisions to be made reflect these objectives and are as follows:

- Were the relevant reports prepared prior to commencement of the remediation (e.g. pre-remediation data gap investigation reports, revised/addendum RAP where applicable, waste classification, AMP, etc)?
- Was the remediation undertaken in accordance with the RAP and any supplementary reports?
- If there were any deviations, what were these and how do they impact the outcome of the validation?
- Are any of the validation results above the VAC and what is the implication of this in relation to the remediation/validation and future site management?
- Is the site suitable for the proposed development from a contamination viewpoint?

7.3.3 Step 3 - Identify Information Inputs

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

- Existing relevant data from previous reports;
- Site information, including site observations, inspections, asbestos clearance certificates, waste and imported materials registers;
- Validation sampling and laboratory analysis results for the remedial excavation and for imported materials;
- Laboratory analysis (as required); and
- Field and laboratory QA/QC data.

7.3.4 Step 4 - Define the Study Boundary

The remediation and validation will be confined to the site boundaries as shown in Figure 2 in Appendix A. The remedial excavation proposed in this RAP for the BH12 asbestos remediation area is expected to be limited horizontally to a 10m by 10m (100m²) area centred on BH12, and to the total depth of fill in this area (~0.3m deep). The asbestos remediation area nominated in this RAP is shown on Figure 5 in Appendix A. The final remediation extent will be confirmed via the data gap investigation and validation process.

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

7.3.5.1 VAC

The validation data will be assessed in accordance with the requirements outlined in Section 7.1.

7.3.5.2 Field and Laboratory QA/QC

Field QA/QC is required for imported materials. This is to include:

- Analysis of inter-laboratory duplicates (5% frequency) and intra-laboratory duplicates (5% frequency), analysed for the same analytical suite as the primary samples;
- Trip blank samples (one per batch/day of sampling), analysed for the same analytical suite as the primary samples excluding asbestos;
- Trip spike samples (one per batch/day of sampling), analysed for BTEXN, only where samples within that batch have been scheduled for analysis of TRH or BTEXN; and
- Rinsate samples (one per batch), analysed for the same analytical suite as the primary samples excluding asbestos, only where re-usable sampling equipment is utilised.

DQIs for field and laboratory QA/QC samples are defined below:

Field Duplicates

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

Trip Blanks

Acceptable targets for trip blank samples will be less than the PQL.

Trip Spikes

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

Laboratory QA/QC

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

A summary of the typical limits is provided below:

RPDs

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

Laboratory Control Samples (LCS) and Matrix Spikes

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

Surrogate Spikes

- 60-140% recovery acceptable for general organics.

Method Blanks

- All results less than PQL.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence will be reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is to be undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, the validation consultant is to adopt the most conservative concentration reported.

7.3.5.3 Appropriateness of PQLs

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

7.3.6 Step 6 – Specify Limits on Decision Errors

To limit the potential for decision errors, a range of quality assurance processes are adopted. A quantitative assessment of the potential for false positives and false negatives in the analytical results is to be undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected. Data will be assessed as above or below the VAC. Statistical analysis is not proposed, therefore there have been no limits on decision errors set for validation purposes.

7.3.7 Step 7 - Optimise the Design for Obtaining Data

The design is to be optimised via the collection of validation data to demonstrate the success of the key aspects of the remediation. Data collection will be via various methods including inspections and sampling.

The proposed sampling plan for the validation is described in Section 7.1.

7.4 Validation Report

As part of the site validation process, a site validation report will be prepared by the validation consultant. The report will present the results of the validation assessment and will be prepared in accordance with the Consultants Reporting Guidelines.

It is not anticipated that staged validation will be necessary. However, should staged validation be required to enable staged development and occupation/use of parts of the site, the validation consultant is to assess this in consultation with the project stakeholders. JKE see no impediment to staged validation, should it be necessary to facilitate the proposed development works.

It should also be noted that any material changes to the remediation or validation strategy will require an updated or addendum RAP, which in turn must be approved by the determining authority.

The need for a post-remediation (i.e. long-term) AMP must be assessed based on the outcome of the validation, as discussed in Section 9.1.

8 CONTINGENCY PLAN

The contingency plan for the project in the context of the site remediation is provided in the following sub-sections:

8.1 Unexpected Finds

Residual hazards that may exist at the site would generally be expected to be detectable through visual or olfactory means. At this site, these types of hazards may include suspected friable types of asbestos such as rope or lagging, stained or odorous soils etc. The procedure to be followed in the event of an unexpected find is presented below:

- In the event of an unexpected find, all work in the immediate vicinity should cease and the remediation contractor must contact the validation consultant and the client/project manager;
- Temporary barricades should be erected to isolate the area from access to workers;
- The validation consultant is to attend the site to inspect the find;
- The validation consultant is to adequately characterise the contamination and provide advice in relation to site management and remediation. In the event that remediation differs from that outlined in this RAP, an addendum RAP must be prepared in consultation with the project stakeholders and submitted to the determining authority; and
- Contamination is to be remediated and validated in accordance with the advice provided, and the results are to be included in the validation report.

8.2 Validation Failure for BH12 Asbestos Remediation Area

In the event of a validation failure, additional material is to be 'chased out' from the area that failed and disposed off-site, then the area re-validated. Due to the potential cost implications for disposal of additional materials, the client and project manager must be informed in the event of a validation failure, an estimate of the additional waste quantity must be provided, and approval must be sought from the client/project manager prior to any off-site disposal of waste.

8.3 Capping Contingency

In the event that contaminated soil cannot be practicably removed, or if the quantity of contaminated material is cost-prohibitive to dispose of, an assessment must be made by the validation consultant regarding the risks posed by this material in the context of the proposed development, should it remain on site and be capped. For hydrocarbon impacted material, it may not be possible to simply cap/contain and manage this material if it poses an unacceptable vapour risk beneath a proposed building. Therefore, further sampling, analysis and risk assessment will be required in this scenario in order to establish a suitable course of action. This contingency is well suited to asbestos contamination however.

In the event that this contingency is to be implemented, a rationale for applying the contingency must be documented, the details below must be reviewed and updated for the situation, and approval must be sought from the project manager/client and the determining authority prior to proceeding with the remedial works (i.e. within an addendum RAP). A validation plan must also be documented.

In relation to asbestos, if all asbestos-contaminated fill cannot be practicably removed and disposed off-site, the fill must be capped with a robust capping layer and consequently the site and this area will be managed under a long-term EMP. The minimum capping requirements in such a circumstance are as follows:

- Installation of a brightly coloured (i.e. orange) geotextile marker layer over the contaminated fill;
- Installation of a minimum of 500mm of clean (validated) materials if the area is to be landscaped, and all landscaping must be shallow and must not penetrate the geotextile. If shallow landscaping is not achievable, then the capping thickness must be increased accordingly to meet this requirement; and
- In areas that are to be paved with hardstand (e.g. pavements, new building slabs etc), there is no need for 500mm of clean material and the pavements can be constructed directly over the top of the geotextile marker in accordance with the engineering requirements for the project.

The proposed remediation and validation steps associated with in-situ capping are outlined in the following table.

Table 8-1: Remediation Details – In-situ Capping Contingency

Step	Primary Role/Responsibility	Procedure
1.	Remediation contractor/principal contractor	<u>Service Trenching, Piling/Footing Excavations and Establishment of Pre-Capping Site Levels:</u> The principal contractor/remediation contractor are to undertake the relevant site preparation works, piling/footing excavations and any excavations required to facilitate the capping procedures. Any surplus excavated materials must be managed and (if required) disposed off-site appropriately in accordance with the relevant requirements outlined previously in this RAP.
2.	Remediation contractor	<u>Installation of Marker Layers and Survey of site levels:</u> After the bulk excavation levels are achieved to facilitate the minimum capping requirements, the geotextile marker is to be installed over the fill and secured appropriately using 'U' nails, pegs or other means. A pre-capping levels survey is to be completed by the remediation contractor prior to the placement of any overlying clean capping layers or construction of pavements etc. The purpose of the survey is to provide factual information of the site levels, and the horizontal extent of the geotextile marker, prior to installation of the clean capping layers. Survey points must be taken at appropriate frequencies (say every 5m lineal for narrow areas, a 5m grid for broader areas, at the corners/edges of the geotextile, and more frequently for significant change in surface elevation. The pre-capping levels survey is to be provided to the client/project manager and the validation consultant prior to any further capping works commencing.
3.	Validation consultant and remediation contractor	<u>Importation of Capping Materials:</u> Imported materials are to be validated in accordance with Section 7. Validated materials can then be used to achieve the minimum capping requirements for the project.

Step	Primary Role/ Responsibility	Procedure
4.	Remediation contractor	<u>Post-Capping Survey of site levels:</u> After completion of capping, a post-capping levels survey is to be completed by the remediation contractor. The purpose of the survey is to provide factual information regarding the capping thickness and confirm that the minimum capping requirements have been achieved. Survey points must be taken at appropriate frequencies as noted for the pre-capping survey. The post-capping levels survey is to be provided to the client/project manager and the validation consultant.

Where contaminated soil is capped on site, a long-term EMP will be required to manage the contamination capped at the site and the long-term EMP will be documented as part of the overall validation process. Public notification and enforcement mechanisms for the long-term EMP are to be arranged and the determining authority (and local council, if applicable) is to be provided with a draft copy of the long-term EMP for consultation prior to finalisation of the document.

The notification and enforcement mechanisms are to include notation on the planning certificate under Section 10.7 of the Environmental Planning and Assessment Act (1979) and a covenant registered on the title to land under Section 88B of the Conveyancing Act (1919).

The long-term EMP will include requirements for passive management of the capping system that will focus on maintaining the capping layers to minimise the potential of exposure to the underlying contaminated soil. The long-term EMP will also include contingencies for managing minor intrusive works in the event that the capping system is breached.

8.4 Importation Failure for VENM or other Imported Materials

Where material to be imported onto the site does not meet the importation VAC, the material should not be imported. Alternative material must be sourced that meets the importation requirements.

8.5 Remediation Strategy Changes

Any material change to the proposed remediation strategy will require an addendum to or a revision of the RAP. This must not occur without appropriate consultation and approvals from the client/determining authority and other relevant parties.

9 SITE MANAGEMENT PLAN FOR REMEDIATION WORKS

The information outlined in this section of the RAP is for the remediation work only. The client and project manager must also make reference to the development consent for specific site management requirements for the overall development of the site.

9.1 Asbestos Management Plan (AMP)

A construction/remediation-phase AMP must be prepared for the site and implemented for the site remediation and development works. The AMP must include the minimum PPE, WHS and other requirements outlined in the documents published by Safe Work Australia, WorkCover Authority of NSW, National Occupational Health and Safety Commission, and other relevant authorities as applicable. An asbestos removal control plan (ARCP) should be prepared by the remediation contractor and issued to SafeWork, and notification of asbestos removal is to be provided to SafeWork at least five days prior to commencement of works.

The client and project team must consider the need for a post-remediation AMP for the site to fulfil the obligations under Clause 429 of the Work Health and Safety Regulation (2017). The need for a post-remediation AMP must be assessed based on the outcome of the validation.

9.2 Interim Site Management

As noted in the previous JKE reports, an interim AMP for ongoing and normal use of the site (addressing asbestos in soil) should be prepared and implemented prior to the commencement of remediation to fulfill the requirement to have an AMP in place under the Work Health and Safety Regulation (2017).

9.3 Project Contacts

Emergency procedures and contact telephone numbers should be displayed in a prominent position at the site entrance gate and within the main site working areas. The contact details of key project personnel are summarised in the following table:

Table 9-1: Project Contacts

Role	Company	Contact Details
Client	NSW Health Infrastructure	Savills to confirm Project Director – Health Infrastructure T: M:
Project Manager	Savills Australia	James Collins Senior Project Manager M: 0402 418 109
Principal Contractor	To be appointed	-
Remediation Contractor	To be appointed	-

Validation Consultant	To be appointed	-
Certifier	To be appointed	-
NSW EPA	Pollution Line	131 555
Emergency Services	Ambulance, Police, Fire	000

9.4 Security

Appropriate fencing should be installed as required to secure the site and to isolate the remediation areas. Warning signs should be erected, which outline the PPE required for remediation work.

9.5 Timing and Sequencing of Remediation Works

The anticipated sequence of remediation works is outlined at the beginning of Section 6 of this RAP. Remediation and validation activities, including the data gap investigation, will occur concurrently with the demolition/development works to facilitate the implementation of the requirements under this RAP.

9.6 Site Soil and Water Management Plan

The remediation contractor should prepare a detailed soil and water management plan prior to the commencement of site works and this must consider the requirements of the AMP. Silt fences should be used to control the surface water runoff at all appropriate locations of the site and appropriate measures are to be implemented to manage soil/water disturbance to the satisfaction of the regulator/determining authority. Reference should be made to the REF for further details.

All stockpiled materials should be placed within an erosion containment boundary with silt fences and sandbags employed to limit sediment movement. The containment area should be located away from drainage lines/low-points, gutters, stormwater pits and inlets and the site boundary. No liquid waste or runoff should be discharged to the stormwater or sewerage system without the approval of the appropriate authorities.

9.7 Noise and Vibration Control Plan

The guidelines for minimisation of noise on construction sites outlined in AS-2460 (2002)¹⁶ should be adopted. Other measures specified in the consent conditions should also be complied with. Noise producing machinery and equipment should only be operated between the hours approved by the determining authority (refer to REF).

All practicable measures should be taken to reduce the generation of noise and vibration to within acceptable limits. In the event that short-term noisy operations are necessary, and where these are likely to affect

¹⁶ Australian Standard, (2002). AS2460: Acoustics - Measurement of the Reverberation Time in Rooms.

residences, notifications should be provided to the relevant authorities and the residents by the project manager, specifying the expected duration of the noisy works.

9.8 Dust Control Plan

All practicable measures should be taken to reduce dust emanating from the site. Factors that contribute to dust production are:

- Wind over a cleared surface;
- Wind over stockpiled material; and
- Movement of machinery in unpaved areas.

Visible dust should not be present at the site boundary. Measures to minimise the potential for dust generation include:

- Use of water sprays on unsealed or exposed soil surfaces;
- Covering of stockpiled materials and excavation faces (particularly during periods of site inactivity and/or during windy conditions) or alternatively the erection of hessian fences around stockpiled soil or large exposed areas of soil;
- Establishment of dust screens consisting of a 2m high shade cloth or similar material secured to a chain wire fence;
- Maintenance of dust control measures to keep the facilities in good operating condition;
- Stopping work during strong winds;
- Loading or unloading of dry soil as close as possible to stockpiles to prevent spreading of loose material around the development area; and
- Geofabric could be placed over exposed soils in the event that excavation is staged.

If stockpiles are to remain on-site or soil remains exposed for a period of longer than several days, dust monitoring should be undertaken at the site. If excessive dust is generated all site activities should cease until either wind conditions are more acceptable or a revised method of excavation/remediation is developed.

Dust is also produced during the transfer of material to and from the site. All material should be covered during transport and should be properly disposed of on delivery. No material is to be left in an exposed, un-monitored condition.

All equipment and machinery should be brushed or washed down before leaving the site to limit dust and sediment movement off-site. In the event of prolonged rain and lack of paved areas all vehicles should be washed down prior to exit from the site, and any soil or dirt on the wheels of the vehicles removed. Water used to clean the vehicles should be collected and tested prior to appropriate disposal under the relevant waste classification guidelines.

Reference is also to be made to the AMP in this regard.

9.9 Dewatering

Temporary dewatering is not anticipated to be required as part of the scope of remediation works. If a rain event occurs during the construction, this water should be managed appropriately on site in accordance with the remediation contractor's soil and water management plan. This water should not be pumped to stormwater or sewer unless a prior application is made and this is approved by the relevant authorities.

9.10 Air Monitoring

Air monitoring details must be outlined as part of the AMP to be prepared for the construction/remediation works. Air monitoring must only be carried out by personnel registered and accredited by NATA (National Association of Testing Authorities). Filter analysis must only be carried out within a NATA certified laboratory. The monitoring results must conform to the requirements of the NOHSC Guidance note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)].

A monitoring program will be used to assess whether the control procedures being applied are satisfactory and that criteria for airborne asbestos fibre levels are not being exceeded. The following levels will be used as action criteria during the air monitoring:

- <0.01 Fibres/ml: Work procedures deemed to be successful;
- 0.01 to 0.02 Fibres/ml: Inspection of the site and review of procedures; and
- >0.02 Fibres/ml: Stop work, inspection of the site, review of procedures, clean-up, rectification works where required and notify the relevant regulator.

9.11 Odour Control Plan

All activities undertaken at the site should be completed in a manner that minimises emissions of smoke, fumes and vapour into the atmosphere and any odours arising from the works or stockpiled material should be controlled. Control measures may include:

- Maintenance of construction equipment so that exhaust emissions comply with the Clean Air Regulations issued under the POEO Act 1997;
- Demolition materials and other combustible waste should not be burnt on site;
- The spraying of a suitable proprietary product to suppress any odours that may be generated by excavated materials; and
- Use of protective covers (e.g. builder's plastic).

All practicable measures should be taken to reduce fugitive emissions emanating from the site so that associated odours do not constitute a nuisance and that the ambient air quality is not adversely impacted.

The following odour management plan should be implemented to limit the exposure of site personnel and surrounding residents to unpleasant odours:

- Excavation and stockpiling of material should be scheduled during periods with low winds if possible;
- A suitable proprietary product could be sprayed on material during excavation and following stockpiling to reduce odours (subject to an appropriate assessment of the product by the validation consultant);
- All complaints from workers and neighbours should be logged and a response provided. Work should be rescheduled as necessary to minimise odour problems;

- The site foreman should consider the following odour control measures as outlined in NEPM:
 - reduce the exposed surface of the odorous materials;
 - time excavation activities to reduce off-site nuisance (particularly during strong winds); and
 - cover exposed excavation faces overnight or during periods of low excavation activity.
- If continued complaints are received, alternative odour management strategies should be considered and implemented.

9.12 WHS Plan

A site specific WHS plan must be prepared by the remediation contractor for all work to be undertaken at the site. The WHS plan should meet all the requirements outlined in SafeWork NSW WHS regulations.

As a minimum requirement, personnel must wear appropriate protective clothing, including long sleeve shirts, long trousers, steel cap boots and hard hats. Additional asbestos-related PPE will be required and this will be specified in the AMP. Washroom and lunchroom facilities should also be provided to allow workers to remove potential contamination from their hands and clothing prior to eating or drinking.

9.13 Waste Management

Prior to commencement of remedial works and excavation for the proposed development, the remediation contractor should develop a waste management plan to minimise the amount of waste produced from the site and promote recycling of building materials such as concrete pavement to the extent practicable.

9.14 Incident Management Contingency

The validation consultant should be contacted if any unexpected conditions are encountered at the site. This should enable the scope of remedial/validation works to be adjusted as required. Similarly, if any incident occurs at the site (e.g. a fuel spill during refuelling of machinery), the validation consultant should be advised to assess potential impacts on contamination conditions and the remediation/validation timetable.

9.15 Hours of Operation

Hours of operation should be between those approved by the determining authority under the development approval process (refer to the REF).

9.16 Community Consultation and Complaints

The remediation contractor should provide details for managing community consultation and complaints within their construction plans.

10 CONCLUSIONS

Previous investigations have identified bonded asbestos (ACM) in soil at one location (BH12) at a concentration that exceeded the adopted HSL-based SAC, and at the ground surface in one other location. The potential for additional occurrences of bonded ACM in/on soil has been acknowledged based on the fact that the fill/soil contains inclusions of demolition rubble.

The proposed remediation strategy includes excavation of the fill from an area at BH12, and disposal of the excavated material to a licensed landfill facility. Based on the available data, the nominated remediation area covers approximately 100m² and it is anticipated that approximately 30m³ of soil will be remediated via the excavation and off-site disposal method. However, parts of the site have been inaccessible to date and need to be investigated when access becomes available (i.e. after demolition of buildings). Further sampling around BH12 is also proposed under the provisions of the RAP in order to better assess the potential extent of asbestos in soil in this area. Data from this investigation will be used to establish whether any additional remediation is required.

A construction/remediation-phase AMP will be in place to manage potential asbestos risks to workers and adjacent land users.

The RAP also includes contingencies for addressing additional contamination should it be identified as an unexpected find or during the additional investigation work.

We are of the opinion that the site can be made suitable for the proposed development via remediation and the implementation of this RAP. A validation report is to be prepared on completion of remediation activities and submitted to the determining authority to demonstrate that the site is suitable for the proposed use following completion of remediation/validation. If contaminated material is capped on site (e.g. if the capping contingency needs to be implemented), a long-term EMP will also be prepared as part of the validation documentation.

The RAP has met the objectives outlined in Section 1.2.

10.1 Remediation Category

JKE has undertaken a preliminary assessment of the remediation Category with regards to the Category 1 remediation triggers in Clause 4.8 of SEPP Resilience and Hazards 2021. We consider that none of the Category 1 triggers have been met and therefore we have assessed that the remediation falls within Category 2. This should be confirmed by the client's expert planner.

10.2 Regulatory Requirements

The regulatory requirements applicable for the remediation are discussed in the following table:

Table 10-1: Regulatory Requirement

Guideline / Legislation / Policy	Applicability
SEPP Resilience and Hazards 2021	Prior notice of Category 2 remediation work is required with regards to Clauses 4.13 at least 30 days before the commencement of work. A notice of completion of remediation work is to be given to the local council within 30 days of completion of the work, in accordance with Clauses 4.14 and 4.15 of SEPP Resilience and Hazards 2021.
POEO Act 1997	Section 143 of the POEO Act 1997 states that if waste is transported to a place that cannot lawfully be used as a waste facility for that waste, then the transporter and owner of the waste are each guilty of an offence. The transporter and owner of the waste have a duty to ensure that the waste is disposed of in an appropriate manner. Appropriate waste tracking is required for all waste that is disposed off-site. Activities should be carried out in a manner which does not result in the pollution of waters.
POEO (Waste) Regulation 2014	Part 7 of the POEO Waste Regulation 2014 set outs the requirements for the transportation and management of asbestos waste and Clause 79 of the POEO Waste Regulation requires waste transporters to provide information to the NSW EPA regarding the movement of any load in NSW of more than 10 square meters of asbestos sheeting, or 100 kilograms of asbestos waste. To fulfil these legal obligations, asbestos waste transporters must use WasteLocate.
Work Health and Safety Regulation (2017)	Sites with asbestos become a 'workplace' when work is carried out there and require a register and AMP. Appropriate SafeWork NSW notification will be required for licensed (Class B) asbestos removal works or handling. Reference is to be made to the remediation/construction-phase AMP for further details regarding the regulatory requirements for managing asbestos during remediation.
SafeWork NSW Code of Practice: How to manage and control asbestos in the workplace (2019)	Sites with asbestos become a 'workplace' when work is carried out there and require a register and AMP. Appropriate SafeWork NSW notification will be required for licensed asbestos removal works or handling (e.g. Class B for non-friable asbestos removal).
NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997	The requirement to notify the EPA should be assessed as part of the site validation process. The need to notify will be largely dependent on the asbestos air monitoring results during the remediation. In our opinion the results obtained by JKE to date do not trigger a need to notify the EPA.

11 LIMITATIONS

The report limitations are outlined below:

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



Important Information About This Report

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

The Report is based on a Unique Set of Project Specific Factors

This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

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

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

Changes in Subsurface Conditions

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

This Report is based on Professional Interpretations of Factual Data

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

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

Investigation Limitations

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

Misinterpretation of Site Investigations by Design Professionals

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

Logs Should not be Separated from the Investigation Report

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

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

Read Responsibility Clauses Closely

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



Appendix A: Report Figures



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

Title:

SITE LOCATION PLAN

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Project No:

E34300PT2

Figure No:

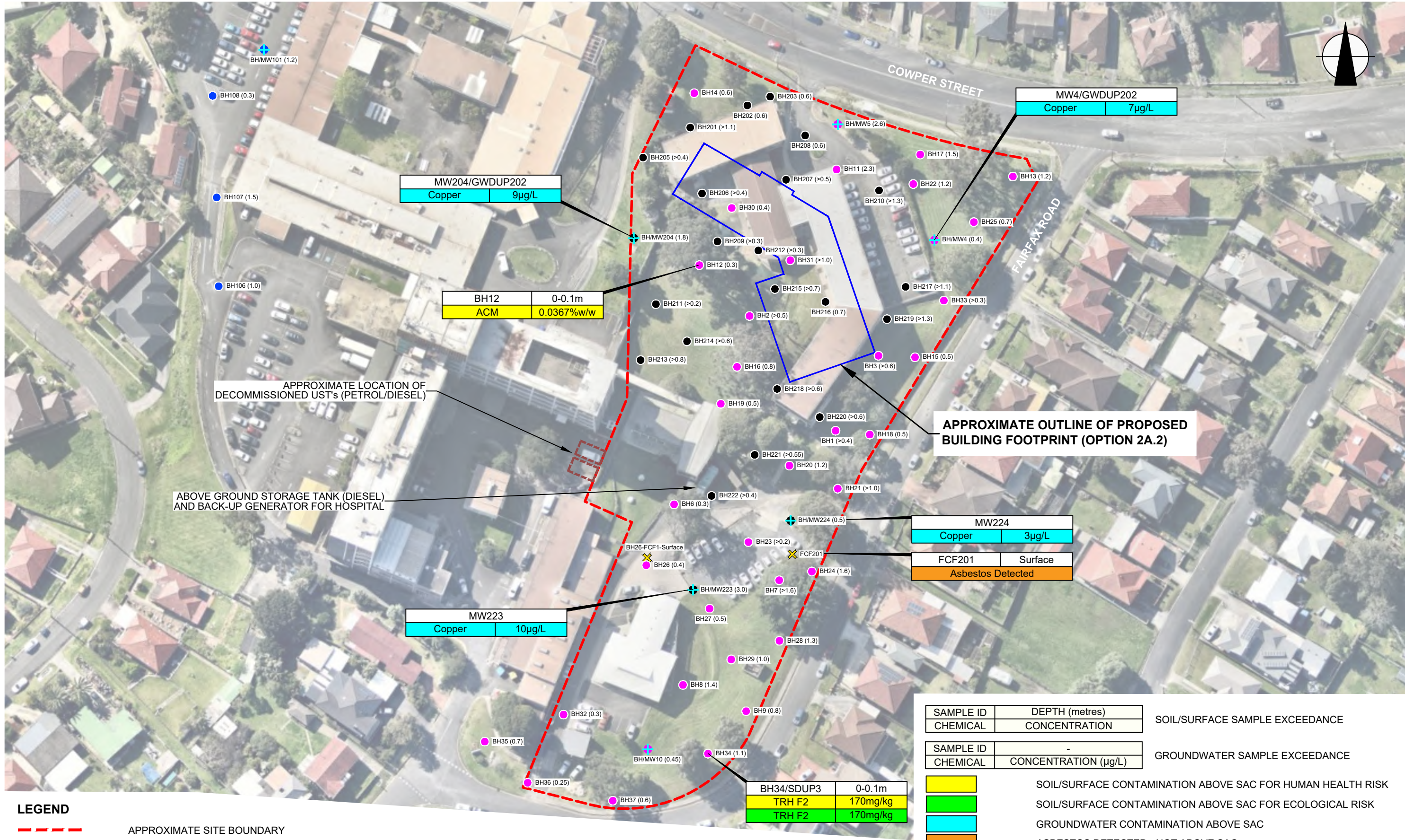
1

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

JKEnvironments



PLOT DATE: 22/11/2023 9:21:31 AM DWG FILE: K:\S\ EIS JOBS\3400\SE\34300PT DUNMORE\CA\IE3\300PT2\IE34300PT2-RAP.DWG © JK ENVIRONMENTS



LEGEND

- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE PSI, 2022)
- ⊕ BH/MW(Fill Depth) BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE PSI, 2022)
- ✕ FCF(Surface) FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)
- BH102 BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE PSI, 2023)
- ⊕ BH/MW101 BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE PSI, 2023)
- BH202 BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- ⊕ BH/MW213 BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)

SAMPLE ID	DEPTH (metres)	SOIL/SURFACE SAMPLE EXCEEDANCE
CHEMICAL	CONCENTRATION	
SAMPLE ID	-	GROUNDWATER SAMPLE EXCEEDANCE
CHEMICAL	CONCENTRATION (µg/L)	
		SOIL/SURFACE CONTAMINATION ABOVE SAC FOR HUMAN HEALTH RISK
		SOIL/SURFACE CONTAMINATION ABOVE SAC FOR ECOLOGICAL RISK
		GROUNDWATER CONTAMINATION ABOVE SAC
		ASBESTOS DETECTED - NOT ABOVE SAC

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 10 20 30 40 50
SCALE 1:1000 @A3 METRES

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

Title: **SAC EXCEEDANCE PLAN**

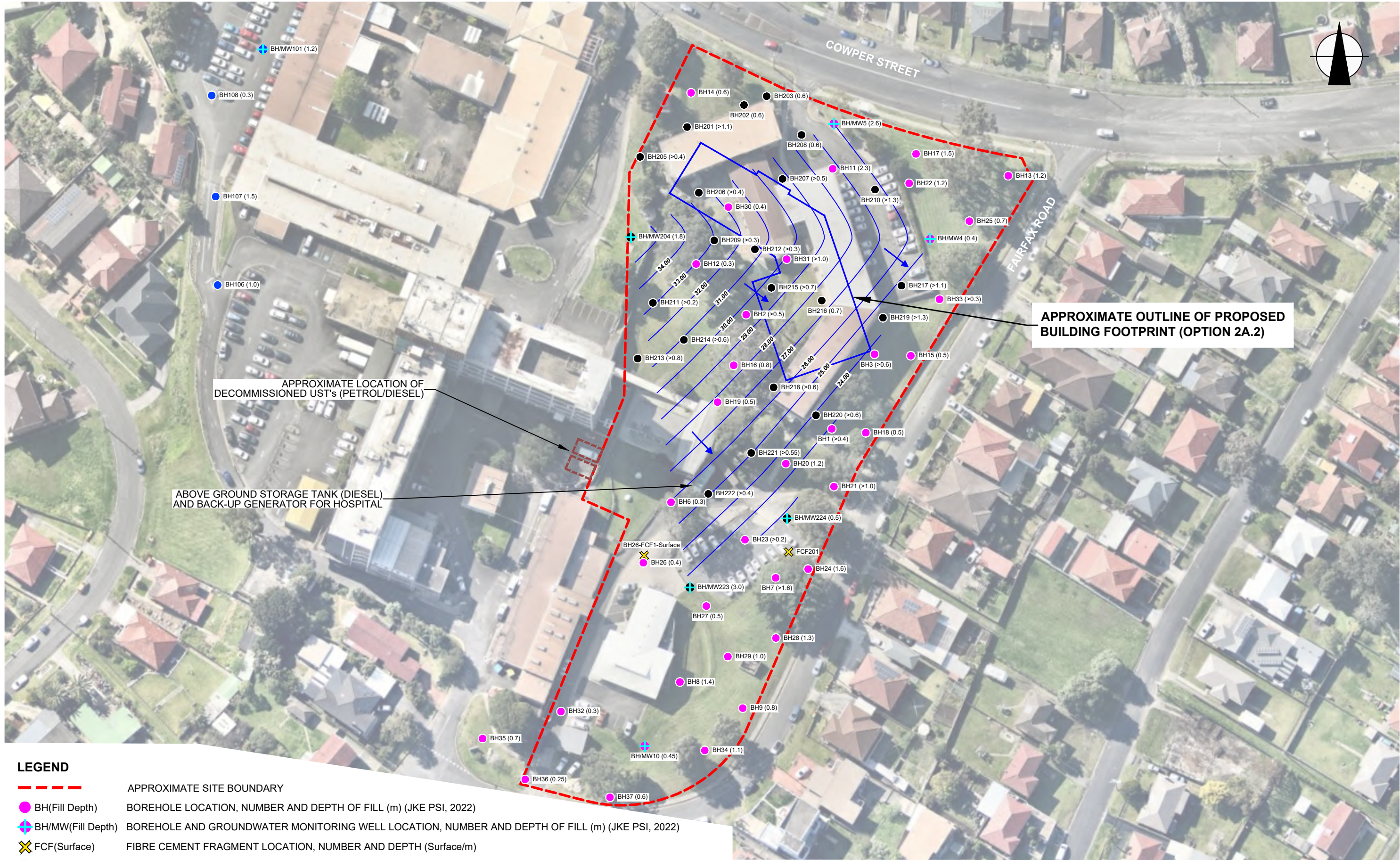
Location: 85-91 COWPER STREET, WARRAWONG, NSW

Project No: E34300PT2 Figure No: 3

JKEnvironments



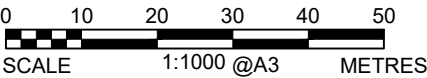
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LEGEND

- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE PSI, 2022)
- BH/MW(Fill Depth) BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE PSI, 2022)
- ✕ FCF(Surface) FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)
- BH102 BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE PSI, 2023)
- BH/MW101 BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE PSI, 2023)
- BH202 BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- BH/MW213 BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
- 24.50 GROUNDWATER CONTOUR INTERVALS (m)
- INFERRED GROUNDWATER FLOW DIRECTION

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

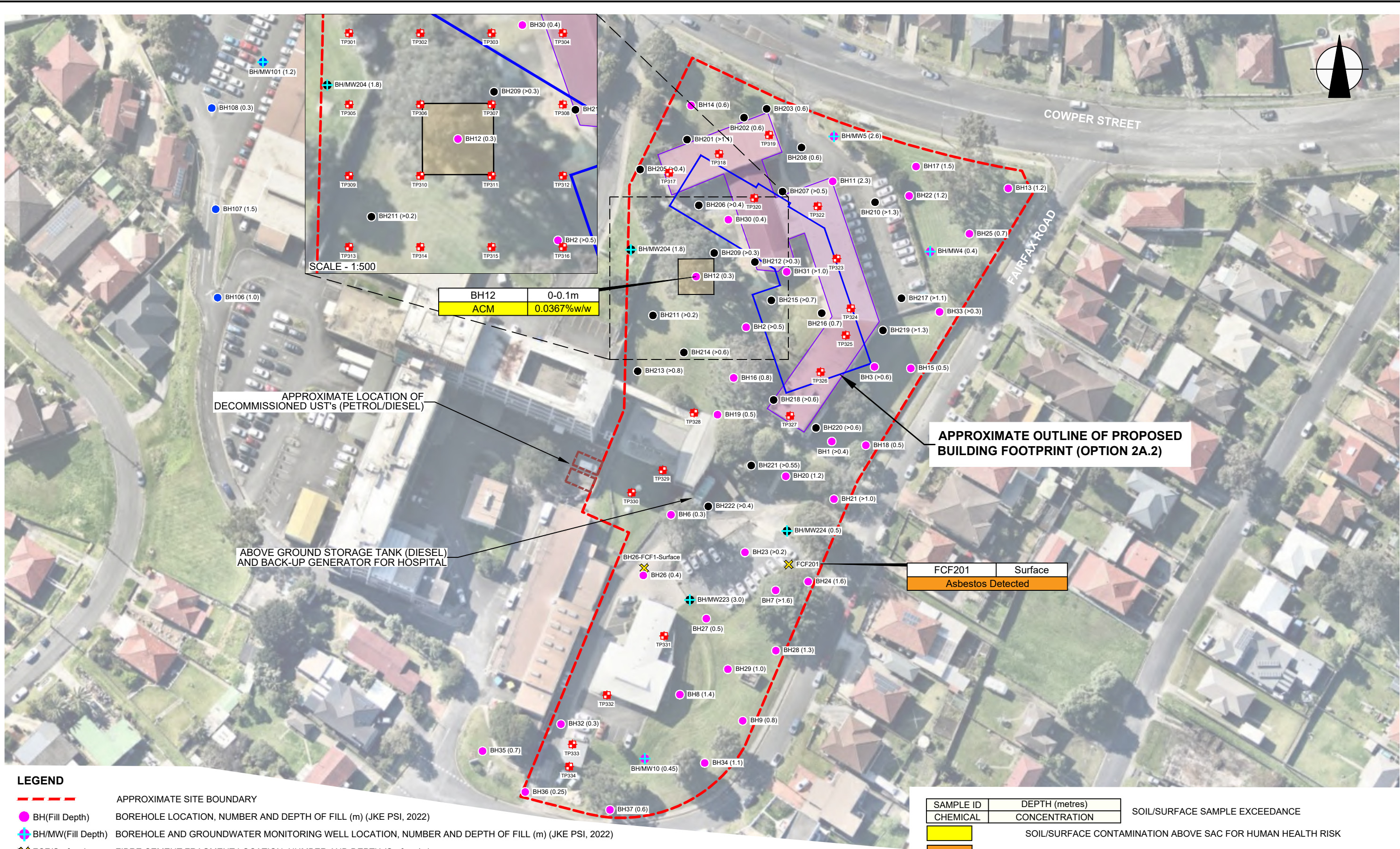


This plan should be read in conjunction with the Environmental report.

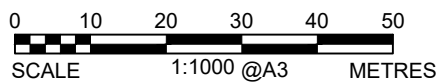
Title: GROUNDWATER CONTOUR PLOT	
Location: 85-91 COWPER STREET, WARRAWONG, NSW	
Project No: E34300PT2	Figure No: 4
JKEnvironments	



PLOT DATE: 24/11/2023 11:38:20 AM DWG FILE: K:\5C EIS JOBS\E34300PT DUNMORECAD\E34300PT2\E34300PT2-RAP.DWG



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM



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

Title: **REMEDIATION AREA & DGI SAMPLE LOCATION PLAN**

Location: 85-91 COWPER STREET, WARRAWONG, NSW

Project No: E34300PT2

Figure No: 5

JKEnvironments





Appendix B: Laboratory Summary Tables and Logs – Previous JKE Investigations

DSI Data Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

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

Table Specific Explanations:

HIL Tables:

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

EIL/ESL Table:

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

QA/QC Table:

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

TABLE S1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-A: 'Residential with garden/accessible soils; children's day care centers; preschools; and primary schools'

All data in mg/kg unless stated otherwise			HEAVY METALS							PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES	
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100	
Site Assessment Criteria (SAC)			100	20	100	6000	300	40	400	7400	300	3	10	270	300	6	50	240	6	160	1	Detected/Not Detected
Sample Reference	Sample Depth	Sample Description																				
BH1	0-0.1	F: Silty clay	<4	<0.4	14	93	23	0.1	9	85	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH1 - [LAB_DUP]	0-0.1	F: Silty clay	<4	<0.4	14	99	24	0.2	9	160	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH1 - [TRIPLICATE]	0-0.1	F: Silty clay	<4	<0.4	14	100	22	0.2	8	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	0.2-0.4	F: Silty clay	<4	<0.4	12	100	17	<0.1	8	73	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1 - [LAB_DUP]	0.2-0.4	F: Silty clay	<4	<0.4	9	64	15	<0.1	7	59	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1 - [TRIPLICATE]	0.2-0.4	F: Silty clay	<4	<0.4	8	59	12	<0.1	6	41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH2	0-0.1	F: Silty clay	<4	<0.4	12	52	18	<0.1	7	76	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH2	0.2-0.4	F: Silty clay	<8	<0.4	8	56	3	<0.1	6	11	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH3	0-0.1	F: Silty clay	<4	<0.4	21	96	29	<0.1	9	99	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH3	0.2-0.4	F: Silty clay	<4	<0.4	9	100	12	<0.1	10	49	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH4	0-0.1	F: Silty clay	<4	<0.4	22	87	24	<0.1	10	76	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH5	0-0.1	F: Silty clay	<4	<0.4	12	100	9	<0.1	9	44	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH5	0.8-1.0	F: Silty clay	<4	<0.4	20	84	17	<0.1	10	52	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH6	0.05-0.15	F: Sandy gravel	<4	<0.4	10	92	4	<0.1	6	24	0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH7	0-0.1	F: Silty clay	<4	<0.4	20	67	18	<0.1	8	74	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH7	0.6-0.8	F: Silty clay	<4	<0.4	7	47	4	<0.1	4	8	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH11	0.05-0.15	F: Sandy gravel	<4	<0.4	8	160	4	<0.1	6	33	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH11	0.7-0.9	F: Silty clay	<4	<0.4	6	73	4	<0.1	9	21	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH11	1.3-1.5	F: Silty clay	<4	<0.4	20	69	7	<0.1	6	26	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH11	2.3-2.5	Silty sandy clay	<4	<0.4	4	53	6	<0.1	11	32	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH12	0-0.1	F: Silty clay	<4	<0.4	16	57	21	<0.1	12	69	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Detected
BH12	0.2-0.3	F: Silty sandy clay	<4	<0.4	6	58	8	<0.1	11	23	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH13	0-0.1	F: Silty clay	<4	<0.4	14	52	54	<0.1	11	140	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH13	1.0-1.2	F: silty sandy clay	<4	<0.4	4	55	2	<0.1	8	12	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH14	0-0.1	F: Silty clay	<4	<0.4	19	68	15	<0.1	12	36	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH15	0-0.1	F: Silty clay	<4	<0.4	12	72	24	<0.1	7	73	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH15	0.4-0.6	F: Silty clay	<4	<0.4	15	98	66	<0.1	11	150	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH16	0-0.1	F: Silty clay	<4	<0.4	19	53	17	<0.1	6	47	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH17	0-0.1	F: Silty clay	<4	<0.4	21	69	38	<0.1	8	88	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH18	0-0.1	F: Silty clay	<4	<0.4	17	48	21	<0.1	12	59	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH18	0.1-0.2	F: Sandy gravel	<4	<0.4	6	36	4	<0.1	9	20	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH18	0.1-0.2	F: Sandy gravel	<4	<0.4	6	19	3	<0.1	10	11	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH18 - [LAB_DUP]	0.1-0.2	F: Sandy gravel	<4	<0.4	5	18	3	<0.1	9	12	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH19	0-0.1	F: Silty clay	<4	0.9	15	91	33	<0.1	8	100	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH20	0-0.1	F: Silty clay	<4	<0.4	12	50	21	<0.1	9	73	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH20	0.7-0.9	F: Silty clay	<4	<0.4	5	35	3	<0.1	4	8	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH21	0-0.1	F: Silty clay	<4	<0.4	18	72	28	<0.1	9	79	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH22	0-0.1	F: Silty clay	<4	<0.4	20	82	35	<0.1	8	91	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH23	0-0.1	F: Sandy gravel	6	<0.4	13	19	8	<0.1	13	42	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH24	0-0.1</																					

TABLE 52
SOIL LABORATORY RESULTS COMPARED TO HSLS
All data in mg/kg unless stated otherwise

				C _u -C ₁₀ (F1)	>C ₁₀ -C ₁₀ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement	
				25	50	0.2	0.5	1	1	1	ppm	
NIRMA 2013 HSL Land Use Category												
Sample Reference	Sample Depth	Sample Description	Depth Category	Soil Category	HSL-A/B: LOW/HIGH DENSITY RESIDENTIAL							
BH1	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH1 - [LAB_DUP]	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH1	0.2-0.4	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH1 - [LAB_DUP]	0.2-0.4	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH2	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH2	0.2-0.4	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH3	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH3	0.2-0.4	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH4	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH5	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH5	0.8-1.0	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH6	0.05-0.15	F: Sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH7	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH7	0.6-0.8	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH8	0.05-0.15	F: Sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH11	0.7-0.9	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH11	1.3-1.5	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH11	2.3-2.5	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH12	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH12	0.2-0.3	F: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH13	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH13	1.0-1.2	F: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH14	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH15	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH15	0.4-0.6	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH16	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH17	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH18	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH18	0.1-0.2	F: Sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH18	0.1-0.2	F: Sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	3.2
BH18 - [LAB_DUP]	0.1-0.2	F: Sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	3.2
BH19	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH20	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH20	0.7-0.9	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH21	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH22	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH23	0-0.1	F: Sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH24	0-0.1	F: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH25	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH25	0.7-0.9	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH26	0-0.1	F: Sandy gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH26	0.2-0.4	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH26	0.5-0.7	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH26 - [LAB_DUP]	0.5-0.7	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH27	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH27 - [LAB_DUP]	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH28	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH30	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH30	0.4-0.6	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH31	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH31	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH32	0.05-0.15	F: Gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH33	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
SDUP1	BH24 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
SDUP1	BH15 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
SDUP5	BH3 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
SDUPS - [LAB_DUP]	BH3 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
SDUP6	BH17 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
SDUP7	BH22 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
BH201	0-0.2	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.5
BH201 - [LAB_DUP]	0-0.2	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.5
BH201	0.8-1	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1
BH202	0-0.2	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1
BH202	1-1.2	Silty Sandy Clay	1m to <2m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.7
BH203	0-0.2	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.9
BH203	0.8-1	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.1
BH204	0-0.2	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH204	1.7-1.8	F: Silty Sandy Clay	1m to <2m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH205	0-0.2	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.2
BH205 - [LAB_DUP]	0-0.2	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.2
BH205	0.8-1	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1
BH206	0-0.4	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.9
BH207	0-0.4	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH208	0.1-0.3	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH208	0.7-1	Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH209	0-0.3	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.5
BH210	0.1-0.3	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH210	1-1.3	F: Gravelly Clay	1m to <2m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH211	0-0.2	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	2.4
BH211	0-0.3	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	2.3
BH212 - [LAB_DUP]	0-0.3	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	2.3
BH213	0-0.2	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	2.1
BH213	0.4-0.6	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.8
BH214	0-0.2	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.5
BH215	0-0.2	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.8
BH215	0.4-0.6	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.1
BH216	0-0.2	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.4
BH217	1.1-1.3	Silty Sandy Clay	1m to <2m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.5
BH218	0.1-0.3	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH217	0.7-1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH218	0-0.2	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.3
BH219	0-0.2	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.3
BH219 - [LAB_DUP]	0-0.2	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.3
BH219	1.1-1.3	F: Silty Sandy Clay	0m to <1m	Sand	<2							

TABLE 53
SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS
All data in mg/kg unless stated otherwise

			C ₆ -C ₁₀ (F3) plus BTEX	ΣC ₁₀ -C ₆₀ (F2) plus naphthalene	ΣC ₁₀ -C ₆₀ (F3)	ΣC ₁₀ -C ₆₀ (F4)
PQL - Envalrad Services			25	100	100	100
NEWNSW 2013 Land Use Category			25	100	100	100
RESIDENTIAL PARKLAND & PUBLIC OPEN SPACE						
Sample Reference	Sample Depth	Soil Texture				
BH1	0-0.1	Fine	<25	<50	<100	<100
BH1 - [LAB_DUP]	0-0.1	Fine	<25	<50	100	<100
BH1	0.2-0.4	Fine	<25	<50	<100	<100
BH1 - [LAB_DUP]	0.2-0.4	Fine	<25	<50	<100	<100
BH2	0-0.1	Fine	<25	<50	<100	<100
BH2	0.2-0.4	Fine	<25	<50	<100	<100
BH3	0-0.1	Fine	<25	<50	<100	<100
BH3	0.2-0.4	Fine	<25	<50	<100	<100
BH4	0-0.1	Fine	<25	<50	<100	<100
BH4	0-0.1	Fine	<25	<50	<100	<100
BH5	0-0.1	Fine	<25	<50	<100	<100
BH5	0.8-1.0	Fine	<25	<50	<100	<100
BH6	0.05-0.15	Fine	<25	<50	110	190
BH7	0-0.1	Fine	<25	<50	150	<100
BH7	0.6-0.8	Fine	<25	<50	<100	<100
BH11	0.05-0.15	Fine	<25	<50	<100	<100
BH11	0.7-0.9	Fine	<25	<50	<100	<100
BH11	1.3-1.5	Fine	<25	<50	220	<100
BH11	2.3-2.5	Fine	<25	<50	<100	<100
BH12	0-0.1	Fine	<25	<50	110	<100
BH12	0.2-0.3	Fine	<25	<50	<100	<100
BH13	0-0.1	Fine	<25	<50	130	<100
BH13	1.0-1.2	Fine	<25	<50	<100	<100
BH14	0-0.1	Fine	<25	<50	<100	<100
BH15	0-0.1	Fine	<25	<50	<100	<100
BH15	0.4-0.6	Fine	<25	<50	<100	<100
BH16	0-0.1	Fine	<25	<50	160	<100
BH17	0-0.1	Fine	<25	<50	<100	<100
BH18	0-0.1	Fine	<25	<50	<100	<100
BH18	0.1-0.2	Fine	<25	<50	<100	<100
BH18	0.1-0.2	Fine	<25	<50	<100	<100
BH18 - [LAB_DUP]	0.1-0.2	Fine	<25	<50	<100	<100
BH19	0-0.1	Fine	<25	<50	110	<100
BH20	0-0.1	Fine	<25	<50	100	<100
BH20	0.7-0.9	Fine	<25	<50	<100	<100
BH21	0-0.1	Fine	<25	<50	<100	<100
BH22	0-0.1	Fine	<25	<50	140	<100
BH23	0-0.1	Fine	<25	<50	<100	<100
BH24	0-0.1	Fine	<25	<50	160	<100
BH25	0-0.1	Fine	<25	<50	<100	<100
BH25	0.7-0.9	Fine	<25	<50	<100	<100
BH26	0-0.1	Fine	<25	<50	140	190
BH26	0.2-0.4	Fine	<25	<50	<100	<100
BH26	0.5-0.7	Fine	<25	<50	<100	<100
BH26 - [LAB_DUP]	0.5-0.7	Fine	<25	<50	<100	<100
BH27	0-0.1	Fine	<25	<50	100	<100
BH27 - [LAB_DUP]	0-0.1	Fine	<25	<50	<100	<100
BH28	0-0.1	Fine	<25	<50	<100	<100
BH30	0-0.1	Fine	<25	<50	<100	<100
BH30	0.4-0.6	Fine	<25	<50	<100	<100
BH31	0-0.1	Fine	<25	<50	<100	<100
BH31	0-0.1	Fine	<25	<50	<100	<100
BH33	0-0.1	Fine	<25	<50	<100	<100
SOLUP1	BH124 0-0.1	Fine	<25	<50	140	<100
SOLUP4	BH15 0-0.1	Fine	<25	<50	<100	<100
SOLUP5	BH10 0-0.1	Fine	<25	<50	100	<100
SOLUP5 - [LAB_DUP]	BH10 0-0.1	Fine	<25	<50	110	<100
SOLUP6	BH17 0-0.1	Fine	<25	<50	<100	<100
SOLUP7	BH22 0-0.1	Fine	<25	<50	<100	<100
BH201	0-0.2	Fine	<25	<50	<100	<100
BH201 - [LAB_DUP]	0-0.2	Fine	<25	<50	<100	<100
BH201	0.8-1	Fine	<25	<50	<100	<100
BH202	0-0.2	Fine	<25	<50	<100	<100
BH202	1-1.2	Fine	<25	<50	<100	<100
BH203	0-0.2	Fine	<25	<50	<100	<100
BH203	0.8-1	Fine	<25	<50	<100	<100
BH204	0-0.2	Fine	<25	<50	110	<100
BH204	1.7-1.8	Fine	<25	<50	<100	<100
BH205	0-0.2	Fine	<25	<50	<100	<100
BH205 - [LAB_DUP]	0-0.2	Fine	<25	<50	<100	<100
BH205	0.8-1	Fine	<25	<50	<100	<100
BH206	0-0.4	Fine	<25	<50	<100	<100
BH207	0-0.4	Fine	<25	<50	<100	<100
BH208	0.1-0.3	Fine	<25	<50	<100	<100
BH208	0.7-1	Fine	<25	<50	<100	<100
BH209	0-0.3	Fine	<25	<50	110	<100
BH210	0.1-0.3	Fine	<25	<50	<100	<100
BH210	1-1.3	Fine	<25	<50	<100	<100
BH211	0-0.2	Fine	<25	<50	<100	<100
BH212	0-0.3	Fine	<25	<50	<100	<100
BH212 - [LAB_DUP]	0-0.3	Fine	<25	<50	<100	<100
BH213	0-0.2	Fine	<25	<50	<100	<100
BH213	0.4-0.6	Fine	<25	<50	<100	<100
BH214	0-0.2	Fine	<25	<50	<100	<100
BH215	0-0.2	Fine	<25	<50	<100	<100
BH215	0.4-0.6	Fine	<25	<50	<100	<100
BH216	0-0.2	Fine	<25	<50	<100	<100
BH216	1.1-1.3	Fine	<25	<50	<100	<100
BH217	0.1-0.3	Fine	<25	<50	110	<100
BH217	0.7-1	Fine	<25	<50	<100	<100
BH218	0-0.2	Fine	<25	<50	<100	<100
BH218	0-0.2	Fine	<25	<50	<100	<100
BH219	0-0.2	Fine	<25	<50	<100	<100
BH219 - [LAB_DUP]	0-0.2	Fine	<25	<50	<100	<100
BH219	1.1-1.3	Fine	<25	<50	<100	<100
BH220	0-0.2	Fine	<25	<50	<100	<100
BH221	0-0.1	Fine	<25	<50	<100	<100
BH221 - [LAB_DUP]	0-0.1	Fine	<25	<50	<100	<100
BH221	0.4-0.55	Fine	<25	<50	<100	<100
BH222	0-0.1	Fine	<25	<50	<100	<100
BH223	0-0.1	Fine	<25	<50	<100	<100
BH223	0.3-0.4	Fine	<25	<50	<100	<100
BH223	1.0-1.2	Coarse	<25	<50	<100	<100
BH224	0-0.1	Coarse	<25	<50	<100	<100
BH224	0.3-0.5	Fine	<25	<50	<100	<100
BH224	0.75-0.95	Fine	<25	<50	<100	<100
S DUP 1	BH205 0-0.1	Fine	<25	<50	<100	<100
S DUP 2	BH201 0-0.1	Fine	<25	<50	<100	<100
S DUP 3	BH202 0-0.1	Fine	<25	<50	<100	<100
S DUP 4	BH203 0-0.1	Fine	<25	<50	<100	<100
S DUP 5	BH219 0-0.1	Fine	<25	<50	<100	<100
S DUP 6	BH215 0-0.1	Fine	<25	<50	<100	<100
SOLUP201	BH222 0-0.2	Fine	<25	<50	<100	<100
Total Number of Samples			53	53	53	53
Maximum Value			<PQL	<PQL	110	<PQL
Concentration above the SAC			VALUE			
Concentration above the PQL			Bold			
Note: Total number of samples and maximum values consider only the DSI data and not the PSI data. In addition, the grey shaded samples are from the PSI 2002.						

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Soil Texture	C _u -C ₆₀ (F1) plus BTEX	ΣC ₁₀ -C ₆₀ (F2) plus naphthalene	ΣC ₁₀ -C ₆₀ (F3)	ΣC ₁₀ -C ₆₀ (F4)
BH1	0-0.1	Fine	800	1000	3500	10000
BH1 - [LAB_DUP]	0-0.1	Fine	800	1000	3500	10000
BH1	0.2-0.4	Fine	800	1000	3500	10000
BH1 - [LAB_DUP]	0.2-0.4	Fine	800	1000	3500	10000
BH2	0-0.1	Fine	800	1000	3500	10000
BH2	0.2-0.4	Fine	800	1000	3500	10000
BH3	0-0.1	Fine	800	1000	3500	10000
BH3	0.2-0.4	Fine	800	1000	3500	10000
BH4	0-0.1	Fine	800	1000	3500	10000
BH4	0-0.1	Fine	800	1000	3500	10000
BH5	0.8-1.0	Fine	800	1000	3500	10000
BH6	0.05-0.15	Fine	800	1000	3500	10000
BH7	0-0.1	Fine	800	1000	3500	10000
BH7	0.6-0.8	Fine	800	1000	3500	10000
BH11	0.05-0.15	Fine	800	1000	3500	10000
BH11	0.7-0.9	Fine	800	1000	3500	10000
BH11	1.3-1.5	Fine	800	1000	3500	10000
BH11	2.3-2.5	Fine	800	1000	3500	10000
BH12	0-0.1	Fine	800	1000	3500	10000
BH12	0.2-0.3	Fine	800	1000	3500	10000
BH13	0-0.1	Fine	800	1000	3500	10000
BH13	1.0-1.2	Fine	800	1000	3500	10000
BH14	0-0.1	Fine	800	1000	3500	10000
BH15	0-0.1	Fine	800	1000	3500	10000
BH15	0.4-0.6	Fine	800	1000	3500	10000
BH16	0-0.1	Fine	800	1000	3500	10000
BH17	0-0.1	Fine	800	1000	3500	10000
BH18	0-0.1	Fine	800	1000	3500	10000
BH18	0.1-0.2	Fine	800	1000	3500	10000
BH18 - [LAB_DUP]	0.1-0.2	Fine	800	1000	3500	10000
BH19	0-0.1	Fine	800	1000	3500	10000
BH20	0-0.1	Fine	800	1000	3500	10000
BH20	0.7-0.9	Fine	800	1000	3500	10000
BH21	0-0.1	Fine	800	1000	3500	10000
BH22	0-0.1	Fine	800	1000	3500	10000
BH23	0-0.1	Fine	800	1000	3500	10000
BH24	0-0.1	Fine	800	1000	3500	10000
BH25	0.7-0.9	Fine	800	1000	3500	10000
BH26	0-0.1	Fine	800	1000	3500	10000
BH26	0.2-0.4	Fine	800	1000	3500	10000
BH26	0.5-0.7	Fine	800	1000	3500	10000
BH26 - [LAB_DUP]	0.5-0.7	Fine	800	1000	3500	10000
BH27	0-0.1	Fine	800	1000	3500	10000
BH27 - [LAB_DUP]	0-0.1	Fine	800	1000	3500	10000
BH28	0-0.1	Fine	800	1000	3500	10000
BH30	0-0.1	Fine	800	1000	3500	10000
BH30	0.4-0.6	Fine	800	1000	3500	10000
BH31	0-0.1	Fine	800	1000	3500	10000
BH31	0-0.1	Fine	800	1000	3500	10000
SOLUP1	BH34 0-0.1	Fine	800	1000	3500	10000
SOLUP2	BH29 0-0.1	Fine	800	1000	3500	10000
SOLUP3	BH34 0-0.1	Fine	800	1000	3500	10000
SOLUP4	BH15 0-0.1	Fine	800	1000	3500	10000
SOLUP5	BH10 0-0.1	Fine	800	1000	3500	10000
SOLUP6 - [LAB_DUP]	BH17 0-0.1	Fine	800	1000	3500	10000
SOLUP7	BH17 0-0.1	Fine	800	1000	3500	10000
SOLUP7	BH22 0-0.1	Fine	800	1000	3500	10000
BH201	0-0.1	Fine	800	1000	3500	10000
BH201 - [LAB_DUP]	0-0.2	Fine	800	1000	3500	10000
BH201	0.8-1	Fine	800	1000	3500	10000
BH202	0-0.2	Fine	800	1000	3500	10000
BH202	1-1.2	Fine	800	1000	3500	10000
BH203	0-0.2	Fine	800	1000	3500	10000
BH203	0.8-1	Fine	800	1000	3500	10000
BH204	0-0.2	Fine	800	1000	3500	10000
BH204	1.7-1.8	Fine	800	1000	3500	10000
BH205	0-0.2	Fine	800	1000	3500	10000
BH205 - [LAB_DUP]	0-0.2	Fine	800	1000	3500	10000
BH205	0.8-1	Fine	800	1000	3500	10000
BH206	0-0.4	Fine	800	1000	3500	10000
BH207	0-0.4	Fine	800	1000	3500	10000
BH208	0.1-0.3	Fine	800	1000	3500	10000
BH208	0-0.3	Fine	800	1000	3500	10000
BH209	0-0.3	Fine	800	1000	3500	10000
BH210	0.1-0.3	Fine	800	1000	3500	10000
BH210	1-1.3	Fine	800	1000	3500	10000
BH211	0-0.2	Fine	800	1000	3500	10000
BH212	0-0.3	Fine	800	1000	3500	10000
BH212 - [LAB_DUP]	0-0.3	Fine	800	1000	3500	10000
BH213	0-0.2	Fine	800	1000	3500	10000
BH213	0.4-0.6	Fine	800	1000	3500	10000
BH214	0-0.2	Fine	800	1000	3500	10000
BH215	0-0.2	Fine	800	1000	3500	10000
BH215	0.4-0.6	Fine	800	1000	3500	10000
BH216	0-0.2	Fine	800	1000	3500	10000
BH216	1-1.1	Fine	800	1000	3500	10000
BH217	0.1-0.3	Fine	800	1000	3500	10000
BH217	0-0.3	Fine	800	1000	3500	10000
BH218	0-0.2	Fine	800	1000	3500	10000
BH219	0-0.2	Fine	800	1000	3500	10000
BH219 - [LAB_DUP]	0-0.2	Fine	800	1000	3500	10000
BH219	1-1.1	Fine	800	1000	3500	10000
BH220	0-0.1	Fine	800	1000	3500	10000
BH221	0-0.1	Fine	800	1000	3500	10000
BH221 - [LAB_DUP]	0-0.1	Fine	800	1000	3500	10000
BH221	0.4-0.55	Fine	800	1000	3500	10000
BH222	0-0.1	Fine	800	1000	3500	10000
BH223	0-0.1	Fine	800	1000	3500	10000
BH223	0.3-0.4	Fine	800	1000	3500	10000
BH223	1.0-1.2	Coarse	700	1000	2500	10000
BH224	0-0.1	Coarse	700	1000	2500	10000
BH224	0.3-0.5	Fine	800	1000	3500	10000
BH224	0.7-0.9	Fine	800	1000	3500	10000
SOLUP1	BH205 0-0.1	Fine	800	1000	3500	10000
SOLUP2	BH201 0-0.1	Fine	800	1000	3500	10000
SOLUP3	BH202 0-0.1	Fine	800	1000	3500	10000
SOLUP4	BH205 0-0.1	Fine	800	1000	3500	10000
SOLUP5	BH219 0-0.1	Fine	800	1000	3500	10000
SOLUP6	BH215 0-0.1	Fine	800	1000	3500	10000
SOLUP7	BH212 0-0.2	Fine	800	1000	3500	10000

TABLE S4 SOIL LABORATORY RESULTS COMPARED TO DIRECT CONTACT CRITERIA All data in mg/kg unless stated otherwise											
Analyte	C ₆ -C ₁₀	>C ₁₀ -C ₁₆	>C ₁₆ -C ₃₄	>C ₃₄ -C ₄₀	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID	
PQL - Envirolab Services	25	50	100	100	0.2	0.5	1	1	1		
CRC 2011 - Direct contact Criteria	4,400	3,300	4,500	6,300	100	14,000	4,500	12,000	1,400		
Site Use		RESIDENTIAL WITH ACCESSIBLE SOIL- DIRECT SOIL CONTACT									
Sample Reference	Sample Depth										
BH1	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH1 - [LAB_DUP]	0-0.1	<25	<50	100	<100	<0.2	<0.5	<1	<1	0	
BH1	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH1 - [LAB_DUP]	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH2	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH2	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH3	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH3	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH4	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH5	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH5	0.8-1.0	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH6	0.05-0.15	<25	<50	110	190	<0.2	<0.5	<1	<1	0	
BH7	0-0.1	<25	<50	150	<100	<0.2	<0.5	<1	<1	0	
BH7	0.6-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH11	0.05-0.15	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH11	0.7-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH11	1.3-1.5	<25	<50	220	<100	<0.2	<0.5	<1	<1	0	
BH11	2.3-2.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH12	0-0.1	<25	<50	110	<100	<0.2	<0.5	<1	<1	0	
BH12	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH13	0-0.1	<25	<50	130	<100	<0.2	<0.5	<1	<1	0	
BH13	1.0-1.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH14	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH15	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH15	0.4-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH16	0-0.1	<25	<50	160	<100	<0.2	<0.5	<1	<1	0	
BH17	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH18	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH18	0.1-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH18	0.1-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	3.2	
BH18 - [LAB_DUP]	0.1-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	3.2	
BH19	0-0.1	<25	<50	110	<100	<0.2	<0.5	<1	<1	0	
BH20	0-0.1	<25	<50	100	<100	<0.2	<0.5	<1	<1	0	
BH20	0.7-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH21	0-0.1	<25	<50	140	<100	<0.2	<0.5	<1	<1	0	
BH22	0-0.1	<25	<50	140	<100	<0.2	<0.5	<1	<1	0	
BH23	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH24	0-0.1	<25	<50	160	<100	<0.2	<0.5	<1	<1	0	
BH25	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH25	0.7-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH26	0-0.1	<25	<50	140	190	<0.2	<0.5	<1	<1	0	
BH26	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH26	0.5-0.7	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH26 - [LAB_DUP]	0.5-0.7	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH27	0-0.1	<25	<50	100	<100	<0.2	<0.5	<1	<1	0	
BH27 - [LAB_DUP]	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH28	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH30	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH30	0.4-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH31	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH33	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
SDUP1	BH24 0-0.1	<25	<50	140	<100	<0.2	<0.5	<1	<1	NA	
SDUP4	BH15 0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	NA	
SDUP5	BH3 0-0.1	<25	<50	100	<100	<0.2	<0.5	<1	<1	NA	
SDUP5 - [LAB_DUP]	BH3 0-0.1	<25	<50	110	<100	<0.2	<0.5	<1	<1	NA	
SDUP6	BH17 0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	NA	
SDUP7	BH22 0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	NA	
BH201	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1.5	
BH201 - [LAB_DUP]	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1.5	
BH201	0.8-1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1	
BH202	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1	
BH202	1-1.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1.7	
BH203	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.9	
BH203	0.8-1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1.1	
BH204	0-0.2	<25	<50	110	<100	<0.2	<0.5	<1	<1	0	
BH204	1.7-1.8	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH205	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1.2	
BH205 - [LAB_DUP]	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1.2	
BH205	0.8-1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1	
BH206	0-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1.9	
BH207	0-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH208	0.1-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH208	0.7-1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH209	0-0.3	<25	<50	110	<100	<0.2	<0.5	<1	<1	1.5	
BH210	0.1-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH210	1-1.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0	
BH211	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	2.4	
BH212	0-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	2.3	
BH212 - [LAB_DUP]	0-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	2.3	
BH213	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	2.1	
BH213	0.4-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.8	
BH214	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.5	
BH215	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.8	
BH215	0.4-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1.1	
BH216	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	1.4	
BH216	1.1-1.3	<25	<50	<100	<100	<0.2	<0.5	<1	<		

TABLE 55
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HSL-A: Residential with garden/accessible soils; children's day care centers; preschools; and primary schools

FIELD DATA															LABORATORY DATA											
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass [Asbestos in ACM (g)]	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos from FA in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample reference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation % (w/w)	FA and AF Estimation % (w/w)	
SAC			No							0.01														0.01	0.001	
27/09/2022	BH1	0-0.1	No	10	8,190	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH1	0-0.1	502.88	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH1	0.1-0.4	NA	--	3,180	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
28/09/2022	BH2	0-0.1	No	--	6,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH2	0-0.1	542.63	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
28/09/2022	BH2	0.1-0.5	NA	--	3,730	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
27/09/2022	BH3	0-0.1	No	--	6,870	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH3	0-0.1	456.64	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH3	0.1-0.2	NA	--	4,630	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
27/09/2022	BH3	0.2-0.6	NA	--	4,010	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
27/09/2022	BH4	0-0.1	No	10	11,130	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH4	0-0.1	412.24	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH4	0.1-0.4	NA	--	2,640	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
27/09/2022	BH5	0-0.1	No	10	11,020	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH5	0-0.1	592.87	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH5	0.1-1.2	NA	--	7,260	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
27/09/2022	BH6	0.02-0.2	No	--	4,280	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH6	0.05-0.15	923.34	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH6	0.2-0.3	NA	--	3,160	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
29/09/2022	BH7	0-0.1	No	10	11,810	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH7	0-0.1	536.82	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
29/09/2022	BH7	0.1-0.6	NA	--	6,490	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
29/09/2022	BH7	0.6-1.6	NA	--	5,680	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
29/09/2022	BH11	0.01-0.15	No	10	8,760	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH11	0.05-0.15	908.2	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
29/09/2022	BH11	0.15-1.6	NA	--	6,810	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228-A	BH11	0.7-0.9	520.53	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
--	--	--	--	--	--	--	--	--	--	--	--	--	--	307228	BH11	1.3-1.5	467.8	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001	
29/09/2022	BH11	1.6-1.9	NA	--	6,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
29/09/2022	BH11	1.9-2.3	NA	--	3,410	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
28/09/2022	BH12	0-0.1	No	10	7,780	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH12	0-0.1	549.94	Chrysotile asbestos detected; Amosite asbestos detected; Crocidolite asbestos detected; Organic fibres detected	No asbestos detected	0.3667	No visible asbestos detected	0.2017	--	0.0367	<0.001
28/09/2022	BH12	0.1-0.2	NA	--	3,210	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
28/09/2022	BH12	0.2-0.3	NA	--	2,650	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228-A	BH12	0.2-0.3	835.02	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH13	0-0.1	No	--	4,810	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH13	0-0.1	394.55	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH13	0.1-0.3	NA	--	3,180	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
29/09/2022	BH14	0-0.1	No	10	10,740	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH14	0-0.1	421.8	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
29/09/2022	BH14	0.1-0.6	NA	--	6,350	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
27/09/2022	BH15	0-0.1	No	--	4,820	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH15	0-0.1	491.69	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH15	0.1-0.2	NA	--	2,180	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
27/09/2022	BH15	0.2-0.3	NA	--	1,360	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
28/09/2022	BH16	0-0.1	No	--	6,920	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH16	0-0.1	592.75	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
28/09/2022	BH16	0.1-0.8	NA	--	3,410	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
27/09/2022	BH17	0-0.1	No	--	5,750	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH17	0-0.1	377.16	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH17	0.1-0.5	NA	--	4,180	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
27/09/2022	BH17	0.5-1.5	NA	--	7,280	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
27/09/2022	BH18	0-0.1	No	10	9,810	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH18	0-0.1	424.39	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH18	0.1-0.2	NA	--	2,020	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH18	0.1-0.2	538.39	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH18	0.2-0.5	NA	--	1,350	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
25/09/2022	BH19	0-0.1	No	10	9,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH19	0-0.1	466.22	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
28/09/2022	BH19	0.1-0.2	NA	--	4,180	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
28/09/2022	BH19	0.2-0.5	NA	--	4,380	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	
28/09/2022	BH20	0-0.1	No	--	7,810	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH20	0-0.1	447.81	No asbestos detected at reporting limit of 0.1g/kg: Organic							

TABLE 56
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs and ESLs
All data in mg/kg unless stated otherwise

Land Use Category				URBAN RESIDENTIAL AND PUBLIC OPEN SPACE														EILs					
				pH	CEC (cmol/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2)	>C ₁₀ -C ₁₆ (F3)	>C ₁₀ -C ₁₆ (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Bio/P
PGL - Envisolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	8	18	104	5	77	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	Sample Depth	Sample Description	Soil Texture																				
BH1	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	14	93	23	9	85	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1 - [LAB_DUP]	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	14	99	24	9	100	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1 - [TRIPPLICATE]	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	14	100	22	8	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH1	0-0.04	F: Silty clay	Fine	8.62	23.2	NA	<4	12	100	17	8	73	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1 - [LAB_DUP]	0-0.04	F: Silty clay	Fine	NA	NA	NA	<4	9	64	15	7	59	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1 - [TRIPPLICATE]	0-0.04	F: Silty clay	Fine	NA	NA	NA	<4	8	59	12	6	41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH2	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	12	52	12	10	76	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH2	0-0.04	F: Silty clay	Fine	NA	NA	NA	<8	8	56	3	6	11	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH3	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	21	96	29	9	99	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH4	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	9	100	12	10	49	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH4	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	22	87	24	10	76	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH5	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	12	100	9	46	11	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH5	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	20	84	17	10	52	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH5	0.05-0.15	F: Silty gravel	Fine	8.62	23.2	NA	<4	10	92	4	6	24	<1	<0.1	>25	<50	<110	190	<0.2	<0.5	<1	<1	<0.05
BH7	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	20	67	18	8	74	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH7	0-0.08	F: Silty clay	Fine	NA	NA	NA	<4	7	47	4	4	8	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH11	0.05-0.15	F: Silty gravel	Fine	8.62	23.2	NA	<4	8	160	4	6	33	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH11	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	6	73	4	9	21	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH11	1.3-1.5	F: Silty clay	Fine	NA	NA	NA	<4	20	69	7	26	26	<1	<0.1	>25	<50	220	<100	<0.2	<0.5	<1	<1	<0.05
BH11	2.3-2.5	Silty sandy clay	Fine	NA	NA	NA	<4	4	53	6	11	32	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH12	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	16	57	21	12	69	<1	<0.1	>25	<50	110	<100	<0.2	<0.5	<1	<1	<0.05
BH12	0-0.09	F: Silty sandy clay	Fine	NA	NA	NA	<4	16	58	8	23	6	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH13	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	14	52	54	11	140	<1	<0.1	>25	<50	190	<100	<0.2	<0.5	<1	<1	<0.05
BH13	1.0-1.2	F: Silty sandy clay	Fine	NA	NA	NA	<4	4	55	2	8	12	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH14	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	19	108	15	36	15	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH15	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	12	72	24	7	73	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH15	0-0.06	F: Silty clay	Fine	8.62	23.2	NA	<4	15	98	46	11	150	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH16	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	19	53	17	6	47	<1	<0.1	>25	<50	140	<100	<0.2	<0.5	<1	<1	<0.05
BH17	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	21	69	38	8	88	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH18	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	17	48	21	12	59	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH18	0-0.2	F: Silty gravel	Fine	NA	NA	NA	<4	6	36	4	9	20	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH18	0-0.1	F: Silty sand	Fine	NA	NA	NA	<4	6	19	3	10	11	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH18 - [LAB_DUP]	0-0.2	F: Silty gravel	Fine	NA	NA	NA	<4	5	18	3	9	12	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH19	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	15	91	33	8	100	<1	<0.1	>25	<50	110	<100	<0.2	<0.5	<1	<1	<0.05
BH20	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	12	50	11	9	73	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH20	0-0.09	F: Silty clay	Fine	NA	NA	NA	<4	5	35	3	4	8	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH21	0-0.1	F: Silty gravel	Fine	8.62	23.2	NA	<4	20	82	35	8	91	<1	<0.1	>25	<50	140	<100	<0.2	<0.5	<1	<1	<0.05
BH21	0-0.1	F: Silty gravel	Fine	NA	NA	NA	<4	8	13	19	8	13	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH24	0-0.1	F: Silty sand	Fine	NA	NA	NA	<4	18	61	20	11	67	<1	<0.1	>25	<50	140	<100	<0.2	<0.5	<1	<1	<0.05
BH25	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	22	76	33	8	89	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH25	0-0.09	F: Silty sandy clay	Fine	8.62	23.2	NA	<4	12	140	4	24	24	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH26	0-0.1	F: Silty gravel	Fine	NA	NA	NA	<4	5	16	3	2	24	<1	<0.1	>25	<50	140	190	<0.2	<0.5	<1	<1	<0.05
BH26	0-0.04	F: Silty clay	Fine	NA	NA	NA	<4	11	70	21	11	94	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH26	0-0.07	F: Silty gravel	Fine	8.62	23.2	NA	<4	9	110	5	12	35	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH26 - [LAB_DUP]	0-0.07	F: Silty gravel	Fine	8.62	23.2	NA	<4	8	120	8	13	33	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH27	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	17	49	21	6	44	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH27 - [LAB_DUP]	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	17	46	21	6	44	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH28	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	19	84	26	7	87	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH28	0-0.06	F: Silty sandy clay	Fine	8.62	23.2	NA	<4	14	130	29	7	87	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH28	0-0.06	F: Silty sandy clay	Fine	8.62	23.2	NA	<4	28	82	6	19	49	<1	NA	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH31	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	15	58	16	8	59	<1	<0.1	>25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH33	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	15	45	18	9	52	<1	<0.1	>25	<50	<100						

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

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total	TRH					BTX COMPOUNDS				ASBESTOS FIBRES	
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B[a]P	Total Endosulfans	Chlorpyrifos	Total Moderately Harmful	Total Scheduled	PCBs	C ₆ -C ₉	C ₁₀ -C ₁₄	C ₁₅ -C ₂₈	C ₂₉ -C ₃₆	Total C ₁₀ -C ₃₆	Benzene	Toluene	Ethyl benzene	Total Xylenes		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	25	50	100	100	50	0.2	0.5	1	1	100	
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	650	NSL	NSL	NSL	NSL	10,000	10	288	600	1,000	-
General Solid Waste SC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650	NSL	NSL	NSL	NSL	10,000	18	518	1,080	1,800	-
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600	NSL	NSL	NSL	NSL	40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste SC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600	NSL	NSL	NSL	NSL	40,000	72	2,073	4,320	7,200	-
Sample Reference	Sample Depth	Sample Description																										
BH1	0-0.1	F: Silty clay	<4	<0.4	14	93	23	0.1	9	85	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH1 - [LAB_DUP]	0-0.1	F: Silty clay	<4	<0.4	14	99	24	0.2	9	160	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH1 - [TRIPLICATE]	0-0.1	F: Silty clay	<4	<0.4	14	100	22	0.2	8	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH1	0.2-0.4	F: Silty clay	<4	<0.4	12	100	17	<0.1	8	73	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH1 - [LAB_DUP]	0.2-0.4	F: Silty clay	<4	<0.4	9	64	15	<0.1	7	59	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH1 - [TRIPLICATE]	0.2-0.4	F: Silty clay	<4	<0.4	8	59	12	<0.1	6	41	NA	NA	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH2	0-0.1	F: Silty clay	<4	<0.4	12	52	18	<0.1	7	76	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH2	0.2-0.4	F: Silty clay	<8	<0.4	8	56	3	<0.1	6	11	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH3	0-0.1	F: Silty clay	<4	<0.4	21	96	29	<0.1	9	99	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH3	0.2-0.4	F: Silty clay	<4	<0.4	9	100	12	<0.1	10	49	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH4	0-0.1	F: Silty clay	<4	<0.4	22	87	24	<0.1	10	76	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH5	0-0.1	F: Silty clay	<4	<0.4	12	100	9	<0.1	9	44	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH5	0.8-1.0	F: Silty clay	<4	<0.4	20	84	17	<0.1	10	52	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH6	0.05-0.15	F: Sandy gravel	<4	<0.4	10	92	4	<0.1	6	24	0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	120	120	<0.2	<0.5	<1	<1	Not Detected	
BH7	0-0.1	F: Silty clay	<4	<0.4	20	67	18	<0.1	8	74	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH7	0.6-0.8	F: Silty clay	<4	<0.4	7	47	4	<0.1	4	8	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH11	0.05-0.15	F: Sandy gravel	<4	<0.4	8	160	4	<0.1	6	33	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH11	0.7-0.9	F: Silty clay	<4	<0.4	6	73	4	<0.1	9	21	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH11	1.3-1.5	F: Silty clay	<4	<0.4	20	69	7	<0.1	6	26	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	180	180	180	<0.2	<0.5	<1	<1	Not Detected	
BH11	2.3-2.5	Silty sandy clay	<4	<0.4	4	53	6	<0.1	11	32	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH12	0-0.1	F: Silty clay	<4	<0.4	16	57	21	<0.1	12	69	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Detected	
BH12	0.2-0.3	F: silty sandy clay	<4	<0.4	6	58	8	<0.1	11	23	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH13	0-0.1	F: Silty clay	<4	<0.4	14	52	54	<0.1	11	140	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH13	1.0-1.2	F: silty sandy clay	<4	<0.4	4	55	2	<0.1	8	12	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH14	0-0.1	F: Silty clay	<4	<0.4	19	68	15	<0.1	12	36	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH15	0-0.1	F: Silty clay	<4	<0.4	12	72	24	<0.1	7	73	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH15	0.4-0.6	F: Silty clay	<4	<0.4	15	98	66	<0.1	11	150	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH16	0-0.1	F: Silty clay	<4	<0.4	19	53	17	<0.1	6	47	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	100	100	<0.2	<0.5	<1	<1	Not Detected	
BH17	0-0.1	F: Silty clay	<4	<0.4	21	69	38	<0.1	8	88	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH18	0-0.1	F: Silty clay	<4	<0.4	17	48	21	<0.1	12	59	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH18	0.1-0.2	F: Sandy gravel	<4	<0.4	6	36	4	<0.1	9	20	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<					

[illegible]

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

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

TABLE G1 SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO ECOLOGICAL GILS SAC All results in µg/L unless stated otherwise.															
	PQL Envirolab Services	ANZG 2018 Marine Waters	PSI SAMPLES					DSI SAMPLES							
			MW4	MW4 LAB DUP	MW5	WDUP1 MW4	WDUP2 MW5	MW4	MW4 LAB DUP	MW5	MW204	MW223	MW224	GWDUP201 (MW204)	GWDUP202 (MW4)
Inorganic Compounds and Parameters															
pH	-	7 - 8.5	7.9	NA	7.4	NA	NA	6.7	NA	7.1	7.6	8.5	7.8	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	980	NA	630	NA	NA	300	NA	720	560	600	1200	NA	NA
Metals and Metalloids															
Arsenic (As III)	1	2.3	2	[NT]	<1	2	<1	<1	<1	<1	<1	1	<1	<1	<1
Cadmium	0.1	0.7	<0.1	[NT]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium (SAC for Cr III adopted)	1	27	<1	[NT]	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	1	1.3	6	[NT]	<1	27	<1	9	8	1	7	10	3	6	7
Lead	1	4.4	<1	[NT]	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Mercury (inorganic)	0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel	1	7	<1	[NT]	<1	4	<1	<1	<1	<1	<1	<1	1	<1	<1
Zinc	1	15	<1	[NT]	<1	21	<1	4	4	3	8	7	9	8	5
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)															
Benzene	1	500	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Toluene	1	180	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Ethylbenzene	1	5	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
m+p-xylene	2	75	<2	NA	<2	<2	<2	<2	<2	<2	<2	<20	<2	<2	<2
o-xylene	1	350	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Total xylenes	2	NSL	<2	NA	<2	<2	<2	<2	<2	<2	<2	<20	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs															
Dichlorodifluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Chloromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Vinyl Chloride	10	100	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Bromomethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Chloroethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Trichlorofluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
1,1-Dichloroethene	1	700	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Trans-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1-dichloroethane	1	250	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Cis-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Bromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Chloroform	1	370	20	NA	12	14	12	<1	<1	<1	4	12	22	4	<1
2,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2-dichloroethane	1	1900	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,1-trichloroethane	1	270	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Cyclohexane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Carbon tetrachloride	1	240	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Benzene	1	500	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Dibromomethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2-dichloropropane	1	900	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Trichloroethene	1	330	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Bromodichloromethane	1	NSL	1	NA	<1	<1	<1	<1	<1	<1	<1	<10	4	<1	<1
trans-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
cis-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,2-trichloroethane	1	1900	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Toluene	1	180	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,3-dichloropropane	1	1100	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Dibromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2-dibromoethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Tetrachloroethene	1	70	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Chlorobenzene	1	55	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Ethylbenzene	1	5	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Bromoform	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
m+p-xylene	2	75	<2	NA	<2	<2	<2	<2	<2	<2	<2	<20	<2	<2	<2
Styrene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,2,2-tetrachloroethane	1	400	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
o-xylene	1	350	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2,3-trichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Isopropylbenzene	1	30	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Bromobenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
n-propyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
2-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
4-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Tert-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,3-dichlorobenzene	1	260	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1



TABLE G2 SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO HUMAN CONTACT GILS All results in µg/L unless stated otherwise.															
	PQL Envirolab Services	Recreational (10 x NHMRC ADWG)	PSI SAMPLES					DSI SAMPLES							
			MW4	MW4 LAB DUP	MW5	WDUP1 MW4	WDUP2 MW5	MW4	MW4 LAB DUP	MW5	MW204	MW223	MW224	GWDUP201 (MW204)	GWDUP202 (MW4)
Inorganic Compounds and Parameters															
pH	-	6.5 - 8.5	7.9	NA	7.4	NA	NA	6.7	NA	7.1	7.6	8.5	7.8	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	980	NA	630	NA	NA	300	NA	720	560	600	1200	NA	NA
Metals and Metalloids															
Arsenic (As III)	1	100	2	[NT]	<1	2	<1	<1	<1	<1	<1	1	<1	<1	<1
Cadmium	0.1	20	<0.1	[NT]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium (total)	1	500	<1	[NT]	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	1	20000	6	[NT]	<1	27	<1	9	8	1	7	10	3	6	7
Lead	1	100	<1	[NT]	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Mercury (inorganic)	0.05	10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel	1	200	<1	[NT]	<1	4	<1	<1	<1	<1	<1	<1	1	<1	<1
Zinc	1	30000	<1	[NT]	<1	21	<1	4	4	3	8	7	9	8	5
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)															
Benzene	1	10	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Toluene	1	8000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Ethylbenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
m+p-xylene	2	NSL	<2	NA	<2	<2	<2	<2	<2	<2	<2	<20	<2	<2	<2
o-xylene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Total xylenes	2	6000	<2	NA	<2	<2	<2	<2	<2	<2	<2	<20	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs															
Dichlorodifluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Chloromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Vinyl Chloride	10	3	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Bromomethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Chloroethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Trichlorofluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
1,1-Dichloroethene	1	300	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Trans-1,2-dichloroethene	1	600	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1-dichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Cis-1,2-dichloroethene	1	600	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Bromochloromethane	1	2500	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Chloroform	1		20	NA	12	14	12	<1	<1	<1	4	12	22	4	<1
2,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2-dichloroethane	1	30	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,1-trichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Cyclohexane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Carbon tetrachloride	1	30	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Benzene	1	10	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Dibromomethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Trichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Bromodichloromethane	1	NSL	1	NA	<1	<1	<1	<1	<1	<1	<1	<10	4	<1	<1
trans-1,3-dichloropropene	1	1000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
cis-1,3-dichloropropene	1	1000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,2-trichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Toluene	1	8000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,3-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Dibromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2-dibromoethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Tetrachloroethene	1	500	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Chlorobenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Ethylbenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Bromoform	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
m+p-xylene	2	NSL	<2	NA	<2	<2	<2	<2	<2	<2	<2	<20	<2	<2	<2
Styrene	1	300	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,2,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
o-xylene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2,3-trichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Isopropylbenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Bromobenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
n-propyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
2-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
4-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Tert-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1

TABLE G3 GROUNDWATER LABORATORY RESULTS COMPARED TO HSLs All data in µg/L unless stated otherwise											
				C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services				10	50	1	1	1	2	1	
NEPM 2013 - Land Use Category				HSL-A/B: LOW/HIGH DENSITY RESIDENTIAL							
Sample Reference	Water Depth	Depth Category	Soil Category								
MW4	1.5	0m to <2m	Sand	13	210	<1	<1	<1	<2	<1	51.6
MW4 - LAB DUP	1.5	0m to <2m	Sand	NA	NA	NA	NA	NA	NA	NA	NA
MW5	1.17	0m to <2m	Sand	<10	280	<1	<1	<1	<2	<1	11.5
WDUP1 (MW4)	1.5	0m to <2m	Sand	19	360	<1	<1	<1	<2	<1	NA
WDUP2 (MW5)	1.17	0m to <2m	Sand	<10	180	<1	<1	<1	<2	<1	NA
MW4	1.1	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	0.1
MW4 - LAB DUP	1.1	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	NA
MW5	2.52	2m to <4m	Sand	<10	<50	<1	<1	<1	<2	<1	0.1
MW204	1.86	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	0.2
MW223	6.56	4m to <8m	Sand	<100	<50	<10	<10	<10	<2	<10	0.3
MW224*	6.47	2m to <4m	Sand	51	<50	<1	<1	<1	<2	<1	1.1
GWDUP201 (MW204)	1.86	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	NA
GWDUP202 (MW4)	1.1	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	NA
Total Number of Samples				8	8	8	8	8	8	8	5
Maximum Value				51	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	1.1
Concentration above the SAC				VALUE							
Site specific assesment (SSA) required				VALUE							
Concentration above the PQL				Bold							
The guideline corresponding to the elevated value is highlighted in dark grey in the Groundwater Assessment Criteria Table below											
Note: Grey shaded samples indicate groundwater results from PSI 2022.											
* The soil depth in MW224 is only 2.3mBGL, therefore the depth category of 2m-<4m has been adopted.											

HSL GROUNDWATER ASSESSMENT CRITERIA

Sample Reference	Water Depth	Depth Category	Soil Category	C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
MW4	1.5	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW4 - LAB DUP	1.5	0m to <2m	Sand	NA	NA	NA	NA	NA	NA	NA
MW5	1.17	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
WDUP1	1.5	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
WDUP2	1.17	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW4	1.1	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW4 - LAB DUP	1.1	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW5	2.52	2m to <4m	Sand	1000	1000	800	NL	NL	NL	NL
MW204	1.86	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW223	6.56	4m to <8m	Sand	1000	1000	800	NL	NL	NL	NL
MW224	6.47	2m to <4m	Sand	1000	1000	800	NL	NL	NL	NL
GWDUP201 (MW204)	1.86	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
GWDUP202 (MW4)	1.1	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA

TABLE G4 GROUNDWATER LABORATORY RESULTS COMPARED TO SITE SPECIFIC HSLs - RISK ASSESSMENT All results in µg/L unless stated otherwise.																	
	PQL	NHMRC	WHO 2008	USEPA RSL	PSI SAMPLES					DSI SAMPLES							
	Envirolab Services	ADWG 2011		Tapwater 2017	MW4	MW4 LAB DUP	MW5	WDUP1 MW4	WDUP2 MW5	MW4	MW4 LAB DUP	MW5	MW204	MW223	MW224	GWDUP201 (MW204)	GWDUP202 (MW4)
Total Recoverable Hydrocarbons (TRH)																	
C ₅ -C ₉ Aliphatics (assessed using F1)	10	-	100	-	13	NA	<10	19	<10	<10	<10	<10	<10	<100	51	<10	<10
>C ₉ -C ₁₄ Aliphatics (assessed using F2)	50	-	100	-	210	NA	280	360	180	<50	<50	<50	<50	<50	<50	<50	<50
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)																	
Benzene	1	1	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Toluene	1	800	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Total xylenes	2	600	-	-	<2	NA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons (PAHs)																	
Naphthalene	1	-	-	6.1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Volatile Organic Compounds (VOCs), including chlorinated VOCs																	
Dichlorodifluoromethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Chloromethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Vinyl Chloride	10	0.3	-	-	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Bromomethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Chloroethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
Trichlorofluoromethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
1,1-Dichloroethene	1	30	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Trans-1,2-dichloroethene	1	60	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1-dichloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Cis-1,2-dichloroethene	1	60	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Bromochloromethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Chloroform	1	250*	-	-	20	NA	12	14	12	<1	<1	<1	4	12	22	4	<1
Bromodichloromethane	1	-	-	-	1	NA	<1	<1	<1	<1	<1	<1	<1	<10	4	<1	<1
2,2-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2-dichloroethane	1	3	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,1-trichloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1-dichloropropene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Cyclohexane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Carbon tetrachloride	1	3	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Benzene	1	1	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Dibromomethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Trichloroethene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
trans-1,3-dichloropropene	1	100	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
cis-1,3-dichloropropene	1	100	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,2-trichloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Toluene	1	800	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,3-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Dibromochloromethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2-dibromoethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Tetrachloroethene	1	50	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,1,2-tetrachloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Chlorobenzene	1	300	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Bromoform	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
m+p-xylene	2	-	-	-	<2	NA	<2	<2	<2	<2	<2	<2	<2	<20	<2	<2	<2
Styrene	1	30	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,1,2,2-tetrachloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
o-xylene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2,3-trichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Isopropylbenzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Bromobenzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
n-propyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
2-chlorotoluene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
4-chlorotoluene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,3,5-trimethyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Tert-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2,4-trimethyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,3-dichlorobenzene	1	20	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Sec-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,4-dichlorobenzene	1	40	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
4-isopropyl toluene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2-dichlorobenzene	1	1500	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
n-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2-dibromo-3-chloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2,4-trichlorobenzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
1,2,3-trichlorobenzene	1	30	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Hexachlorobutadiene	1	0.07	-	-	<1	NA	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Concentration above the SAC																	
Concentration above the PQL																	
GIL >PQL																	
Note: Grey shaded samples indicate groundwater results from PSI 2022.																	

TABLE Q2
GROUNDWATER QA/QC SUMMARY

		TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene	Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc	
	PQL Envirolab SYD	10	50	100	100	1	1	1	2	1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	1	0.1	1	1	1	0.05	1	1	
	PQL Envirolab VIC	10	50	100	100	1.0	1.0	1.0	2.0	1.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	1	0.1	1	1	1	0.05	1	1	
Intra laboratory duplicate	MW204	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<1	7	<1	<0.05	<1	8	
	GW DUP201	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<1	6	<1	<0.05	<1	8	
	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	6.5	nc	nc	nc	8
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	15%	nc	nc	nc	0%
Intra laboratory duplicate	MW4	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<1	9	<1	<0.05	<1	4	
	GW DUP202	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<1	7	<1	<0.05	<1	5	
	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	8	nc	nc	nc	4.5
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	25%	nc	nc	nc	22%
Field Blank	TB-W201	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<1	<1	<1	<0.05	<1	<1	
	17/08/2023																																	
Trip Spike	TS-W201	-	-	-	-	104%	103%	102%	98%	102%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	17/08/2023																																	
Result outside of QA/QC acceptance criteria		Value																																

PSI 2022 Data Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

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

Table Specific Explanations:

HIL Tables:

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

EIL/ESL Table:

Site specific ABC values for specific metals have been adopted.

Waste Classification and TCLP Table:

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

QA/QC Table:

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

TABLE S1 SOIL LABORATORY RESULTS COMPARED TO NEPM 2013. HIL-A: 'Residential with garden/accessible soils; children's day care centers; preschools; and primary schools'																						
All data in mg/kg unless stated otherwise			HEAVY METALS							PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES	
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100	
Site Assessment Criteria (SAC)			100	20	100	6000	300	40	400	7400	300	3	10	270	300	6	50	240	6	160	1	Detected/Not Detected
Sample Reference	Sample Depth	Sample Description																				
BH1	0-0.1	F: Silty clay	<4	<0.4	14	93	23	0.1	9	85	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH1 - [LAB_DUP]	0-0.1	F: Silty clay	<4	<0.4	14	99	24	0.2	9	160	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	
BH1 - [TRIPLICATE]	0-0.1	F: Silty clay	<4	<0.4	14	100	22	0.2	8	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH1	0.2-0.4	F: Silty clay	<4	<0.4	12	100	17	<0.1	8	73	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH1 - [LAB_DUP]	0.2-0.4	F: Silty clay	<4	<0.4	9	64	15	<0.1	7	59	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH1 - [TRIPLICATE]	0.2-0.4	F: Silty clay	<4	<0.4	8	59	12	<0.1	6	41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH2	0-0.1	F: Silty clay	<4	<0.4	12	52	18	<0.1	7	76	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH2	0.2-0.4	F: Silty clay	<8	<0.4	8	56	3	<0.1	6	11	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH3	0-0.1	F: Silty clay	<4	<0.4	21	96	29	<0.1	9	99	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH3	0.2-0.4	F: Silty clay	<4	<0.4	9	100	12	<0.1	10	49	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH4	0-0.1	F: Silty clay	<4	<0.4	22	87	24	<0.1	10	76	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH5	0-0.1	F: Silty clay	<4	<0.4	12	100	9	<0.1	9	44	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH5	0.8-1.0	F: Silty clay	<4	<0.4	20	84	17	<0.1	10	52	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH6	0.05-0.15	F: Sandy gravel	<4	<0.4	10	92	4	<0.1	6	24	0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH7	0-0.1	F: Silty clay	<4	<0.4	20	67	18	<0.1	8	74	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH7	0.6-0.8	F: Silty clay	<4	<0.4	7	47	4	<0.1	4	8	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH8	0-0.1	F: Silty clay	<4	<0.4	12	55	9	<0.1	5	30	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH9	0-0.1	F: Silty clay	<4	<0.4	16	56	11	<0.1	6	28	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH10	0-0.1	F: Silty clay	<4	<0.4	9	69	9	<0.1	4	35	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH10 - [LAB_DUP]	0-0.1	F: Silty clay	<4	<0.4	12	94	14	<0.1	5	41	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	
BH10 - [TRIPLICATE]	0-0.1	F: Silty clay	<4	<0.4	11	96	9	<0.1	5	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH11	0.05-0.15	F: Sandy gravel	<4	<0.4	8	160	4	<0.1	6	33	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH11	0.7-0.9	F: Silty clay	<4	<0.4	6	73	4	<0.1	9	21	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected	
BH11	1.3-1.5	F: Silty clay	<4	<0.4	20	69	7	<0.1	6	26	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH11	2.3-2.5	Silty sandy clay	<4	<0.4	4	53	6	<0.1	11	32	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	Detected	
BH12	0-0.1	F: Silty clay	<4	<0.4	16	57	21	<0.1	12	69	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH12	0.2-0.3	F: silty sandy clay	<4	<0.4	6	58	8	<0.1	11	23	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected	
BH13	0-0.1	F: Silty clay	<4	<0.4	14	52	54	<0.1	11	140	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH13	1.0-1.2	F: silty sandy clay	<4	<0.4	4	55	2	<0.1	8	12	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH14	0-0.1	F: Silty clay	<4	<0.4	19	68	15	<0.1	12	36	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH15	0-0.1	F: Silty clay	<4	<0.4	12	72	24	<0.1	7	73	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH15	0.4-0.6	F: Silty clay	<4	<0.4	15	98	66	<0.1	11	150	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH16	0-0.1	F: Silty clay	<4	<0.4	19	53	17	<0.1	6	47	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH17	0-0.1	F: Silty clay	<4	<0.4	21	69	38	<0.1	8	88	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH18	0-0.1	F: Silty clay	<4	<0.4	17	48	21	<0.1	12	59	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH18	0.1-0.2	F: Sandy gravel	<4	<0.4	6	36	4	<0.1	9	20	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH18	0.1-0.2	F: Sandy gravel	<4	<0.4	6	19	3	<0.1	10	11	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH18 - [LAB_DUP]	0.1-0.2	F: Sandy gravel	<4	<0.4	5	18	3	<0.1	9	12	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	
BH19	0-0.1	F: Silty clay	<4	0.9	15	91	33	<0.1	8	100	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH20	0-0.1	F: Silty clay	<4	<0.4	12	50	21	<0.1	9	73	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH20	0.7-0.9	F: Silty clay	<4	<0.4	5	35	3	<0.1	4	8	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected	
BH21	0-0.1	F: Silty clay	<4	<0.4	18	72	28	<0.1	9	79	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH22	0-0.1	F: Silty clay	<4	<0.4	20	82	35	<0.1	8	91	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH23	0-0.1	F: Sandy gravel	6	<0.4	13	19	8	<0.1	13	42	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH24	0-0.1	F: Silty sand	<4	<0.4	18	58	20	<0.1	8	67	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH25	0-0.1	F: Silty clay	<4	<0.4	22	76	33	<0.1	8	89	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH25	0.7-0.9	Silty sandy clay	<4	<0.4	12	140	4	<0.1	11	34	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH26	0-0.1	F: Sandy gravel	<4	<0.4	5	16	3	<0.1	2	24	0.2	<0.5	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	Not Detected	
BH26-FCF1-Surface	Surface	Material	NA	NA	NA	NA	NA	NA														

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

				C _u -C ₅₀ (F1)	>C _u -C ₅₀ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
				25	50	0.2	0.5	1	1	1	ppm
NEMF 2013 HSL Land Use Category				HSL A/B: LOW/HIGH DENSITY RESIDENTIAL							
Sample Reference	Sample Depth	Sample Description	Depth Category	Soil Category							
BH1	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH1 - [LAB_DUP]	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH1	0.2-0.4	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH1 - [LAB_DUP]	0.2-0.4	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH2	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH2	0.2-0.4	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH3	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH3	0.2-0.4	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH4	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH5	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH5	0.8-1.0	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH6	0.05-0.15	F: Silty gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH7	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH7	0.6-0.8	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH8	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH9	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH10	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH10 - [LAB_DUP]	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH11	0.05-0.15	F: Silty gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH11	0.7-0.9	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH11	1.3-1.5	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH11	2.3-2.5	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH12	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH12	0.2-0.3	F: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH13	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH13	1.0-1.2	F: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH14	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH15	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH15	0.4-0.6	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH16	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH17	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH18	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH18	0.1-0.2	F: Silty gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH18	0.1-0.2	F: Silty gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	3.2
BH18 - [LAB_DUP]	0.1-0.2	F: Silty gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	3.2
BH19	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH20	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH20	0.7-0.9	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH21	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH22	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH23	0-0.1	F: Silty gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH24	0-0.1	F: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH25	0-0.1	F: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH26	0-0.1	F: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH26	0.7-0.9	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH26	0-0.1	F: Silty gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH26	0.2-0.4	F: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH26	0.5-0.7	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH26 - [LAB_DUP]	0.5-0.7	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH27	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH27 - [LAB_DUP]	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH28	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH29	0-0.1	F: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH30	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH30	0.4-0.6	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH31	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH32	0.05-0.15	F: Gravelly clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH32	0.5-0.7	F: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH33	0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH34	0-0.1	F: Silty sand	0m to <1m	Sand	<25	120	<0.2	<0.5	<1	<1	0
BH34 - silica gel clean up	0-0.1	F: Silty sand	0m to <1m	Sand	<50	72	NA	NA	NA	NA	0
BH34	0.6-0.8	F: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH34	1.1-1.3	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH35	0-0.1	F: Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH36	0.1-0.2	F: Silty gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH36	0.3-0.4	Silty sandy clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH37	0-0.1	F: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
BH37 - [LAB_DUP]	0-0.1	F: Silty sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	0
SOU11	BH24 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	NA
SOU12	BH29 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	NA
SOU13	BH34 0-0.1	F: Silty sand	0m to <1m	Sand	<25	170	<0.2	<0.5	<1	<1	NA
SOU14	BH15 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	NA
SOU15	BH3 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	NA
SOU16	BH17 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	NA
SOU17	BH22 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	NA
SOU18	BH27 0-0.1	F: Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	NA
Total Number of Samples					76	76	75	75	75	75	67
Maximum Value					<PQL	170	<PQL	<PQL	<PQL	<PQL	3.2
Concentration above the SAC					VALUE						
Concentration above the PQL					Bold						
The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below											

HSL SOIL ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Sample Description	Depth Category	Soil Category	C _u -C ₅₀ (F1)	>C _u -C ₅₀ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
BH1	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1 - [LAB_DUP]	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1	0.2-0.4	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1 - [LAB_DUP]	0.2-0.4	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH2	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH2	0.2-0.4	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH3	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH3	0.2-0.4	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH4	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH5	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH5	0.8-1.0	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH6	0.05-0.15	F: Silty sandy gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH7	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH7	0.6-0.8	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH8	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH9	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH10	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH10 - [LAB_DUP]	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH11	0.05-0.15	F: Silty sandy gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH11	0.7-0.9	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH11	1.3-1.5	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH11	2.3-2.5	Silty sandy gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH12	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH12	0.2-0.3	F: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH13	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH13	1.0-1.2	F: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH14	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH15	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH15	0.4-0.6	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH16	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH17	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH18	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH18	0.1-0.2	F: Silty sandy gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH18 - [LAB_DUP]	0.1-0.2	F: Silty sandy gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH19	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH20	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH20	0.7-0.9	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH21	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH22	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH23	0-0.1	F: Silty sandy gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH24	0-0.1	F: Silty sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH25	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH25	0.7-0.9	Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH26	0-0.1	F: Silty sandy gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH26	0.2-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH26	0.5-0.7	Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH26 - [LAB_DUP]	0.5-0.7	Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH27	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH27 - [LAB_DUP]	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH28	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH29	0-0.1	F: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH30	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH31	0.4-0.6	Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH32	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH32	0.05-0.15	F: Gravelly clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH32	0.5-0.7	F: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH33	0-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH34	0-0.1	F: Silty sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH34 - silica gel clean up	0-0.1	F: Silty sand	0m to <1m	Sand	45	110	NA	NA	NA	NA	NA
BH35	0.6-0.8	F: Silty sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH36	1.1-1.3	Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH35	0-0.1	F: Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH37	0.1-0.2	F: Silty sandy gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH36	0.3-0.4	Silty sandy clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH37	0-0.1	F: Silty sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH37 - [LAB_DUP]	0-0.1	F: Silty sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
SQU1P1	BH24-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SQU1P2	BH29-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SQU1P3	BH14-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SQU1P4	BH15-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SQU1P5	BH13-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SQU1P6	BH14-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SQU1P7	BH17-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SQU1P8	BH22-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SQU1P9	BH27-0.1	F: Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3



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

			C ₆ -C ₈ (F3) plus BTEX	>C ₉ -C ₁₀ (F2) plus naphthalene	<C ₁₀ -C ₁₄ (F3)	<C ₁₅ -C ₂₄ (F4)
POL - EnviroLab Services			25	50	100	100
NEM 2013 Land Use Category						
Sample Reference	Sample Depth	Soil Texture	RESIDENTIAL, PARKLAND & PUBLIC OPEN SPACE			
BH1	0.0-1	Fine	<25	<50	<100	<100
BH1 - [LAB_DUP]	0.0-1	Fine	<25	<50	100	<100
BH1	0.2-0.4	Fine	<25	<50	<100	<100
BH1 - [LAB_DUP]	0.2-0.4	Fine	<25	<50	<100	<100
BH2	0.0-1	Fine	<25	<50	<100	<100
BH2	0.2-0.4	Fine	<25	<50	<100	<100
BH3	0.0-1	Fine	<25	<50	<100	<100
BH3	0.2-0.4	Fine	<25	<50	<100	<100
BH4	0.0-1	Fine	<25	<50	<100	<100
BH5	0.0-1	Fine	<25	<50	<100	<100
BH5	0.8-1.0	Fine	<25	<50	<100	<100
BH6	0.05-0.15	Fine	<25	<50	110	190
BH7	0.0-1	Fine	<25	<50	190	<100
BH7	0.8-0.8	Fine	<25	<50	<100	<100
BH8	0.0-1	Fine	<25	<50	<100	<100
BH9	0.0-1	Fine	<25	<50	<100	<100
BH10	0.0-1	Fine	<25	<50	130	<100
BH10 - [LAB_DUP]	0.0-1	Fine	<25	<50	170	<100
BH11	0.05-0.15	Fine	<25	<50	<100	<100
BH11	0.7-0.9	Fine	<25	<50	<100	<100
BH11	1.3-1.5	Fine	<25	<50	220	<100
BH11	2.3-2.5	Fine	<25	<50	<100	<100
BH12	0.0-1	Fine	<25	<50	110	<100
BH12	0.2-0.3	Fine	<25	<50	<100	<100
BH13	0.0-1	Fine	<25	<50	130	<100
BH13	1.0-1.2	Fine	<25	<50	<100	<100
BH14	0.0-1	Fine	<25	<50	<100	<100
BH15	0.0-1	Fine	<25	<50	<100	<100
BH15	0.4-0.6	Fine	<25	<50	<100	<100
BH16	0.0-1	Fine	<25	<50	160	<100
BH17	0.0-1	Fine	<25	<50	<100	<100
BH18	0.0-1	Fine	<25	<50	<100	<100
BH18	0.1-0.2	Fine	<25	<50	<100	<100
BH18 - [LAB_DUP]	0.1-0.2	Fine	<25	<50	<100	<100
BH19	0.0-1	Fine	<25	<50	110	<100
BH20	0.0-1	Fine	<25	<50	100	<100
BH20	0.7-0.9	Fine	<25	<50	<100	<100
BH21	0.0-1	Fine	<25	<50	140	<100
BH22	0.0-1	Fine	<25	<50	140	<100
BH23	0.0-1	Fine	<25	<50	<100	<100
BH24	0.0-1	Fine	<25	<50	160	<100
BH25	0.0-1	Fine	<25	<50	<100	<100
BH25	0.7-0.9	Fine	<25	<50	<100	<100
BH26	0.0-1	Fine	<25	<50	140	190
BH26	0.2-0.4	Fine	<25	<50	<100	<100
BH26	0.5-0.7	Fine	<25	<50	<100	<100
BH26 - [LAB_DUP]	0.5-0.7	Fine	<25	<50	<100	<100
BH27	0.0-1	Fine	<25	<50	100	<100
BH27 - [LAB_DUP]	0.0-1	Fine	<25	<50	<100	<100
BH28	0.0-1	Fine	<25	<50	<100	<100
BH29	0.0-1	Fine	<25	<50	<100	<100
BH30	0.0-1	Fine	<25	<50	<100	<100
BH30	0.4-0.6	Fine	<25	<50	<100	<100
BH31	0.0-1	Fine	<25	<50	<100	<100
BH32	0.05-0.15	Fine	<25	<50	100	120
BH32	0.5-0.7	Fine	<25	<50	<100	<100
BH33	0.0-1	Fine	<25	<50	<100	<100
BH34	0.0-1	Fine	<25	120	330	180
BH34 - silica gel clean up	0.0-1	Fine	<25	72	<100	<100
BH34	0.6-0.8	Fine	<25	<50	<100	<100
BH34	1.1-1.3	Fine	<25	<50	<100	<100
BH35	0.0-1	Fine	<25	<50	130	<100
BH36	0.1-0.2	Fine	<25	<50	120	140
BH36	0.3-0.4	Fine	<25	<50	<100	<100
BH37	0.0-1	Fine	<25	<50	<100	<100
BH37 - [LAB_DUP]	0.0-1	Fine	<25	<50	<100	<100
SOU1	BH24 0-0.1	Fine	<25	<50	140	<100
SOU2	BH29 0-0.1	Fine	<25	<50	<100	<100
SOU3	BH34 0-0.1	Fine	<25	170	260	260
SOU4	BH15 0-0.1	Fine	<25	<50	<100	<100
SOU5	BH3 0-0.1	Fine	<25	<50	100	<100
SOU5 - [LAB_DUP]	BH3 0-0.1	Fine	<25	<50	<100	<100
SOU6	BH17 0-0.1	Fine	<25	<50	<100	<100
SOU7	BH22 0-0.1	Fine	<25	<50	<100	<100
SOU8	BH27 0-0.1	Fine	<25	<50	<100	<100
Total Number of Samples			76	76	76	76
Maximum Value			<76	170	420	250
Concentration above the SAC			VALUE			
Concentration above the POL			None			

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Soil Texture	C ₆ -C ₈ (F3) plus BTEX	>C ₉ -C ₁₀ (F2) plus naphthalene	<C ₁₀ -C ₁₄ (F3)	<C ₁₅ -C ₂₄ (F4)
BH1	0.0-1	Fine	800	1000	3500	10000
BH1 - [LAB_DUP]	0.0-1	Fine	800	1000	3500	10000
BH1	0.2-0.4	Fine	800	1000	3500	10000
BH1 - [LAB_DUP]	0.2-0.4	Fine	800	1000	3500	10000
BH2	0.0-1	Fine	800	1000	3500	10000
BH2	0.2-0.4	Fine	800	1000	3500	10000
BH3	0.0-1	Fine	800	1000	3500	10000
BH3	0.2-0.4	Fine	800	1000	3500	10000
BH4	0.0-1	Fine	800	1000	3500	10000
BH5	0.0-1	Fine	800	1000	3500	10000
BH5	0.8-1.0	Fine	800	1000	3500	10000
BH6	0.05-0.15	Fine	800	1000	3500	10000
BH7	0.0-1	Fine	800	1000	3500	10000
BH7	0.8-0.8	Fine	800	1000	3500	10000
BH8	0.0-1	Fine	800	1000	3500	10000
BH9	0.0-1	Fine	800	1000	3500	10000
BH10	0.0-1	Fine	800	1000	3500	10000
BH10 - [LAB_DUP]	0.0-1	Fine	800	1000	3500	10000
BH11	0.05-0.15	Fine	800	1000	3500	10000
BH11	0.7-0.9	Fine	800	1000	3500	10000
BH11	1.3-1.5	Fine	800	1000	3500	10000
BH11	2.3-2.5	Fine	800	1000	3500	10000
BH12	0.0-1	Fine	800	1000	3500	10000
BH12	0.2-0.3	Fine	800	1000	3500	10000
BH13	0.0-1	Fine	800	1000	3500	10000
BH13	1.0-1.2	Fine	800	1000	3500	10000
BH14	0.0-1	Fine	800	1000	3500	10000
BH15	0.0-1	Fine	800	1000	3500	10000
BH15	0.4-0.6	Fine	800	1000	3500	10000
BH16	0.0-1	Fine	800	1000	3500	10000
BH17	0.0-1	Fine	800	1000	3500	10000
BH18	0.0-1	Fine	800	1000	3500	10000
BH18	0.1-0.2	Fine	800	1000	3500	10000
BH18 - [LAB_DUP]	0.1-0.2	Fine	800	1000	3500	10000
BH19	0.0-1	Fine	800	1000	3500	10000
BH20	0.0-1	Fine	800	1000	3500	10000
BH20	0.7-0.9	Fine	800	1000	3500	10000
BH21	0.0-1	Fine	800	1000	3500	10000
BH22	0.0-1	Fine	800	1000	3500	10000
BH23	0.0-1	Fine	800	1000	3500	10000
BH24	0.0-1	Fine	800	1000	3500	10000
BH25	0.0-1	Fine	800	1000	3500	10000
BH25	0.7-0.9	Fine	800	1000	3500	10000
BH26	0.0-1	Fine	800	1000	3500	10000
BH26	0.2-0.4	Fine	800	1000	3500	10000
BH26	0.5-0.7	Fine	800	1000	3500	10000
BH26 - [LAB_DUP]	0.5-0.7	Fine	800	1000	3500	10000
BH27	0.0-1	Fine	800	1000	3500	10000
BH27 - [LAB_DUP]	0.0-1	Fine	800	1000	3500	10000
BH28	0.0-1	Fine	800	1000	3500	10000
BH29	0.0-1	Fine	800	1000	3500	10000
BH30	0.0-1	Fine	800	1000	3500	10000
BH30	0.4-0.6	Fine	800	1000	3500	10000
BH31	0.0-1	Fine	800	1000	3500	10000
BH32	0.05-0.15	Fine	800	1000	3500	10000
BH32	0.5-0.7	Fine	800	1000	3500	10000
BH33	0.0-1	Fine	800	1000	3500	10000
BH34	0.0-1	Fine	800	1000	3500	10000
BH34 - silica gel clean up	0.0-1	Fine	800	1000	3500	10000
BH34	0.6-0.8	Fine	800	1000	3500	10000
BH34	1.1-1.3	Fine	800	1000	3500	10000
BH35	0.0-1	Fine	800	1000	3500	10000
BH36	0.1-0.2	Fine	800	1000	3500	10000
BH36	0.3-0.4	Fine	800	1000	3500	10000
BH37	0.0-1	Fine	800	1000	3500	10000
BH37 - [LAB_DUP]	0.0-1	Fine	800	1000	3500	10000
SOU1	BH24 0-0.1	Fine	800	1000	3500	10000
SOU2	BH29 0-0.1	Fine	800	1000	3500	10000
SOU3	BH34 0-0.1	Fine	800	1000	3500	10000
SOU4	BH15 0-0.1	Fine	800	1000	3500	10000
SOU5	BH3 0-0.1	Fine	800	1000	3500	10000
SOU5 - [LAB_DUP]	BH3 0-0.1	Fine	800	1000	3500	10000
SOU6	BH17 0-0.1	Fine	800	1000	3500	10000
SOU7	BH22 0-0.1	Fine	800	1000	3500	10000
SOU8	BH27 0-0.1	Fine	800	1000	3500	10000

TABLE S4 SOIL LABORATORY RESULTS COMPARED TO DIRECT CONTACT CRITERIA All data in mg/kg unless stated otherwise											
Analyte		C ₆ -C ₁₀	>C ₁₀ -C ₁₆	>C ₁₆ -C ₃₄	>C ₃₄ -C ₄₀	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		4,400	3,300	4,500	6,300	100	14,000	4,500	12,000	1,400	
Site Use		RESIDENTIAL WITH ACCESSIBLE SOIL- DIRECT SOIL CONTACT									
Sample Reference	Sample Depth										
BH1	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH1 - [LAB_DUP]	0-0.1	<25	<50	100	<100	<0.2	<0.5	<1	<1	<1	0
BH1	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH1 - [LAB_DUP]	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH2	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH2	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH3	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH3	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH4	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH5	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH5	0.8-1.0	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH6	0.05-0.15	<25	<50	110	190	<0.2	<0.5	<1	<1	<1	0
BH7	0-0.1	<25	<50	150	<100	<0.2	<0.5	<1	<1	<1	0
BH7	0.6-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH8	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH9	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH10	0-0.1	<25	<50	130	<100	<0.2	<0.5	<1	<1	<1	0
BH10 - [LAB_DUP]	0-0.1	<25	<50	170	<100	<0.2	<0.5	<1	<1	<1	0
BH11	0.05-0.15	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH11	0.7-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH11	1.3-1.5	<25	<50	220	<100	<0.2	<0.5	<1	<1	<1	0
BH11	2.3-2.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH12	0-0.1	<25	<50	110	<100	<0.2	<0.5	<1	<1	<1	0
BH12	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH13	0-0.1	<25	<50	130	<100	<0.2	<0.5	<1	<1	<1	0
BH13	1.0-1.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH14	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH15	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH15	0.4-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH16	0-0.1	<25	<50	160	<100	<0.2	<0.5	<1	<1	<1	0
BH17	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH18	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH18	0.1-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH18	0.1-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	3.2
BH18 - [LAB_DUP]	0.1-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	3.2
BH19	0-0.1	<25	<50	110	<100	<0.2	<0.5	<1	<1	<1	0
BH20	0-0.1	<25	<50	100	<100	<0.2	<0.5	<1	<1	<1	0
BH20	0.7-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH21	0-0.1	<25	<50	140	<100	<0.2	<0.5	<1	<1	<1	0
BH22	0-0.1	<25	<50	140	<100	<0.2	<0.5	<1	<1	<1	0
BH23	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH24	0-0.1	<25	<50	160	<100	<0.2	<0.5	<1	<1	<1	0
BH25	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH25	0.7-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH26	0-0.1	<25	<50	140	190	<0.2	<0.5	<1	<1	<1	0
BH26	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH26	0.5-0.7	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH26 - [LAB_DUP]	0.5-0.7	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH27	0-0.1	<25	<50	100	<100	<0.2	<0.5	<1	<1	<1	0
BH27 - [LAB_DUP]	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH28	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH29	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH30	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH30	0.4-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH31	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH32	0.05-0.15	<25	<50	100	120	<0.2	<0.5	<1	<1	<1	0
BH32	0.5-0.7	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH33	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH34	0-0.1	<25	120	330	180	<0.2	<0.5	<1	<1	<1	0
BH34 - silica gel clean up	0-0.1	<50	72	<100	<100	NA	NA	NA	NA	NA	0
BH34	0.6-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH34	1.1-1.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH35	0-0.1	<25	<50	130	<100	<0.2	<0.5	<1	<1	<1	0
BH36	0.1-0.2	<25	<50	120	140	<0.2	<0.5	<1	<1	<1	0
BH36	0.3-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH37	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH37 - [LAB_DUP]	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
SDUP1	BH24 0-0.1	<25	<50	140	<100	<0.2	<0.5	<1	<1	<1	NA
SDUP2	BH29 0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
SDUP3	BH34 0-0.1	<25	170	420	250	<0.2	<0.5	<1	<1	<1	NA
SDUP4	BH15 0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
SDUP5	BH3 0-0.1	<25	<50	100	<100	<0.2	<0.5	<1	<1	<1	NA
SDUP5 - [LAB_DUP]	BH3 0-0.1	<25	<50	110	<100	<0.2	<0.5	<1	<1	<1	NA
SDUP6	BH17 0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
SDUP7	BH22 0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
SDUP8	BH27 0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
Total Number of Samples		76	76	76	76	75	75	75	75	75	67
Maximum Value		<PQL	170	420	250	<PQL	<PQL	<PQL	<PQL	<PQL	3.2
Concentration above the SAC		VALUE									
Concentration above the PQL		Bold									

VALUE
Bold

TABLE 55
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HSL-C:Public open space; secondary schools; and footpaths

FIELD DATA														LABORATORY DATA												
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample reference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation % (w/w)	FA and AF Estimation % (w/w)
SAC			No					0.01			0.001			0.001												
27/09/2022	BH1	0-0.1	No	10	8,190	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH1	0-0.1	502.88	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH1	0.1-0.4	NA	-	3,180	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
28/09/2022	BH2	0-0.1	No	-	6,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH2	0-0.1	542.63	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
28/09/2022	BH2	0.1-0.5	NA	-	3,730	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
27/09/2022	BH3	0-0.1	No	-	6,870	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH3	0-0.1	456.64	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH3	0.1-0.2	NA	-	4,630	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
27/09/2022	BH3	0.2-0.6	NA	-	4,010	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
27/09/2022	BH4	0-0.1	No	10	11,130	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH4	0-0.1	412.24	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH4	0.1-0.4	NA	-	2,640	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
27/09/2022	BH5	0-0.1	No	10	11,020	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH5	0-0.1	592.87	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH5	0.1-1.2	NA	-	7,260	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
27/09/2022	BH6	0.02-0.2	No	-	4,280	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH6	0.05-0.15	923.34	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH6	0.2-0.3	NA	-	3,160	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
29/09/2022	BH7	0-0.1	No	10	11,810	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH7	0-0.1	536.82	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
29/09/2022	BH7	0.1-0.6	NA	-	6,490	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
29/09/2022	BH7	0.6-1.6	NA	-	5,680	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
29/09/2022	BH8	0-0.1	No	10	10,650	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH8	0-0.1	479.55	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
29/09/2022	BH8	0.1-1.1	NA	-	6,480	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
29/09/2022	BH8	1.1-1.4	NA	-	2,010	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
26/09/2022	BH9	0-0.1	No	10	10,780	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH9	0-0.1	382.6	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
26/09/2022	BH9	0.1-0.93	NA	10	8,210	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
28/09/2022	BH10	0-0.1	No	10	10,370	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH10	0-0.1	463.72	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
28/09/2022	BH10	0.1-0.5	NA	-	3,370	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
29/09/2022	BH11	0.01-0.15	No	10	8,760	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH11	0.05-0.15	908.2	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
29/09/2022	BH11	0.15-1.6	NA	-	6,810	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228-A	BH11	0.7-0.9	520.53	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	307228	BH11	1.3-1.5	467.8	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
29/09/2022	BH11	1.6-1.9	NA	-	6,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
29/09/2022	BH11	1.9-2.3	NA	-	3,410	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
28/09/2022	BH12	0-0.1	No	10	7,780	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH12	0-0.1	549.94	Chrysotile asbestos detected: Amosite asbestos detected: Crocidolite asbestos detected: Organic fibres detected	No asbestos detected	0.3667	No visible asbestos detected	0.2017	--	0.0367	<0.001
28/09/2022	BH12	0.1-0.2	NA	-	3,210	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
28/09/2022	BH12	0.2-0.3	NA	-	2,650	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228-A	BH12	0.2-0.3	835.02	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH13	0-0.1	No	-	4,810	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH13	0-0.1	394.55	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH13	0.1-0.3	NA	-	3,180	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
29/09/2022	BH14	0-0.1	No	10	10,740	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH14	0-0.1	421.8	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
29/09/2022	BH14	0.1-0.6	NA	-	6,350	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
27/09/2022	BH15	0-0.1	No	-	4,820	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH15	0-0.1	491.69	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
27/09/2022	BH15	0.1-0.2	NA	-	2,180	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
27/09/2022	BH15	0.2-0.3	NA	-	1,360	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
28/09/2022	BH16	0-0.1	No	-	6,920	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH16	0-0.1	592.75	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	--	--	<0.01	<0.001
28/09/2022	BH16	0.1-0.8	NA	-	3,410	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--					--	--	--	--	--	--	--	
27/09/2022	BH17	0-0.1	No	-	5,750	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	307228	BH17	0-0.1	377.16</								

TABLE 26
SOIL LABORATORY RESULTS COMPARED TO NEMO 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category	URBAN RESIDENTIAL AND PUBLIC OPEN SPACE																													
	pH	CEC (cmol/kg)	Clay Content (% clay)	AGED HEAVY METALS-EILs						EILs		EILs				EILs				Benzene	Toluene	Ethylbenzene	Total Xylenes	Bis(p)						
				Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DOT	C ₁₀ -C ₁₉ (F1)	>C ₁₀ -C ₁₉ (F2)	>C ₁₀ -C ₁₉ (F3)	>C ₁₀ -C ₁₉ (F4)															
NSL - Environment Services	-	1	-	4	1	1	1	1	1	0.1	25	50	100	100	100	0.2	0.5	1	1	1	1	1	1	1	0.05					
Ambient Background Concentration (ABC)	-	-	-	NSL	8	18	104	5	77	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL					
Sample Reference	Sample Depth	Sample Description	Soil Texture	AGED HEAVY METALS-EILs										EILs		C _c -C _u (F1)		>C _u -C _u (F3)		>C _u -C _u (F4)		Benzene		Toluene		Ethylbenzene		Total Xylenes		Bis(p)
BH1	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	14	93	23	9	85	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH1 - [LAB_DUMP]	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	14	99	24	9	160	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH1 - [THERMOCATE]	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	14	100	22	8	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.05	
BH1	0.0-0.4	F: Silty clay	Fine	8.62	23.2	NA	<4	12	100	17	8	79	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH1 - [LAB_DUMP]	0.0-0.4	F: Silty clay	Fine	NA	NA	NA	<4	9	64	15	7	59	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH1 - [THERMOCATE]	0.0-0.4	F: Silty clay	Fine	NA	NA	NA	<4	8	59	12	6	41	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH2	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	12	52	7	76	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH2	0.2-0.4	F: Silty clay	Fine	NA	NA	NA	<4	8	56	3	6	11	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH3	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	21	96	29	9	99	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH3	0.2-0.4	F: Silty clay	Fine	8.62	23.2	NA	<4	9	100	12	10	49	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH4	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	22	87	24	10	76	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH4	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	17	100	9	9	44	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH5	0.0-0.15	F: Silty clay	Fine	8.62	23.2	NA	<4	20	84	17	10	52	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH5	0.8-0.15	F: Silty gravel	Fine	8.62	23.2	NA	<4	10	92	4	6	24	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH7	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	20	87	18	8	74	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH7	0.6-0.8	F: Silty clay	Fine	NA	NA	NA	<4	7	47	4	4	8	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH8	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	9	55	9	5	30	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH9	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	16	56	11	6	28	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH10	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	17	100	9	9	44	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH10 - [LAB_DUMP]	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	12	94	14	5	41	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH10 - [THERMOCATE]	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	11	96	9	5	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.05	
BH11	0.0-0.15	F: Silty gravel	Fine	8.62	23.2	NA	<4	8	100	4	6	33	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH11	0.7-0.9	F: Silty clay	Fine	NA	NA	NA	<4	6	73	4	9	21	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH11	1.3-1.5	F: Silty clay	Fine	NA	NA	NA	<4	20	69	7	6	26	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH11	2.3-2.5	Silty sandy clay	Fine	NA	NA	NA	<4	4	53	6	1	32	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH12	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	16	57	21	12	69	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH12	0.2-0.3	F: Silty sandy clay	Fine	NA	NA	NA	<4	6	58	8	11	23	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH13	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	14	100	11	10	140	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH13	1.0-1.2	F: Silty sandy clay	Fine	NA	NA	NA	<4	4	55	2	8	12	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH14	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	19	68	15	12	36	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH15	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	12	72	24	7	73	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH15	0.4-0.6	F: Silty clay	Fine	8.62	23.2	NA	<4	15	98	16	11	59	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH16	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	19	53	17	6	47	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH17	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	21	89	38	8	86	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH18	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	17	48	21	12	59	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH18	0.1-0.2	F: Silty gravel	Fine	NA	NA	NA	<4	6	36	4	9	20	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH18	0.1-0.2	F: Silty gravel	Fine	NA	NA	NA	<4	6	19	3	10	11	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH18 - [LAB_DUMP]	0.1-0.2	F: Silty clay	Fine	NA	NA	NA	<4	5	18	3	9	12	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH19	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	15	91	33	8	100	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH20	0-0.1	F: Silty clay	Fine	NA	NA	NA	<4	12	50	21	9	73	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH20	0.0-0.8	F: Silty clay	Fine	NA	NA	NA	<4	8	35	3	4	8	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH21	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	20	82	35	8	91	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH21	0-0.1	F: Silty clay	Fine	8.62	23.2	NA	<4	6	13	19	8	13	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH21	0-0.1	F: Silty sand	Fine	NA	NA	NA	<4	18	58	20	8	87	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<0.05	
BH25	0-0.1	F: Silty sand																												

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

			HEAVY METALS								PAHs		OC/OP PESTICIDES					Total	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled	PCBs	C ₆ -C ₉	C ₁₀ -C ₁₄	C ₁₅ -C ₂₈	C ₂₉ -C ₃₆	Total C ₁₀ -C ₃₆	Benzene	Toluene	Ethyl benzene	Total Xylenes		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	25	50	100	100	50	0.2	0.5	1	1	100	
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	650	NSL		10,000	10	288	600	1,000	-		
General Solid Waste SCC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650	NSL		10,000	18	518	1,080	1,800	-		
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600	NSL		40,000	40	1,152	2,400	4,000	-		
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600	NSL		40,000	72	2,073	4,320	7,200	-		
Sample Reference	Sample Depth	Sample Description																										
BH1	0-0.1	F: Silty clay	<4	<0.4	14	93	23	0.1	9	85	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH1 - [LAB_DUP]	0-0.1	F: Silty clay	<4	<0.4	14	99	24	0.2	9	160	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH1 - [TRIPLICATE]	0-0.1	F: Silty clay	<4	<0.4	14	100	22	0.2	8	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH1	0.2-0.4	F: Silty clay	<4	<0.4	12	100	17	<0.1	8	73	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH1 - [LAB_DUP]	0.2-0.4	F: Silty clay	<4	<0.4	9	64	15	<0.1	7	59	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH1 - [TRIPLICATE]	0.2-0.4	F: Silty clay	<4	<0.4	8	59	12	<0.1	6	41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH2	0-0.1	F: Silty clay	<4	<0.4	12	52	18	<0.1	7	76	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH2	0.2-0.4	F: Silty clay	<8	<0.4	8	56	3	<0.1	6	11	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH3	0-0.1	F: Silty clay	<4	<0.4	21	96	29	<0.1	9	99	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH3	0.2-0.4	F: Silty clay	<4	<0.4	9	100	12	<0.1	10	49	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH4	0-0.1	F: Silty clay	<4	<0.4	22	87	24	<0.1	10	76	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH5	0-0.1	F: Silty clay	<4	<0.4	12	100	9	<0.1	9	44	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH5	0.8-1.0	F: Silty clay	<4	<0.4	20	84	17	<0.1	10	52	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH6	0.05-0.15	F: Sandy gravel	<4	<0.4	10	92	4	<0.1	6	24	0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<120	<0.2	<0.5	<1	<1	Not Detected	
BH7	0-0.1	F: Silty clay	<4	<0.4	20	67	18	<0.1	8	74	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH7	0.6-0.8	F: Silty clay	<4	<0.4	7	47	4	<0.1	4	8	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH8	0-0.1	F: Silty clay	<4	<0.4	12	55	9	<0.1	5	30	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH9	0-0.1	F: Silty clay	<4	<0.4	16	56	11	<0.1	6	28	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH10	0-0.1	F: Silty clay	<4	<0.4	9	69	9	<0.1	4	35	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH10 - [LAB_DUP]	0-0.1	F: Silty clay	<4	<0.4	12	94	14	<0.1	5	41	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<120	<0.2	<0.5	<1	<1	NA	
BH10 - [TRIPLICATE]	0-0.1	F: Silty clay	<4	<0.4	11	96	9	<0.1	5	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BH11	0.05-0.15	F: Sandy gravel	<4	<0.4	8	160	4	<0.1	6	33	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH11	0.7-0.9	F: Silty clay	<4	<0.4	6	73	4	<0.1	9	21	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH11	1.3-1.5	F: Silty clay	<4	<0.4	20	69	7	<0.1	6	26	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	180	<100	180	<0.2	<0.5	<1	<1	Not Detected	
BH11	2.3-2.5	Silty sandy clay	<4	<0.4	4	53	6	<0.1	11	32	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH12	0-0.1	F: Silty clay	<4	<0.4	16	57	21	<0.1	12	69	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Detected	
BH12	0.2-0.3	F: silty sandy clay	<4	<0.4	6	58	8	<0.1	11	23	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH13	0-0.1	F: Silty clay	<4	<0.4	14	52	54	<0.1	11	140	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH13	1.0-1.2	F: silty sandy clay	<4	<0.4	4	55	2	<0.1	8	12	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH14	0-0.1	F: Silty clay	<4	<0.4	19	68	15	<0.1	12	36	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH15	0-0.1	F: Silty clay	<4	<0.4	12	72	24	<0.1	7	73	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected	
BH15	0.4-0.6	F: Silty clay	<4	<0.4	15	98	66	<0.1	11	150	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA	
BH16	0-0.1	F: Silty clay	<4	<0.4	19	53	17	<0.1	6	47	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<100	<0.2	<0.5	<1	<1	Not Detected	
BH17	0-0.1	F: Silty clay	<4	<0																								

[illegible]

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

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

TABLE G1 SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO ECOLOGICAL GILs SAC All results in µg/L unless stated otherwise.							
	PQL Envirolab Services	ANZG 2018 Marine Waters	SAMPLES				
			MW4	MW4 - LAB DUP	MW5	WDUP1	WDUP2
Inorganic Compounds and Parameters							
pH		7 - 8.5	7.9	NA	7.4	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	980	NA	630	NA	NA
Metals and Metalloids							
Arsenic (As III)	1	2.3	2	[NT]	<1	2	<1
Cadmium	0.1	0.7	<0.1	[NT]	<0.1	<0.1	<0.1
Chromium (SAC for Cr III adopted)	1	27	<1	[NT]	<1	2	<1
Copper	1	1.3	6	[NT]	<1	27	<1
Lead	1	4.4	<1	[NT]	<1	1	<1
Total Mercury (inorganic)	0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel	1	7	<1	[NT]	<1	4	<1
Zinc	1	15	<1	[NT]	<1	21	<1
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)							
Benzene	1	500	<1	NA	<1	<1	<1
Toluene	1	180	<1	NA	<1	<1	<1
Ethylbenzene	1	5	<1	NA	<1	<1	<1
m+p-xylene	2	75	<2	NA	<2	<2	<2
o-xylene	1	350	<1	NA	<1	<1	<1
Total xylenes	2	NSL	<2	NA	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs							
Dichlorodifluoromethane	10	NSL	<10	NA	<10	<10	<10
Chloromethane	10	NSL	<10	NA	<10	<10	<10
Vinyl Chloride	10	100	<10	NA	<10	<10	<10
Bromomethane	10	NSL	<10	NA	<10	<10	<10
Chloroethane	10	NSL	<10	NA	<10	<10	<10
Trichlorofluoromethane	10	NSL	<10	NA	<10	<10	<10
1,1-Dichloroethene	1	700	<1	NA	<1	<1	<1
Trans-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1
1,1-dichloroethane	1	250	<1	NA	<1	<1	<1
Cis-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1
Bromochloromethane	1	NSL	<1	NA	<1	<1	<1
Chloroform	1	370	20	NA	12	14	12
2,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1
1,2-dichloroethane	1	1900	<1	NA	<1	<1	<1
1,1,1-trichloroethane	1	270	<1	NA	<1	<1	<1
1,1-dichloropropene	1	NSL	<1	NA	<1	<1	<1
Cyclohexane	1	NSL	<1	NA	<1	<1	<1
Carbon tetrachloride	1	240	<1	NA	<1	<1	<1
Benzene	1	500	<1	NA	<1	<1	<1
Dibromomethane	1	NSL	<1	NA	<1	<1	<1
1,2-dichloropropane	1	900	<1	NA	<1	<1	<1
Trichloroethene	1	330	<1	NA	<1	<1	<1
Bromodichloromethane	1	NSL	1	NA	<1	<1	<1
trans-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1
cis-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1
1,1,2-trichloroethane	1	1900	<1	NA	<1	<1	<1
Toluene	1	180	<1	NA	<1	<1	<1
1,3-dichloropropane	1	1100	<1	NA	<1	<1	<1
Dibromochloromethane	1	NSL	<1	NA	<1	<1	<1
1,2-dibromoethane	1	NSL	<1	NA	<1	<1	<1
Tetrachloroethene	1	70	<1	NA	<1	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1
Chlorobenzene	1	55	<1	NA	<1	<1	<1
Ethylbenzene	1	5	<1	NA	<1	<1	<1
Bromoform	1	NSL	<1	NA	<1	<1	<1
m+p-xylene	2	75	<2	NA	<2	<2	<2
Styrene	1	NSL	<1	NA	<1	<1	<1
1,1,2,2-tetrachloroethane	1	400	<1	NA	<1	<1	<1
o-xylene	1	350	<1	NA	<1	<1	<1
1,2,3-trichloropropane	1	NSL	<1	NA	<1	<1	<1
Isopropylbenzene	1	30	<1	NA	<1	<1	<1
Bromobenzene	1	NSL	<1	NA	<1	<1	<1
n-propyl benzene	1	NSL	<1	NA	<1	<1	<1
2-chlorotoluene	1	NSL	<1	NA	<1	<1	<1
4-chlorotoluene	1	NSL	<1	NA	<1	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1
Tert-butyl benzene	1	NSL	<1	NA	<1	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1
1,3-dichlorobenzene	1	260	<1	NA	<1	<1	<1
Sec-butyl benzene	1	NSL	<1	NA	<1	<1	<1
1,4-dichlorobenzene	1	60	<1	NA	<1	<1	<1
4-isopropyl toluene	1	NSL	<1	NA	<1	<1	<1
1,2-dichlorobenzene	1	160	<1	NA	<1	<1	<1
n-butyl benzene	1	NSL	<1	NA	<1	<1	<1
1,2-dibromo-3-chloropropane	1	NSL	<1	NA	<1	<1	<1
1,2,4-trichlorobenzene	1	20	<1	NA	<1	<1	<1
Hexachlorobutadiene	1	NSL	<1	NA	<1	<1	<1
1,2,3-trichlorobenzene	1	3	<1	NA	<1	<1	<1
Polycyclic Aromatic Hydrocarbons (PAHs)							
Naphthalene	0.2	50	<0.2	NA	<0.2	<0.1	<0.2
Acenaphthylene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Phenanthrene	0.1	0.6	<0.1	NA	<0.1	<0.1	<0.1
Anthracene	0.1	0.01	<0.1	NA	<0.1	<0.1	<0.1
Fluoranthene	0.1	1	<0.1	NA	<0.1	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	NA	<0.2	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	NA	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Concentration above the SAC Concentration above the PQL GIL >PQL							
	VALUE						
	Bold						
	Red						

TABLE G2 SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO HUMAN CONTACT GILs All results in µg/L unless stated otherwise.							
	PQL Envirolab Services	Recreational (10 x NHMRC ADWG)	SAMPLES				
			MW4	MW4 - LAB DUP	MW5	WDUP1	WDUP2
Inorganic Compounds and Parameters							
pH		6.5 - 8.5	7.9	NA	7.4	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	980	NA	630	NA	NA
Metals and Metalloids							
Arsenic (As III)	1	100	2	[NT]	<1	2	<1
Cadmium	0.1	20	<0.1	[NT]	<0.1	<0.1	<0.1
Chromium (total)	1	500	<1	[NT]	<1	2	<1
Copper	1	20000	6	[NT]	<1	27	<1
Lead	1	100	<1	[NT]	<1	1	<1
Total Mercury (inorganic)	0.05	10	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel	1	200	<1	[NT]	<1	4	<1
Zinc	1	30000	<1	[NT]	<1	21	<1
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)							
Benzene	1	10	<1	NA	<1	<1	<1
Toluene	1	8000	<1	NA	<1	<1	<1
Ethylbenzene	1	3000	<1	NA	<1	<1	<1
m+p-xylene	2	NSL	<2	NA	<2	<2	<2
o-xylene	1	NSL	<1	NA	<1	<1	<1
Total xylenes	2	6000	<2	NA	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs							
Dichlorodifluoromethane	10	NSL	<10	NA	<10	<10	<10
Chloromethane	10	NSL	<10	NA	<10	<10	<10
Vinyl Chloride	10	3	<10	NA	<10	<10	<10
Bromomethane	10	NSL	<10	NA	<10	<10	<10
Chloroethane	10	NSL	<10	NA	<10	<10	<10
Trichlorofluoromethane	10	NSL	<10	NA	<10	<10	<10
1,1-Dichloroethene	1	300	<1	NA	<1	<1	<1
Trans-1,2-dichloroethene	1	600	<1	NA	<1	<1	<1
1,1-dichloroethane	1	NSL	<1	NA	<1	<1	<1
Cis-1,2-dichloroethene	1	600	<1	NA	<1	<1	<1
Bromochloromethane	1	2500	<1	NA	<1	<1	<1
Chloroform	1		20	NA	12	14	12
2,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1
1,2-dichloroethane	1	30	<1	NA	<1	<1	<1
1,1,1-trichloroethane	1	NSL	<1	NA	<1	<1	<1
1,1-dichloropropene	1	NSL	<1	NA	<1	<1	<1
Cyclohexane	1	NSL	<1	NA	<1	<1	<1
Carbon tetrachloride	1	30	<1	NA	<1	<1	<1
Benzene	1	10	<1	NA	<1	<1	<1
Dibromomethane	1	NSL	<1	NA	<1	<1	<1
1,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1
Trichloroethene	1	NSL	<1	NA	<1	<1	<1
Bromodichloromethane	1	NSL	1	NA	<1	<1	<1
trans-1,3-dichloropropene	1	1000	<1	NA	<1	<1	<1
cis-1,3-dichloropropene	1	1000	<1	NA	<1	<1	<1
1,1,2-trichloroethane	1	NSL	<1	NA	<1	<1	<1
Toluene	1	8000	<1	NA	<1	<1	<1
1,3-dichloropropane	1	NSL	<1	NA	<1	<1	<1
Dibromochloromethane	1	NSL	<1	NA	<1	<1	<1
1,2-dibromoethane	1	NSL	<1	NA	<1	<1	<1
Tetrachloroethene	1	500	<1	NA	<1	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1
Chlorobenzene	1	3000	<1	NA	<1	<1	<1
Ethylbenzene	1	3000	<1	NA	<1	<1	<1
Bromoform	1	NSL	<1	NA	<1	<1	<1
m+p-xylene	2	NSL	<2	NA	<2	<2	<2
Styrene	1	300	<1	NA	<1	<1	<1
1,1,2,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1
o-xylene	1	NSL	<1	NA	<1	<1	<1
1,2,3-trichloropropane	1	NSL	<1	NA	<1	<1	<1
Isopropylbenzene	1	NSL	<1	NA	<1	<1	<1
Bromobenzene	1	NSL	<1	NA	<1	<1	<1
n-propyl benzene	1	NSL	<1	NA	<1	<1	<1
2-chlorotoluene	1	NSL	<1	NA	<1	<1	<1
4-chlorotoluene	1	NSL	<1	NA	<1	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1
Tert-butyl benzene	1	NSL	<1	NA	<1	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1
1,3-dichlorobenzene	1	200	<1	NA	<1	<1	<1
Sec-butyl benzene	1	NSL	<1	NA	<1	<1	<1
1,4-dichlorobenzene	1	400	<1	NA	<1	<1	<1
4-isopropyl toluene	1	NSL	<1	NA	<1	<1	<1
1,2-dichlorobenzene	1	15000	<1	NA	<1	<1	<1
n-butyl benzene	1	NSL	<1	NA	<1	<1	<1
1,2-dibromo-3-chloropropane	1	NSL	<1	NA	<1	<1	<1
1,2,4-trichlorobenzene	1	300	<1	NA	<1	<1	<1
1,2,3-trichlorobenzene	1		<1	NA	<1	<1	<1
Hexachlorobutadiene	1	7	<1	NA	<1	<1	<1
Polycyclic Aromatic Hydrocarbons (PAHs)							
Naphthalene	0.2	NSL	<0.2	NA	<0.2	<0.1	<0.2
Acenaphthylene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Phenanthrene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Fluoranthene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	NA	<0.2	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	NA	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	NA	<0.1	<0.1	<0.1
Concentration above the SAC Concentration above the PQL GIL >PQL							
		VALUE					
		Bold					
		Red					

TABLE G3
GROUNDWATER LABORATORY RESULTS COMPARED TO HSLs
All data in µg/L unless stated otherwise

				C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services				10	50	1	1	1	2	1	
NEPM 2013 - Land Use Category				HSL-A/B: LOW/HIGH DENSITY RESIDENTIAL							
Sample Reference	Water Depth	Depth Category	Soil Category								
MW4	1.5	0m to <2m	Sand	13	210	<1	<1	<1	<2	<1	51.6
MW4 - LAB DUP	1.5	0m to <2m	Sand	NA	NA	NA	NA	NA	NA	NA	NA
MW5	1.17	0m to <2m	Sand	<10	280	<1	<1	<1	<2	<1	11.5
WDUP1	1.5	0m to <2m	Sand	19	360	<1	<1	<1	<2	<1	NA
WDUP2	1.17	0m to <2m	Sand	<10	180	<1	<1	<1	<2	<1	NA
Total Number of Samples				4	4	4	4	4	4	4	2
Maximum Value				19	360	<PQL	<PQL	<PQL	<PQL	<PQL	51.6
Concentration above the SAC			VALUE								
Site specific assesment (SSA) required			VALUE								
Concentration above the PQL			Bold								
The guideline corresponding to the elevated value is highlighted in grey in the Groundwater Assessment Criteria Table below											

HSL GROUNDWATER ASSESSMENT CRITERIA

Sample Reference	Water Depth	Depth Category	Soil Category	C ₆ -C ₁₀ (F1)	>C ₁₀ -C ₁₆ (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
MW4	1.5	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW4 - LAB DUP	1.5	0m to <2m	Sand	NA	NA	NA	NA	NA	NA	NA
MW5	1.17	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
WDUP1	1.5	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
WDUP2	1.17	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA

TABLE G4 GROUNDWATER LABORATORY RESULTS COMPARED TO SITE SPECIFIC HSLs - RISK ASSESSMENT All results in µg/L unless stated otherwise.									
	PQL	NHMRC	WHO 2008	USEPA RSL	SAMPLES				
	Envirolab	ADWG 2011		Tapwater 2017	MW4	MW4 - LAB DUP	MW5	WDUP1	WDUP2
	Services								
Total Recoverable Hydrocarbons (TRH)									
C ₆ -C ₉ Aliphatics (assessed using F1)	10	-	15000	-	13	NA	<10	19	<10
>C ₉ -C ₁₄ Aliphatics (assessed using F2)	50	-	100	-	210	NA	280	360	180
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)									
Benzene	1	1	-	-	<1	NA	<1	<1	<1
Toluene	1	800	-	-	<1	NA	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	NA	<1	<1	<1
Total xylenes	2	600	-	-	<2	NA	<2	<2	<2
Polycyclic Aromatic Hydrocarbons (PAHs)									
Naphthalene	1	-	-	6.1	<1	NA	<1	<1	<1
Volatile Organic Compounds (VOCs), including chlorinated VOCs									
Dichlorodifluoromethane	10	-	-	-	<10	NA	<10	<10	<10
Chloromethane	10	-	-	-	<10	NA	<10	<10	<10
Vinyl Chloride	10	0.3	-	-	<10	NA	<10	<10	<10
Bromomethane	10	-	-	-	<10	NA	<10	<10	<10
Chloroethane	10	-	-	-	<10	NA	<10	<10	<10
Trichlorofluoromethane	10	-	-	-	<10	NA	<10	<10	<10
1,1-Dichloroethene	1	30	-	-	<1	NA	<1	<1	<1
Trans-1,2-dichloroethene	1	60	-	-	<1	NA	<1	<1	<1
1,1-dichloroethane	1	-	-	-	<1	NA	<1	<1	<1
Cis-1,2-dichloroethene	1	60	-	-	<1	NA	<1	<1	<1
Bromochloromethane	1	250	-	-	<1	NA	<1	<1	<1
Chloroform	1		-	-	20	NA	12	14	12
2,2-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1
1,2-dichloroethane	1	3	-	-	<1	NA	<1	<1	<1
1,1,1-trichloroethane	1	-	-	-	<1	NA	<1	<1	<1
1,1-dichloropropene	1	-	-	-	<1	NA	<1	<1	<1
Cyclohexane	1	-	-	-	<1	NA	<1	<1	<1
Carbon tetrachloride	1	3	-	-	<1	NA	<1	<1	<1
Benzene	1	1	-	-	<1	NA	<1	<1	<1
Dibromomethane	1	-	-	-	<1	NA	<1	<1	<1
1,2-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1
Trichloroethene	1	-	-	-	<1	NA	<1	<1	<1
Bromodichloromethane	1	-	-	-	1	NA	<1	<1	<1
trans-1,3-dichloropropene	1	100	-	-	<1	NA	<1	<1	<1
cis-1,3-dichloropropene	1	100	-	-	<1	NA	<1	<1	<1
1,1,2-trichloroethane	1	-	-	-	<1	NA	<1	<1	<1
Toluene	1	800	-	-	<1	NA	<1	<1	<1
1,3-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1
Dibromochloromethane	1	-	-	-	<1	NA	<1	<1	<1
1,2-dibromoethane	1	-	-	-	<1	NA	<1	<1	<1
Tetrachloroethene	1	50	-	-	<1	NA	<1	<1	<1
1,1,1,2-tetrachloroethane	1	-	-	-	<1	NA	<1	<1	<1
Chlorobenzene	1	300	-	-	<1	NA	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	NA	<1	<1	<1
Bromoform	1	-	-	-	<1	NA	<1	<1	<1
m+p-xylene	2	-	-	-	<2	NA	<2	<2	<2
Styrene	1	30	-	-	<1	NA	<1	<1	<1
1,1,2,2-tetrachloroethane	1	-	-	-	<1	NA	<1	<1	<1
o-xylene	1	-	-	-	<1	NA	<1	<1	<1
1,2,3-trichloropropane	1	-	-	-	<1	NA	<1	<1	<1
Isopropylbenzene	1	-	-	-	<1	NA	<1	<1	<1
Bromobenzene	1	-	-	-	<1	NA	<1	<1	<1
n-propyl benzene	1	-	-	-	<1	NA	<1	<1	<1
2-chlorotoluene	1	-	-	-	<1	NA	<1	<1	<1
4-chlorotoluene	1	-	-	-	<1	NA	<1	<1	<1
1,3,5-trimethyl benzene	1	-	-	-	<1	NA	<1	<1	<1
Tert-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1
1,2,4-trimethyl benzene	1	-	-	-	<1	NA	<1	<1	<1
1,3-dichlorobenzene	1	20	-	-	<1	NA	<1	<1	<1
Sec-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1
1,4-dichlorobenzene	1	40	-	-	<1	NA	<1	<1	<1
4-isopropyl toluene	1	-	-	-	<1	NA	<1	<1	<1
1,2-dichlorobenzene	1	1500	-	-	<1	NA	<1	<1	<1
n-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1
1,2-dibromo-3-chloropropane	1	-	-	-	<1	NA	<1	<1	<1
1,2,4-trichlorobenzene	1	30	-	-	<1	NA	<1	<1	<1
1,2,3-trichlorobenzene	1		-	-	<1	NA	<1	<1	<1
Hexachlorobutadiene	1	7	-	-	<1	NA	<1	<1	<1
Concentration above the SAC									
Concentration above the PQL									
GIL >PQL									

[illegible]

		TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j,k)fluoranthene	Benzo(e)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene	Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc	
PQL Envirolab SYD		10	50	100	100	1	1	1	2	1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	1	0.1	1	1	1	0.05	1	1	
PQL Envirolab VIC		10	50	100	100	1.0	1.0	1.0	2.0	1.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	1	0.1	1	1	1	0.05	1	1	
Intra laboratory duplicate	MW5	<10	280	1600	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<1	<1	<1	<0.05	<1	<1	
	WDUP2	<10	180	1700	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<1	<0.1	<1	<1	<1	<0.05	<1	<1	
	MEAN	230	1650	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %	nc	43%	6%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter laboratory duplicate	MW4	13	210	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2	<0.1	<1	6	<1	<0.05	<1	<1	
	WDUP1	19	360	460	<100	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2	<0.1	2	27	1	4	<0.05	21	
	MEAN	16	285	255	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	2	nc	1.25	16.5	0.75	2.0125	nc	10.75
	RPD %	38%	53%	161%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	nc	120%	127%	67%	198%	nc	191%
Field Blank	TB-W1 30/09/2022	0	0	0	0	<1	<1	<1	<2	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Spike	TS-W1 30/09/2022	-	-	-	-	115%	99%	119%	115%	115%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Result outside of QA/QC acceptance criteria			Value																															

PSI 2022 and DSI Borehole Logs

BOREHOLE LOG

Borehole No.
4
1 / 2

EASTING: 305534.879
NORTHING: 6181919.422

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Method:** SPIRAL AUGER **R.L. Surface:** 26.91 m
Date: 27/9/22 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** Q.V./R.R.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING										FILL: Silty clay, medium to high plasticity, dark grey, with fine to medium grained sandstone and latite gravel, trace of root fibres.	w>PL			GRASS COVER
						26	1			LATITE: fine to medium grained, light grey, dark grey, green grey and orange brown.	MW	M		DAPTO LATITE MODERATE 'TC' BIT RESISTANCE HIGH RESISTANCE
							25	2		REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 6.1m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 1.0m TO 6.1m. CASING 0.05m TO 1.0m. 2mm SAND FILTER PACK 1.2m TO 6.1m. BENTONITE SEAL 0.8m TO 1.2m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETE GATIC COVER.
							24	3						
							23	4						
							22	5						
							21	6						
							20							

Borehole No.

4

2 / 2

EASTING: 305534.879
NORTHING: 6181919.422

CORED BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Core Size:** NMLC **R.L. Surface:** 26.91 m
Date: 27/9/22 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** Q.V./R.R.

Water Loss/Level Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)										DEFECT DETAILS		Formation
							VL-0.1	L-0.3	M-1	H-3	VH-10	EH	600	200	60	20	SPACING (mm)	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness	
	26			START CORING AT 0.94m															
		1		NO CORE 0.33m															
70% RETURN		25		LATITE: fine grained, dark grey, speckled light grey and green grey. Joint spacing generally >0.6m below 2.5m.	SW	VH							5.5					(1.39m) J, 5°, P, S, Clay FILLED (1.45m) Cr, 0°, 75 mm.t (1.55m) Cr, 10°, 15 mm.t (1.61m) J, 25°, P, R, Cn (1.71m) J, 80°, C, R, Fe Ct (1.81m) Jh, 80°, C, R, Fe Ct (1.86m) Jx2, 50°, C, R, Fe Ct	
		2											7.1						
		24				FR							7.4					(2.13m) XWS, 10°, 25 mm.t (2.15m) J, 25°, P, R, Clay FILLED (2.23m) J, 30°, Un, R, Cn (2.41m) J, 80°, Un, R, Fe Sn (2.50m) J, 60°, P, R, Cn (2.62m) J, 70°, C, R, Cn	
100% RETURN		23											9.0					(2.86m) J, 5°, P, R, Cn	
		22											6.5						
		21											8.7					(3.89m) J, 80°, C, R, Cn	
		20											7.9					(4.51m) J, 25°, P, R, Clay FILLED	
													4.3						
													7.7					(5.40m) J, 0°, P, R, Cn (5.44m) Jx2, 25°, Un, R, Cn (5.56m) Jh, 70°, C, R, Cn	
													7.1					(6.05m) Jx2, 60°, P, R, Cn	
				END OF BOREHOLE AT 6.16 m															
	20																		

JK 9.024 LIB GLB Log JK CORED BOREHOLE - MASTER 34300LX2 WARRAWONG.GPJ <<DrawingFile>> (20/12/2022 14:08 10:01:00:01 Dated Lab and In Situ Tool - DGD | Lib JK 9.024 2019-05-31 Proj JK 9.01.0 2018-03-20)

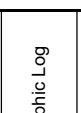
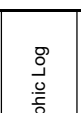
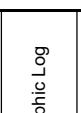
BOREHOLE LOG

Borehole No.
5
1 / 2

EASTING: 305507.874
NORTHING: 6181951.763

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Method:** SPIRAL AUGER **R.L. Surface:** 28.49 m
Date: 27/9/22 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** Q.V./R.R.

Groundwater Record	SAMPLES			Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION OF AUGERING	█	█	█	█	28	1			FILL: Silty clay, medium plasticity, dark grey and dark brown, with fine to medium grained sand and fine to medium grained igneous and sandstone gravel, trace of brick fragments, ash and root fibres.	w-PL			GRASS COVER SAMPLE TOO FRIABLE FOR HP
	█	█	█	█					FILL: Silty clay, medium to high plasticity, dark brown, brown and dark grey, with fine to medium grained sand and fine to medium grained sandstone gravel, trace of root fibres.	w>PL			
	█	█	█	█	27	2						210 210 220	
	█	█	█	█									
					26								
					25	3		-	LATITE: fine to medium grained, dark grey, light grey, green grey and red brown, with occasional clay bands.	HW	L - M		DAPTO LATITE LOW TO MODERATE 'TC' BIT RESISTANCE
													HIGH RESISTANCE
					24	4			REFER TO CORED BOREHOLE LOG				'TC' BIT REFUSAL GROUNDWATER MONITORING WELL INSTALLED TO 8.15m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 3m TO 8.15m. CASING 0.05m TO 3m. 2mm SAND FILTER PACK 3.2m TO 8.15m. BENTONITE SEAL 2.5m TO 3.2m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
					23	5							
					22	6							

JK 9.02.4 LIB GLB Log JK AUGERHOLE - MASTER 34300LX2 PORTKEMBLA HOSPITAL GPJ <<DrawingFile>> 02/11/2022 12:04 10:01 00:01 Dated Lab and in Situ Test - DGD Lib JK 9.02.4 2019-05-31 Proj JK 9.01.0 2018-03-20

CORED BOREHOLE LOG

Borehole No.
5
2 / 2

EASTING: 305507.874
NORTHING: 6181951.763

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Core Size:** NMLC **R.L. Surface:** 28.49 m
Date: 27/9/22 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** Q.V./R.R.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)										DEFECT DETAILS		Formation
								VL-0.1	L-0.3	M-1	H-3	VH-10	EH	600	200	60	20	Specific	General	
		25			START CORING AT 3.60m															
			4		LATITE: fine grained, dark grey, light grey and green grey. Non-intact below 4.4m.	SW	VH													
			5		NO CORE 1.47m															
			6																	
			7		LATITE: fine grained, dark grey, speckled light grey and green grey.	FR	VH													
			8																	
			9		END OF BOREHOLE AT 8.15 m															

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2			Method: 300mm PENDULUM AUGER				R.L. Surface: N/A						
Date: 1/8/23			Datum: -										
Plant Type: EXCAVATOR			Logged/Checked by: O.B./T.H.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, brown, trace of sand, igneous and sandstone gravel, and root fibres.	w≈PL			GRASS COVER SCREEN: 10.01kg 0-0.1m, NO FCF SCREEN: 11.11kg 0.1-1.0m, NO FCF
						0.5			FILL: Silty sandy clay, medium to high plasticity, brown, with igneous and latite cobbles, trace of igneous and sandstone gravel, and brick fragments.				
						1			END OF BOREHOLE AT 1.1m				REFUSAL ON INFERRED BEDROCK
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH202

1/1

Environmental logs are not to be used for geotechnical purposes

SDUP3: 0-0.1m

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

300mm PENDULUM AUGER

R.L. Surface:

N/A

Date:

1/8/23

Datum:

-

Plant Type:

EXCAVATOR

Logged/Checked by:

O.B./T.H.

Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0			FILL: Silty sandy clay, low to medium plasticity, brown, trace of igneous gravel, tree roots and root fibres.	w≈PL			GRASS COVER SCREEN: 10.33kg 0-0.1m, NO FCF SCREEN: 10.51kg 0.1-0.6m, NO FCF
							0.5			as above, but with sandstone cobbles.				
								1	CI-CH	Silty sandy CLAY: medium to high plasticity, light brown.	w≈PL			RESIDUAL
							1.5			END OF BOREHOLE AT 1.2m				
							2							
							2.5							
							3							
							3.5							

Client:HEALTH INFRASTRUCTURE Project:PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location:85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2			Method: 300mm PENDULUM AUGER			R.L. Surface: N/A							
Date: 1/8/23			Datum: -										
Plant Type: EXCAVATOR			Logged/Checked by: O.B./T.H.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty sandy clay, low to medium plasticity, brown, trace of ironstone gravel and root fibres.	w≈PL			GRASS COVER
						0.5							SCREEN: 10.12kg 0-0.1m, NO FCF SCREEN: 10.71kg 0.1-0.6m, NO FCF
						1		CH	Silty CLAY: high plasticity, light brown.	w≈PL			RESIDUAL
						1.5			END OF BOREHOLE AT 1.1m				
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH/MW204

1/3

Environmental logs are not to be used for geotechnical purposes

Client:HEALTH INFRASTRUCTURE

Project:PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:85-91 COWPER STREET, WARRAWONG, NSW

Job No.:E34300PT2

Date:31/7/23

Plant Type:JK205

Method:SPIRAL AUGER

Logged/Checked by:O.B./T.H.

R.L. Surface:N/A

Datum:-

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL DB									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, brown, trace of ironstone gravel, sand and root fibres.	w≈PL			GRASS COVER
						0.5		FILL: Silty sandy clay, low to medium plasticity, dark brown, with ironstone gravel.				SCREEN: 10.61kg 0-0.1m, NO FCF SCREEN: 4.07kg 0.1-1.0m, NO FCF	
					N = 7 3,4,3	1							
					N = 24 4,10,14	1.5			as above, but light grey. LATITE: 6.20m.t	w<PL			INSUFFICIENT RETURN FOR BULK SCREEN COMMENCE CORING AT 1.8m DEPTH
						2							-LATITE ROCK CORE
					2.5								
					3								
						3.5							

Environmental logs are not to be used for geotechnical purposes

[illegible]

Environmental logs are not to be used for geotechnical purposes

Client:	HEALTH INFRASTRUCTURE												
Project:	PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE												
Location:	85-91 COWPER STREET, WARRAWONG, NSW												
Job No.: E34300PT2		Method: SPIRAL AUGER						R.L. Surface: N/A					
Date: 31/7/23								Datum: -					
Plant Type: JK205		Logged/Checked by: O.B./T.H.											
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL DB									
						7.5	<<< <<<		LATITE: 6.20m.t				
						8	<<< <<<		END OF BOREHOLE AT 8.0				GROUNDWATER MONITORING WELL INSTALLED TO 8.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 0m TO 2.0m. CASING 8.0m TO 2.0. BENTONITE SEAL 0.7m TO 0m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						8.5							
						9							
						9.5							
						10							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH205

1/1

Environmental logs are not to be used for geotechnical purposes

SDUP1: 0-0.1m

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

300mm PENDULUM AUGER

R.L. Surface:

N/A

Date:

1/8/23

Datum:

-

Plant Type:

EXCAVATOR

Logged/Checked by:

O.B./T.H.

Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0			FILL: Silty clay, low to medium plasticity, brown, trace of igneous gravel, sand, clay nodules and root fibres.	w≈PL			GRASS COVER SCREEN: 10.16kg 0-0.1m, NO FCF SCREEN: 10.47kg 0.1-1.1m, NO FCF
						0.5								
						1								
							1			END OF BOREHOLE AT 1.0m				SPIRAL AUGER REFUSAL ON INFERRED BEDROCK
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH206

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Date: 2/8/23 Plant Type: -				Method: HAND AUGER Logged/Checked by: O.B./T.H.				R.L. Surface: N/A Datum: -					
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty sandy clay, low to medium plasticity, brown, trace of root fibres.	w≈PL			GRASS COVER SCREEN: 5.45kg 0-0.4m, NO FCF
						0.5			END OF BOREHOLE AT 0.4m				HAND AUGER REFUSAL ON OBSTRUCTION IN FILL
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH207

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2			Method: HAND AUGER				R.L. Surface: N/A						
Date: 31/7/23			Datum: -										
Plant Type: -			Logged/Checked by: O.B./T.H.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty sandy clay, low to medium plasticity, brown, trace of igneous gravel, sand, timber fragments and root fibres.	w≈PL			GRASS COVER SCREEN: 4.81kg 0-0.1m, NO FCF SCREEN: 7.11kg 0.1-0.5m, NO FCF
						0.5			END OF BOREHOLE AT 0.5m				HAND AUGER REFUSAL ON STIFF CLAY
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH208

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Method: SPIRAL AUGER R.L. Surface: N/A													
Date: 31/7/23 Datum: -													
Plant Type: JK205 Logged/Checked by: O.B./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	ASPHLTIC CONCRETE: 100mm.t				
						0.5			FILL: Silty clay, medium to high plasticity, brown and orange brown, trace of igneous gravel, and asphalt fragments.	w≈PL			SCREEN: 4.62kg 0.1-0.3m, NO FCF
					N = 8 2,2,6	1	SC	Silty sandy CLAY: medium to high plasticity, dark brown and orange brown.	w≈PL			RESIDUAL	
						1.5			END OF BOREHOLE AT 1.1m				'TC' BIT REFUSAL ON INFERRED BEDROCK
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH209

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Date: 2/8/23 Plant Type: -				Method: HAND AUGER Logged/Checked by: O.B./T.H.				R.L. Surface: N/A Datum: -					
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, brown, trace of igneous gravel, sand and root fibres.				GRASS COVER SCREEN: 6.91kg 0-0.3m, NO FCF
						0.5			END OF BOREHOLE AT 0.3m				HAND AUGER REFUSAL ON STIFF CLAY
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No. **BH210**

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Date: 31/7/23 Plant Type: JK205			Method: SPIRAL AUGER Logged/Checked by: O.B./T.H.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 100mm.t	w≈PL			SCREEN: 2.16kg 0.1-0.3m, NO FCF SCREEN: 6.74kg 0.3-1.0m, NO FCF INSUFFICIENT RETURN FOR BULK SAMPLE HIGH 'TC' IT RESISTANCE
						0.5		FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel, brick fragments and slag. FILL: Silty clay, low to medium plasticity, dark brown and light grey, trace of igneous and sandstone gravel, sand, and brick fragments.					
						1		FILL: Gravelly clay, low to medium plasticity, dark brown, with igneous gravel. END OF BOREHOLE AT 1.3m					
						1.5							'TC' BIT REFUSAL ON INFERRED BEDROCK
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH211

1/1

Environmental logs are not to be used for geotechnical purposes

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

300mm PENDULUM AUGER

R.L. Surface:

N/A

Date:

2/8/23

Datum:

-

Plant Type:

EXCAVATOR

Logged/Checked by:

O.B./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0			FILL: Silty sandy clay, low to medium plasticity, dark brown, with igneous gravel and cobbles, roots and root fibres. END OF BOREHOLE AT 0.2m	w≈PL			GRASS COVER SCREEN: 12.01kg 0-0.2m, NO FCF REFUSAL ON OBSTRUCTION IN FILL
						0.5							
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH212
1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Date: 2/8/23 Plant Type: -				Method: HAND AUGER Logged/Checked by: O.B./T.H.				R.L. Surface: N/A Datum: -					
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0			FILL: Silty sandy clay, low to medium plasticity, brown, trace of root fibres.	w≈PL			GRASS COVER SCREEN: 5.11kg 0-0.3m, NO FCF
						0.5			END OF BOREHOLE AT 0.3m				HAND AUGER REFUSAL ON STIFF CLAY
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH213

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2			Method: 300mm PENDULUM AUGER				R.L. Surface: N/A						
Date: 2/8/23			Datum: -										
Plant Type: EXCAVATOR			Logged/Checked by: O.B./T.H.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty sandy clay, low to medium plasticity, brown, with igneous cobbles, trace of igneous gravel, clay nodules and root fibres.	w≈PL			GRASS COVER SCREEN: 11.91kg 0-0.1m, NO FCF SCREEN: 11.15kg 0.1-0.8m, NO FCF
						0.5		as above, but light brown.					
						1			END OF BOREHOLE AT 0.8m				REFUSAL ON OBSTRUCTION IN FILL/POSSIBLY BEDROCK
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH214

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Date: 2/8/23 Plant Type: EXCAVATOR			Method: 300mm PENDULUM AUGER Logged/Checked by: O.B./T.H.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty sandy clay, low to medium plasticity, dark brown, with igneous gravel and cobbles, trace of root fibres.	w≈PL			GRASS COVER SCREEN: 10.22kg 0-0.1m, NO FCF SCREEN: 10.91kg 0.1-0.6m, NO FCF
						0.5							
						1			END OF BOREHOLE AT 0.6m				REFUSAL ON OBSTRUCTION IN FILL
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH215
1/1

SDUP6: 0-0.1m

Environmental logs are not to be used for geotechnical purposes

Client:HEALTH INFRASTRUCTURE

Project:PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:85-91 COWPER STREET, WARRAWONG, NSW

Job No.:E34300PT2

Method:300mm PENDULUM AUGER

R.L. Surface:N/A

Date:2/8/23

Datum:-

Plant Type:EXCAVATOR

Logged/Checked by:O.B./T.H.

Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0			FILL: Silty sandy clay, low to medium plasticity, brown, with brick fragments, trace of igneous and sandstone gravel and cobbles, roots and root fibres.	w≈PL			GRASS COVER SCREEN: 10.12kg 0-0.1m, NO FCF SCREEN: 11.01kg 0.1-0.7m, NO FCF
						0.5								
							1			END OF BOREHOLE AT 0.7m				REFUSAL ON OBSTRUCTION IN FILL/POSSIBLY BEDROCK
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH216

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Date: 1/8/23 Plant Type: EXCAVATOR			Method: 300mm PENDULUM AUGER Logged/Checked by: O.B./T.H.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/Weathering	Strength/Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	ES	ASS	ASB	SAL	DB	0 0.5 1 1.5 2 2.5 3 3.5		CL-CI	FILL: Silty sandy clay, medium to high plasticity, brown, with igneous cobbles and brick fragments, trace of igneous and sandstone gravel, roots and root fibres.	w≈PL			SCREEN: 10.21kg 0-0.1m, NO FCF SCREEN: 11.37kg 0.1-0.7m, NO FCF
	FILL: Silty sandy clay, low to medium plasticity, light brown, trace of igneous gravel.												
	Silty sandy CLAY: low to medium plasticity, light brown.	w≈PL	RESIDUAL										
									END OF BOREHOLE AT 1.3m				

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH217

1/1

Environmental logs are not to be used for geotechnical purposes

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

SPIRAL AUGER

R.L. Surface:

N/A

Date:

31/7/23

Datum:

-

Plant Type:

JK205

Logged/Checked by:

O.B./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL DB									
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 100mm.t				
						0.5			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel, and sand.	w<PL			SCREEN: 1.91kg 0.1-0.7m, NO FCF
					N = 10 3,4,6	1			as above, but trace of brick fragments.	w≈PL			SCREEN: 6.45kg 0.7-1.1m, NO FCF
						1.5			END OF BOREHOLE AT 1.1m				TC' BIT REFUSAL ON INFERRED BEDROCK
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH218

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Method: 300mm PENDULUM AUGER R.L. Surface: N/A Date: 1/8/23 Datum: - Plant Type: EXCAVATOR Logged/Checked by: O.B./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, light brown, with igneous and sandstone cobbles, and brick fragments, trace of roots and root fibres.	w≈PL			GRASS COVER SCREEN: 9.01kg 0-0.1m, NO FCF SCREEN: 10.33kg 0.1-0.6m, NO FCF
						0.5			as above, but brown.				
									END OF BOREHOLE AT 0.6m				REFUSAL ON INFERRED BEDROCK
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No.
BH219
1/1

SDUP5: 0-0.1m

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Method: 300mm PENDULUM AUGER R.L. Surface: N/A Date: 1/8/23 Datum: - Plant Type: EXCAVATOR Logged/Checked by: O.B./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty sandy clay, low to medium plasticity, dark brown, trace of igneous gravel and cobbles, and root fibres.	w≈PL			GRASS COVER SCREEN: 8.71kg 0-0.1m, NO FCF SCREEN: 11.45kg 0.1-1.3m, NO FCF
						0.5			as above, but light brown.				
						1			as above, but without igneous cobbles.				
						1.5			END OF BOREHOLE AT 1.3m				REFUSAL ON INFERRED BEDROCK
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH220

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2			Method: 300mm PENDULUM AUGER				R.L. Surface: N/A						
Date: 1/8/23			Datum: -										
Plant Type: EXCAVATOR			Logged/Checked by: O.B./T.H.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty sandy clay, low to medium plasticity, brown, with igneous cobbles and brick fragments, trace of igneous and sandstone gravel.	w≈PL			GRASS COVER SCREEN: 10.29kg 0-0.1m, NO FCF SCREEN: 11.25kg 0.1-0.6m, NO FCF
						0.5			as above, but light brown.				
									END OF BOREHOLE AT 0.6m				REFUSAL ON OBSTRUCTION IN FILL/POSSIBLY BEDROCK
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH221

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2			Method: HAND AUGER				R.L. Surface: N/A						
Date: 15/8/23			Datum: -										
Plant Type: -			Logged/Checked by: K.T./T.H.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Sandy silty clay, medium to high plasticity, dark brown, trace of ironstone gravel, ash, bark chips and root fibres.	w<PL			GRASS COVER
						0.5		FILL: Silty clay, medium to high plasticity, dark brown, trace of igneous and ironstone gravel, brick and concrete fragments and root fibres.	SCREEN: 8.97kg 0-0.1m, NO FCF INSUFFICIENT RETURN FOR BULK SAMPLE				
									END OF BOREHOLE AT 0.55m				HAND AUGER REFUSAL ON GRAVEL/HARD CLAY
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH222
1/1

SDUP201: 0-0.1m

Environmental logs are not to be used for geotechnical purposes

Client:HEALTH INFRASTRUCTURE

Project:PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:85-91 COWPER STREET, WARRAWONG, NSW

Job No.:E34300PT2

Method:HAND AUGER

R.L. Surface:N/A

Date:15/8/23

Datum:-

Plant Type:-

Logged/Checked by:K.T./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium to high plasticity, dark brown, trace of sand, igneous and ironstone gravel, roots and root fibres. FILL: Silty clay, medium to high plasticity, brown, trace of sand, ironstone gravel and root fibres. END OF BOREHOLE AT 0.4m	w<PL			GRASS COVER SCREEN: 8.76kg 0-0.1m, NO FCF INSUFFICIENT RETURN FOR BULK SAMPLE HAND AUGER REFUSAL ON GRAVEL/HARD CLAY
						0.5							
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG

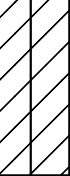


Log No.

BH/MW223

1/3

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE													
Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE													
Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2			Method: SPIRAL AUGER					R.L. Surface: N/A					
Date: 14/8/23								Datum: -					
Plant Type: JK205			Logged/Checked by: K.T./T.H.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION	█	█	█	█		0			FILL: Silty clay, medium to high plasticity, dark brown, trace of sand, and igneous, ironstone and sandstone gravel, and root fibres.	w<PL			GRASS COVER
	█	█	█	█		0.5			FILL: Silty clay, medium to high plasticity, brown, trace of igneous and sandstone gravel and root fibres.	D			SCREEN: 9.25kg 0-0.1m, NO FCF SCREEN: 4.75kg 0.15-0.4m, NO FCF
					N = SPT 18/ 150mm REFUSAL	1			FILL: Clayey sand, fine to medium grained, brown, with fine to medium grained ash.				SCREEN: 3.2kg 0.7-1.0m, NO FCF
	█	█	█	█		1.5			FILL: Sand, fine to medium grained, brown, with clay fines, trace of igneous gravel.	D			POSSIBLY NATURAL
					N = SPT 21/ 150mm REFUSAL	2							SCREEN: 2.8kg 1.7-2.0m, NO FCF
						2.5							SCREEN: 7.01kg 2.5-3.0m, NO FCF
	█	█	█	█	N = SPT 23/ 150mm REFUSAL	3		CL-CI	Silty CLAY: low to medium plasticity, brown, with fine to medium grained sand.	w≈PL	Hd		RESIDUAL
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH/MW223

3/3

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Date: 14/8/23 Plant Type: JK205			Method: SPIRAL AUGER Logged/Checked by: K.T./T.H.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
						7.5			LATITE: fine grained, light grey and dark grey.	VH			DAPTO LATITE
						8			END OF BOREHOLE AT 8.0m				GROUNDWATER MONITORING WELL INSTALLED TO 8.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 3.0m TO 8.0m. CASING 3.0m TO SURFACE. 2mm SAND FILTER PACK 3.2m TO 8.0 m. BENTONITE SEAL 2.7m TO 3.2m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						8.5							
						9							
						9.5							
						10							

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH/MW224

1/3

Environmental logs are not to be used for geotechnical purposes

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

SPIRAL AUGER

R.L. Surface:

N/A

Date:

14/8/23

Datum:

-

Plant Type:

JK205

Logged/Checked by:

K.T./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Sandy gravel, fine to coarse grained, grey, sub-angular, igneous, fine to medium grained sand. FILL: Gravelly clay, low to medium plasticity, grey, fine to coarse grained igneous gravel, trace of sand.	D w<PL			SCREEN: 11.2kg 0-0.1m, NO FCF SCREEN: 7.27kg 0.1-0.5m, NO FCF
						0.5		CI-CH	Sandy silty CLAY: medium to high plasticity, brown, trace of igneous gravel.	w<PL			RESIDUAL
						1							
						1.5							
						2							
						2.5		-	Extremely Weathered latite: silty sandy clay, low to medium plasticity, grey brown. LATITE: fine grained, dark grey and light grey, with iron staining in fractures.	XW VH	D		DAPTO LATITE COMMENCED CORING AT 2.6m DEPTH
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH/MW224
2/3

Environmental logs are not to be used for geotechnical purposes

Client:HEALTH INFRASTRUCTURE

Project:PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:85-91 COWPER STREET, WARRAWONG, NSW

Job No.:E34300PT2

Date:14/8/23

Plant Type:JK205

Method:SPIRAL AUGER

Logged/Checked by:K.T./T.H.

R.L. Surface:N/A

Datum:-

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL DB									
						4			LATITE: fine grained, dark grey and light grey, with iron staining in fractures.	VH			DAPTO LATITE
						4.5							
						5							
						5.5							
						6							
						6.5							
						7							

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW														
Job No.: E34300PT2 Method: SPIRAL AUGER R.L. Surface: N/A Date: 14/8/23 Datum: - Plant Type: JK205 Logged/Checked by: K.T./T.H.														
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks	
	ES	ASS	ASB	SAL										DB
						7.5			LATITE: fine grained, dark grey and light grey, with iron staining in fractures.	VH				DAPTO LATITE
						8			END OF BOREHOLE AT 7.5m					GROUNDWATER MONITORING WELL INSTALLED TO 7.5m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 2.5m TO 7.5m. CASING 2.5m TO SURFACE. 2mm SAND FILTER PACK 2.3m TO 7.5 m. BENTONITE SEAL 2.0m TO 2.3m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						8.5								
						9								
						9.5								
						10								

JKEnvironments

ENVIRONMENTAL LOG



Log No.

BH1

1/1

Environmental logs are not to be used for geotechnical purposes

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

SPIRAL AUGER /
PUSH TUBE

R.L. Surface:

N/A

Date:

27/9/22

Datum:

-

Plant Type:

EZIPROBE

Logged/Checked by:

N.M./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0			FILL: Silty clay, low to medium plasticity, brown, trace of sand, igneous gravel, roots and root fibres. FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel, concrete fragments, roots, root fibres and ash.	w<PL			GRASS COVER
						0.5			END OF BOREHOLE AT 0.4m				SCREEN: 8.19kg 0-0.1m NO FCF SCREEN: 3.18kg 0.1-0.4m NO FCF INCREASED ASH BETWEEN 0.25-0.3m 'TC' BIT REFUSAL ON OBSTRUCTION IN FILL
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Date: 28/9/22 Plant Type: EZIPROBE			Method: SPIRAL AUGER / PUSH TUBE Logged/Checked by: N.M./T.H.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel, roots and root fibres.	w<PL			GRASS COVER
						0.5			FILL: Silty clay, medium to high plasticity, brown, trace of igneous and ironstone gravel, roots and root fibres.	w<PL			SCREEN: 6.80kg 0-0.1m NO FCF SCREEN: 3.73kg 0.1-0.5m NO FCF
						0.5			END OF BOREHOLE AT 0.5m				'TC' BIT REFUSAL ON OBSTRUCTION IN FILL
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

Environmental logs are not to be used for geotechnical purposes

SDUP5: 0-0.1

Client:HEALTH INFRASTRUCTURE Project:PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location:85-91 COWPER STREET, WARRAWONG, NSW													
Job No.:E34300PT2 Method:SPIRAL AUGER / PUSH TUBE R.L. Surface:N/A Date:27/9/22 Datum:- Plant Type:EZIPROBE Logged/Checked by:N.M./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium to high plasticity, dark brown, trace of fine to medium grained sand, igneous gravel, roots and root fibres.	w≈PL			GRASS COVER
						0.5			FILL: Silty clay, medium to high plasticity, brown, trace of brick fragments, igneous and ironstone gravel, roots and root fibres.	w<PL			SCREEN: 6.87kg 0-0.1m NO FCF
									END OF BOREHOLE AT 0.6m				SCREEN: 4.01kg 0.2-0.6m NO FCF
						1							'TC' BIT REFUSAL ON OBSTRUCTION IN FILL
						1.5							
						2							
						2.5							
						3							
						3.5							

BOREHOLE LOG

Borehole No.
4
1 / 2

EASTING: 305534.879
NORTHING: 6181919.422

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Method:** SPIRAL AUGER **R.L. Surface:** 26.91 m
Date: 27/9/22 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** Q.V./R.R.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING										FILL: Silty clay, medium to high plasticity, dark grey, with fine to medium grained sandstone and latite gravel, trace of root fibres.	w>PL			GRASS COVER
						26	1			LATITE: fine to medium grained, light grey, dark grey, green grey and orange brown.	MW	M		DAPTO LATITE MODERATE 'TC' BIT RESISTANCE HIGH RESISTANCE
							25	2		REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 6.1m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 1.0m TO 6.1m. CASING 0.05m TO 1.0m. 2mm SAND FILTER PACK 1.2m TO 6.1m. BENTONITE SEAL 0.8m TO 1.2m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETE GATIC COVER.
							24	3						
							23	4						
							22	5						
							21	6						
							20							

Borehole No.

4

2 / 2

EASTING: 305534.879
NORTHING: 6181919.422

CORED BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Core Size:** NMLC **R.L. Surface:** 26.91 m
Date: 27/9/22 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** Q.V./R.R.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)	DEFECT DETAILS		Formation
									SPACING (mm)	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness	
		26			START CORING AT 0.94m						
70% RETURN			1		NO CORE 0.33m						
					LATITE: fine grained, dark grey, speckled light grey and green grey. Joint spacing generally >0.6m below 2.5m.	SW	VH	5.5		(1.39m) J, 5°, P, S, Clay FILLED (1.45m) Cr, 0°, 75 mm.t (1.55m) Cr, 10°, 15 mm.t (1.61m) J, 25°, P, R, Cn (1.71m) J, 80°, C, R, Fe Ct (1.81m) Jh, 80°, C, R, Fe Ct (1.86m) Jx2, 50°, C, R, Fe Ct	
		25	2					7.1			
								7.4		(2.13m) XWS, 10°, 25 mm.t (2.15m) J, 25°, P, R, Clay FILLED (2.23m) J, 30°, Un, R, Cn (2.41m) J, 80°, Un, R, Fe Sn (2.50m) J, 60°, P, R, Cn (2.62m) J, 70°, C, R, Cn	
		24	3					9.0		(2.86m) J, 5°, P, R, Cn	
								6.5			
		23	4					8.7		(3.89m) J, 80°, C, R, Cn	
								7.9		(4.51m) J, 25°, P, R, Clay FILLED	
		22	5					4.3			
								7.7		(5.40m) J, 0°, P, R, Cn (5.44m) Jx2, 25°, Un, R, Cn (5.56m) Jh, 70°, C, R, Cn	
	21	6								7.1	
					END OF BOREHOLE AT 6.16 m						
		20									

JK 9.024.LIB.GLB Log JK Cored Borehole - MASTER 34300LX2 WARRAWONG.GPJ <<DrawingFile>> (20/12/2022 14:08 10:01:00:01) D:\git\Lab and In Situ Tool - DGD | Lib JK 9.024.2019-05-31 Proj JK 9.01.0.2018-03-20

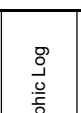
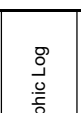
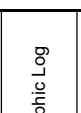
BOREHOLE LOG

Borehole No.
5
1 / 2

EASTING: 305507.874
NORTHING: 6181951.763

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Method:** SPIRAL AUGER **R.L. Surface:** 28.49 m
Date: 27/9/22 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** Q.V./R.R.

Groundwater Record	SAMPLES			Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION OF AUGERING						28			FILL: Silty clay, medium plasticity, dark grey and dark brown, with fine to medium grained sand and fine to medium grained igneous and sandstone gravel, trace of brick fragments, ash and root fibres.	w-PL			GRASS COVER SAMPLE TOO FRIABLE FOR HP
						1							
						27			FILL: Silty clay, medium to high plasticity, dark brown, brown and dark grey, with fine to medium grained sand and fine to medium grained sandstone gravel, trace of root fibres.	w>PL		210 210 220	
						2							
						26							
						3		-	LATITE: fine to medium grained, dark grey, light grey, green grey and red brown, with occasional clay bands.	HW	L - M		DAPTO LATITE LOW TO MODERATE 'TC' BIT RESISTANCE
						25							HIGH RESISTANCE
						24			REFER TO CORED BOREHOLE LOG				'TC' BIT REFUSAL GROUNDWATER MONITORING WELL INSTALLED TO 8.15m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 3m TO 8.15m. CASING 0.05m TO 3m. 2mm SAND FILTER PACK 3.2m TO 8.15m. BENTONITE SEAL 2.5m TO 3.2m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						23							
						22							

JK 9.02.4 LIB GLB Log JK AUGERHOLE - MASTER 34300LX2 PORTKEMBLA HOSPITAL GPJ <<DrawingFile>> 02/11/2022 12:04 10.01.00.01 Dated Lab and in Situ Test - DGD Lib JK 9.02.4 2019-05-31 Proj JK 9.01.02 2018-03-20

CORED BOREHOLE LOG

Borehole No.

5

2 / 2

EASTING: 305507.874
NORTHING: 6181951.763

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Core Size:** NMLC **R.L. Surface:** 28.49 m
Date: 27/9/22 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** Q.V./R.R.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)	DEFECT DETAILS				Formation
									SPACING (mm)		DESCRIPTION		
											Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness		
								Specific		General			
		25			START CORING AT 3.60m								
70% RETURN			4		LATITE: fine grained, dark grey, light grey and green grey. Non-intact below 4.4m.	SW	VH						
		24											
		5			NO CORE 1.47m								
		23											
		6											
100% RETURN		22	7		LATITE: fine grained, dark grey, speckled light grey and green grey.	FR	VH						
		21											
		8											
		20			END OF BOREHOLE AT 8.15 m								
		19	9										

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

SPIRAL AUGER /
PUSH TUBE

R.L. Surface:

N/A

Date:

27/9/22

Datum:

-

Plant Type:

EZIPROBE

Logged/Checked by:

N.M./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0		-	ASPHALT: 20mm.t FILL: Sandy gravel, fine to coarse grained, sub-angular igneous, grey, fine to medium grained sand, trace of clay and asphalt fragments.	M			SCREEN: 4.28kg 0.02-0.2m NO FCF
						0.5		CL	FILL: Silty clay, medium to high plasticity, grey brown, trace of igneous gravel.	w<PL			SCREEN: 3.16kg 0.2-0.3m NO FCF
									Silty Sandy CLAY: low to medium plasticity, light brown mottled orange, trace of ironstone gravel.	w<PL			RESIDUAL
						1			END OF BOREHOLE AT 1.0m				
						1.5							
						2							
						2.5							
						3							
						3.5							

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

SPIRAL AUGER /
PUSH TUBE

R.L. Surface:

N/A

Date:

29/9/22

Datum:

-

Plant Type:

EZIPROBE

Logged/Checked by:

N.M./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous and ironstone gravel, terracotta fragments, roots and root fibres.	w<PL			GRASS COVER SCREEN: 11.81kg 0-0.1m NO FCF SCREEN: 6.49kg 0.1-0.6m NO FCF
						0.5			FILL: Silty clay, medium to high plasticity, grey brown, trace of igneous and ironstone gravel and root fibres.	w≈PL			SCREEN: 5.68kg 0.6-1.6m NO FCF
						1							
						1.5			END OF BOREHOLE AT 1.6m				'TC' BIT REFUSAL ON OBSTRUCTION IN FILL
						2							
						2.5							
						3							
						3.5							

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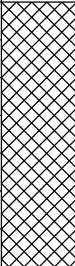
BOREHOLE LOG

Borehole No.
8
1 / 2

EASTING: 305464.625
NORTHING: 6181795.055

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Method:** SPIRAL AUGER **R.L. Surface:** 31.27 m
Date: 29/9/22 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** Q.V./R.R.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING					N = 10 2,9,1	31				FILL: Silty clay, medium plasticity, dark grey, with fine to coarse grained sandstone and latite gravel, trace of fine to medium grained sand and root fibres.	w>PL		210 180 180	GRASS COVER
						1								
						30								
								-	LATITE: fine to medium grained, dark grey, light grey, green grey and red brown. REFER TO CORED BOREHOLE LOG	MW	M - H		DAPTO LATITE MODERATE TO HIGH 'TC' BIT RESISTANCE 'TC' BIT REFUSAL	
						2								
						29								
						3								
						28								
						4								
						27								
						5								
						26								
						6								
						25								

CORED BOREHOLE LOG

Borehole No.

8

2 / 2

EASTING: 305464.625
NORTHING: 6181795.055

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Core Size:** NMLC **R.L. Surface:** 31.27 m
Date: 29/9/22 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** Q.V./R.R.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$										DEFECT DETAILS		Formation
								VL-0.1	L-0.3	M-1	H-3	VH-10	EH	600	200	60	20	Specific	General	
		30			START CORING AT 1.60m															
			2		LATITE: fine grained, dark grey, speckled light grey, green grey and red brown. Non-intact from 1.9m to 3.1m. Joint spacing generally 0.3m to 0.6m below 3.1m.	SW	VH													
			29																	
			28																	
			27																	
			26																	
			25																	
			24																	
			23																	
			22																	
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			4																	
			3																	
			2																	
			1																	
			0																	
			30		END OF BOREHOLE AT 5.91 m															
			29																	
			28																	
			27																	
			26																	
			25																	
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			6																	
			5																	
			4																	
			3																	
			2																	
			1																	
			0																	

Borehole No.
9
1 /

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Method:** SPIRAL AUGER **R.L. Surface:** 29.53 m
Date: 26/9/22 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** Q.V./R.R.

[illegible]

CORED BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2**Core Size:** NMLC**R.L. Surface:** 29.53 m**Date:** 26/9/22**Inclination:** VERTICAL**Datum:** AHD**Plant Type:** JK308**Bearing:** N/A**Logged/Checked By:** Q.V./R.R.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness	General	
		29			START CORING AT 0.93m							
	70% RETURN		1	✓	LATITE: fine to medium grained, dark grey, speckled light grey, green grey and red brown. Non-intact between 1.6m and 2m.	HW	M - H			(0.95m) J, 90°, C, R, Clay FILLED		
			2	✓						(1.16m) CS, 0°, 30 mm.t		
			2	✓						(1.50m) J, 80°, C, R, Fe Ct		
			2	✓						(1.58m) Cr, 0°, 90 mm.t		
			2	✓						(1.70m) Jx2, 90°, C, Fe Ct		
			2	✓						(1.84m) CS, 40°, 30 mm.t		
			2	✓						(1.90m) J, 80°, C, R, Fe Ct		
			2	✓						(2.07m) J, 90°, C, R, Fe Ct		
			2	✓						(2.18m) J, 10°, C, R, Fe Ct		
			2	✓						(2.26m) J, 90°, C, R, Fe Ct		
			2	✓						(2.37m) Cr, 0°, 90 mm.t		
			2	✓						(2.47m) J, 90°, C, R, Fe Ct		
			2	✓						(2.59m) J, 70°, C, R, Fe Ct		
			3	✓	Extremely Weathered latite: sandy CLAY, low plasticity, yellow brown, orange brown and dark grey, fine to medium grained sand and gravel.	XW	Hd			(2.79m) J, 90°, P, R, Fe Ct		
			3	✓	NO CORE 0.33m							
	80% RETURN		4	✓	LATITE: fine to medium grained, dark grey, orange brown, green grey and orange brown. Non-intact.	HW	L			(3.45m) Jh, 90°, C, R, Fe Ct		
			4	✓						(3.54m) Jx2, 40°, P, R, Fe Ct		
			4	✓						(3.76m) J, 70°, P, R, Fe Ct		
			4	✓						(4.12m) J, 90°, C, R, Fe Ct		
			5	✓	Extremely Weathered latite: sandy CLAY, low plasticity, orange brown, yellow brown and dark grey, fine to medium grained sand.	XW	Hd					
			5	✓	NO CORE 0.15m					(4.74m) Cr, 0°, 30 mm.t		
			5	✓	LATITE: fine to medium grained, dark grey, speckled light grey and red brown. Generally non-intact.	MW - SW	H			(4.81m) J, 50°, C, R, Fe Ct		
			5	✓						(5.10m) J, 90°, C, R, Fe Ct		
			5	✓						(5.26m) J, 10°, P, R, Fe Ct		
			5	✓						(5.36m) Jhx2, 70°, P, R, Fe Ct		
			5	✓						(5.56m) J, 90°, C, R, Fe Ct		
			5	✓						(5.80m) J, 90°, C, R, Fe Ct		
			6		END OF BOREHOLE AT 5.95 m							
		23										

Borehole No.
10
1 / 2

BOREHOLE LOG

EASTING: 305454.787
NORTHING: 6181777.116

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Method:** SPIRAL AUGER **R.L. Surface:** 32.24 m
Date: 28/9/22 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** Q.V./R.R.

Groundwater Record	SAMPLES			Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS									
DRY ON COMPLETION OF AUGERING						32			FILL: Silty clay, medium plasticity, dark grey and dark brown, with fine to medium grained igneous gravel, trace of fine to medium grained sand and root fibres.	w>PL			GRASS COVER
						1		-	Extremely Weathered latite: silty SAND, fine to medium grained, yellow brown, orange brown and light grey, trace of root fibres.	XW	Hd		DAPTO LATITE
						31							
						2			LATITE: fine to medium grained, yellow brown, light grey and red brown.	HW	VL		VERY LOW 'TC' BIT RESISTANCE
						30					L - M		LOW TO MODERATE RESISTANCE
						3					L		LOW RESISTANCE
						29							
						4			LATITE: fine grained, light grey, dark grey, green grey, brown and yellow brown.	HW	L - M		LOW TO MODERATE RESISTANCE
						28							
						27			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 8.5m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 1.5m TO 8.5m. CASING 0.05m TO 1.5m. 2mm SAND FILTER PACK 1.7m TO 8.5m. BENTONITE SEAL 1.0m TO 1.7m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						26							

JK 9.02.4 LIB GLB Log JK AUGERHOLE - MASTER 34300LX2 PORTKEMBLA HOSPITAL GPJ <DrawingFile> 02/1/2022 12:04 10.01.00.01 Dated Lab and in Situ Test - DGD Lib JK 9.02.4 2019-05-31 Proj JK 9.01.0 2018-03-20

CORED BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED COMMUNITY HEALTH CENTRE
Location: PORT KEMBLA HOSPITAL, WARRAWONG, NSW

Job No.: 34300LX2 **Core Size:** NMLC **R.L. Surface:** 32.24 m
Date: 28/9/22 **Inclination:** VERTICAL **Datum:** AHD
Plant Type: JK308 **Bearing:** N/A **Logged/Checked By:** Q.V./R.R.

Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_p(50)$	SPACING (mm)	DEFECT DETAILS		Formation
										DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness	General	
		28			START CORING AT 4.50m							
					NO CORE 0.46m							
	70% RETURN		5		Extremely Weathered latite: sandy CLAY, low plasticity, dark brown and grey, fine to medium grained sand and gravel.	XW	Hd					
			27									
					NO CORE 0.65m							
			6									
			26		LATITE: fine to medium grained, dark grey, light grey and red brown.	HW	M - H					
	90% RETURN		7									
			25		NO CORE 0.45m							
					LATITE: fine to medium grained, dark grey, light grey and red brown.	HW	M - H					
			8									
			24									
					END OF BOREHOLE AT 8.59 m							
			9									
			23									
			10									
			22									

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH11
1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE	
Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE	
Location: 85-91 COWPER STREET, WARRAWONG, NSW	
Job No.: E34300PT2	Method: SPIRAL AUGER / PUSH TUBE
Date: 29/9/22	R.L. Surface: N/A
Plant Type: EZIPROBE	Datum: -
Logged/Checked by: N.M./T.H.	

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	ASPHALT: 10mm.t FILL: Sandy gravel, fine to coarse grained, grey, sub-angular igneous gravel, fine to medium grained sand, trace of clay fines, asphalt and plastic fragments.	M			SCREEN: 8.76kg 0.01-0.15m NO FCF
						0.5		FILL: Silty clay, medium to high plasticity, dark brown, trace of sand, brick fragments, igneous gravel and ash.	w<PL			SCREEN: 6.81kg 0.15-1.6m NO FCF	
						1.5		FILL: Silty clay, medium to high plasticity, black, no inclusions.	w<PL			SCREEN: 6.90kg 1.6-1.9m NO FCF	
						2		FILL: Silty clay, medium to high plasticity, grey brown, trace of igneous gravel and sand.	w<PL			SCREEN: 3.41kg 1.9-2.3m NO FCF	
						2.5		-	Extremely Weathered latite: silty sandy CLAY, low to medium plasticity, brown mottled orange brown, trace of ironstone gravel. END OF BOREHOLE AT 2.5m	XW			RESIDUAL
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

SPIRAL AUGER /
PUSH TUBE

R.L. Surface:

N/A

Date:

28/9/22

Datum:

-

Plant Type:

EZIPROBE

Logged/Checked by:

N.M./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel, roots and root fibres.	w<PL			GRASS COVER
									FILL: Silty sandy clay, low to medium plasticity, brown, trace of ironstone and igneous gravel and metal fragments.	w<PL			SCREEN: 7.78kg 0-0.1m NO FCF SCREEN: 3.21kg 0.1-0.2m NO FCF SCREEN: 2.65kg 0.2-0.3m NO FCF 'TC' BIT REFUSAL ON OBSTRUCTION IN FILL
						0.5			END OF BOREHOLE AT 0.3m				
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH13

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE	
Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE	
Location: 85-91 COWPER STREET, WARRAWONG, NSW	
Job No.: E34300PT2	Method: SPIRAL AUGER / PUSH TUBE
Date: 27/9/22	R.L. Surface: N/A
Plant Type: EZIPROBE	Datum: -
Logged/Checked by: N.M./T.H.	

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of sand, igneous gravel, slag, ash, glass fragments, roots and root fibres.	w≈PL			GRASS COVER
						0.5			FILL: Silty clay, medium to high plasticity, orange brown and dark grey, trace of igneous gravel, ash and root fibres.	w<PL			SCREEN: 4.81kg 0-0.1m NO FCF SCREEN: 3.18kg 0.1-0.3m NO FCF INSUFFICIENT RETURN FOR BULK SCREEN
						1			FILL: Silty sandy clay, low to medium plasticity, brown and orange brown, fine to medium grained sand, trace of igneous and ironstone gravel, roots and root fibres.				INSUFFICIENT RETURN FOR BULK SCREEN
						1.2			END OF BOREHOLE AT 1.2m				'TC' BIT REFUSAL ON OBSTRUCTION IN FILL
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2				Method: HAND AUGER				R.L. Surface: N/A					
Date: 29/9/22				Datum: -									
Plant Type:				Logged/Checked by: N.M./T.H.									
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel, roots and root fibres.	w≈PL			SCREEN: 10.74kg 0-0.1m NO FCF SCREEN: 6.35kg 0.1-0.6m NO FCF
						0.5							
									END OF BOREHOLE AT 0.6m				REFUSAL ON OBSTRUCTION IN FILL
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH15

1/1

Environmental logs are not to be used for geotechnical purposes

SDUP4: 0-0.1

Client: HEALTH INFRASTRUCTURE	
Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE	
Location: 85-91 COWPER STREET, WARRAWONG, NSW	
Job No.: E34300PT2	Method: SPIRAL AUGER / PUSH TUBE
Date: 27/9/22	R.L. Surface: N/A
Plant Type: EZIPROBE	Datum: -
Logged/Checked by: N.M./T.H.	

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium to high plasticity, dark brown, trace of fine to medium grained sand, igneous gravel, roots and root fibres.	w<PL			GRASS COVER
						0.5			FILL: Sandy gravel, fine to coarse grained, sub-angular, igneous gravel, trace of ash and slag.	w<PL			SCREEN: 4.82kg 0-0.1m NO FCF
						0.5			FILL: Silty sandy clay, low to medium plasticity, brown, fine to medium grained sand, trace of igneous and ironstone gravel, ash, roots and root fibres.	w<PL			SCREEN: 2.18kg 0.1-0.2m NO FCF
						1	CL-CI	Silty Sandy CLAY: low to medium plasticity, light brown mottled grey, fine to medium grained sand, trace of ironstone gravel.				SCREEN: 1.36kg 0.2-0.3m NO FCF INSUFFICIENT RETURN FOR BULK SCREEN RESIDUAL	
						1.5			END OF BOREHOLE AT 1.1m				
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:HEALTH INFRASTRUCTURE

Project:PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:85-91 COWPER STREET, WARRAWONG, NSW

Job No.:E34300PT2

Method:SPIRAL AUGER /
PUSH TUBE

R.L. Surface:N/A

Date:28/9/22

Datum:-

Plant Type:EZIPROBE

Logged/Checked by:N.M./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous and ironstone gravel, roots and root fibres.	w<PL			GRASS COVER
						0.5			FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel, roots and root fibres.	w<PL			SCREEN: 6.92kg 0-0.1m NO FCF SCREEN: 3.41kg 0.1-0.8m NO FCF
						1	CL-CI	Silty Sandy CLAY: low to medium plasticity, light brown mottled orange brown, trace of ironstone gravel, sand and root fibres.	w<PL			RESIDUAL	
						1.5			END OF BOREHOLE AT 1.2m				
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

SDUP6: 0-0.1m

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Method: SPIRAL AUGER / PUSH TUBE R.L. Surface: N/A													
Date: 27/9/22 Datum: - Plant Type: EZIPROBE Logged/Checked by: N.M./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of sand, igneous gravel, roots and root fibres.	w≈PL			GRASS COVER
						0.5			FILL: Silty clay, medium to high plasticity, brown, trace of igneous and ironstone gravel, roots and root fibres.	w<PL			SCREEN: 5.75kg 0-0.1m NO FCF SCREEN: 4.18kg 0.1-0.5m NO FCF
						1.5	CL-CI	Silty Sandy CLAY: low to medium plasticity, fine to medium grained sand, trace of ironstone gravel, roots and root fibres.	w<PL			RESIDUAL	
						2			END OF BOREHOLE AT 2.0m				
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH18

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE													
Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE													
Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2		Method: SPIRAL AUGER / PUSH TUBE				R.L. Surface: N/A							
Date: 27/9/22						Datum: -							
Plant Type: EZIPROBE		Logged/Checked by: N.M./T.H.											
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of sand, igneous gravel, roots and root fibres.	w<PL			GRASS COVER
								FILL: Gravel, fine to coarse grained, sub-angular, slag gravel, trace of sand and ash.	D			SCREEN: 9.81kg	
								FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel, roots and root fibres.	w<PL			0-0.1m NO FCF SCREEN: 2.02kg	
						0.5	CL-CI	Silty Sandy CLAY: low to medium plasticity, light brown mottled orange brown, trace of ironstone gravel.	w<PL			0.1-0.2m NO FCF SCREEN: 1.35kg	
								END OF BOREHOLE AT 0.75m				RESIDUAL	
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Date: 28/9/22 Plant Type: EZIPROBE			Method: SPIRAL AUGER / PUSH TUBE Logged/Checked by: N.M./T.H.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of sand, igneous gravel, concrete fragments, roots and root fibres.	w<PL			GRASS COVER
						0.5		FILL: Silty clay, medium to high plasticity, dark brown, trace of roots and root fibres.	w<PL			SCREEN: 9.20kg 0-0.1m NO FCF	
					CL-CI		Silty Sandy CLAY: low to medium plasticity, light brown mottled orange brown, fine to medium grained sand, trace of ironstone gravel, roots and root fibres.	w<PL			SCREEN: 4.18kg 0.1-0.2m NO FCF		
						1			END OF BOREHOLE AT 1.0m				SCREEN: 4.38kg 0.2-0.5m NO FCF RESIDUAL
						1.5							
						2							
						2.5							
						3							
						3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

SPIRAL AUGER /
PUSH TUBE

R.L. Surface:

N/A

Date:

28/9/22

Datum:

-

Plant Type:

EZIPROBE

Logged/Checked by:

N.M./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of sand, igneous gravel, roots and root fibres.	w<PL			GRASS COVER
						0.5			FILL: Silty clay, medium to high plasticity, brown, trace of igneous and ironstone gravel, concrete fragments, roots and root fibres.	w<PL			SCREEN: 7.81kg 0-0.1m NO FCF SCREEN: 3.18kg 0.1-1.2m NO FCF
						1							
						1.5		CL-CI	Silty Sandy CLAY: low to medium plasticity, light brown mottled grey, trace of ironstone gravel.	w<PL			RESIDUAL
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Method: SPIRAL AUGER / PUSH TUBE R.L. Surface: N/A													
Date: 28/9/22 Datum: - Plant Type: EZIPROBE Logged/Checked by: N.M./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel, concrete and metal fragments, roots and root fibres.	w<PL			GRASS COVER
						0.5			FILL: Silty clay, medium to high plasticity, brown, trace of igneous and ironstone gravel and concrete fragments.	w<PL			SCREEN: 9.81kg 0-0.1m NO FCF SCREEN: 4.66kg 0.1-0.7m NO FCF
						1			END OF BOREHOLE AT 1.0m				'TC' BIT REFUSAL ON OBSTRUCTION IN FILL
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

SDUP7: 0-0.1

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

SPIRAL AUGER /
PUSH TUBE

R.L. Surface:

N/A

Date:

27/9/22

Datum:

-

Plant Type:

EZIPROBE

Logged/Checked by:

N.M./T.H.

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:HEALTH INFRASTRUCTURE

Project:PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:85-91 COWPER STREET, WARRAWONG, NSW

Job No.:E34300PT2

Method:SPIRAL AUGER /
PUSH TUBE

R.L. Surface:N/A

Date:28/9/22

Datum:-

Plant Type:EZIPROBE

Logged/Checked by:N.M./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Sandy gravel, fine to coarse grained, grey, sub-angular, igneous gravel, fine to medium grained sand, trace of clay, geofabric, ironstone gravel and terracotta fragments. END OF BOREHOLE AT 0.2m	M			SCREEN: 13.41kg 0-0.2m NO FCF
						0.5							'TC' BIT REFUSAL ON OBSTRUCTION IN FILL
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

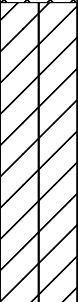
ENVIRONMENTAL LOG

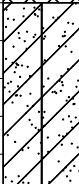
Environmental logs are not to be used for geotechnical purposes



Log No.
BH24
1/1

SDUP1: 0-0.1

Client:HEALTH INFRASTRUCTURE Project:PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location:85-91 COWPER STREET, WARRAWONG, NSW													
Job No.:E34300PT2			Method:SPIRAL AUGER / PUSH TUBE				R.L. Surface:N/A						
Date:26/9/22			Datum:-										
Plant Type:EZIPROBE			Logged/Checked by:N.M./T.H.										
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE TION						0			FILL: Silty sand, fine to medium grained, brown, with clay fines, trace of igneous, ironstone and sandstone gravel, roots and root fibres.	M			GRASS COVER SCREEN: 4.10kg 0-0.1m NO FCF SCREEN: 3.32kg 0.1-1.6m NO FCF
						0.5							
						1							
						1.5							
								CI-CH	Silty CLAY: medium to high plasticity, brown, trace of sandstone and ironstone gravel, roots and root fibres.	w≈PL			RESIDUAL
						2							
						2.5			END OF BOREHOLE AT 2.4m				
						3							
						3.5							

Client: HEALTH INFRASTRUCTURE													
Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE													
Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2				Method: SPIRAL AUGER / PUSH TUBE				R.L. Surface: N/A					
Date: 27/9/22				Datum: -									
Plant Type: EZIPROBE				Logged/Checked by: N.M./T.H.									
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION	█	█	█	█		0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel, sand, concrete fragments, roots and root fibres.	w≈PL			GRASS COVER SCREEN: 4.36kg 0-0.1m NO FCF SCREEN: 2.81kg 0.1-0.3m NO FCF INSUFFICIENT RETURN FOR BULK SCREEN RESIDUAL
	█	█	█	█		0.5			FILL: Silty clay, medium to high plasticity, brown, trace of sand, ironstone and igneous gravel, roots and root fibres.	w<PL			
	█	█	█	█		█	1		CL-CI	Silty Sandy CLAY: low to medium plasticity, brown mottled orange brown, trace of ironstone gravel.			
						1.5			END OF BOREHOLE AT 1.2m				
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Date: 26/9/22 Plant Type: EZIPROBE			Method: SPIRAL AUGER / PUSH TUBE Logged/Checked by: N.M./T.H.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0			FILL: Gravel, medium to coarse grained, grey, sub-angular, igneous, trace of brick, tile, terracotta, PVC, fiberglass and shell fragments.	D			BH26-FCF1 SURFACE LEVEL
						0.5		CL-CI	FILL: Silty clay, medium to high plasticity, grey, trace of igneous gravel, terracotta and brick fragments, roots and root fibres.	w<PL			GRAVEL COVER
						1			Silty Sandy CLAY: low to medium plasticity, brown mottled orange brown, trace of ironstone gravel.	w<PL			SCREEN: 10.42kg 0-0.15m NO FCF
									END OF BOREHOLE AT 1.1m				SCREEN: 7.81kg 0.15-0.4m NO FCF RESIDUAL
						1.5							
						2							
						2.5							
						3							
						3.5							

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Method: HAND AUGER R.L. Surface: N/A													
Date: 28/9/22 Datum: -													
Plant Type: Logged/Checked by: N.M./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium to high plasticity, dark brown, trace of sand, igneous gravel, terracotta fragments, roots and root fibres.	w≈PL			GRASS COVER
						0.5		CL-CI	Silty Sandy CLAY: low to medium plasticity, brown mottled orange brown, fine to medium grained sand.	w<PL			SCREEN: 9.46kg 0-0.1m NO FCF
									END OF BOREHOLE AT 0.7m				SCREEN: 4.83kg 0.1-0.5m NO FCF RESIDUAL
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Method: SPIRAL AUGER / PUSH TUBE R.L. Surface: N/A Date: 26/9/22 Datum: - Plant Type: EZIPROBE Logged/Checked by: N.M./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, medium to high plasticity, dark brown, trace of igneous, ironstone and sandstone gravel, roots and root fibres.	w<PL			GRASS COVER
						0.5			FILL: Gravel, fine to coarse grained, sub-angular, igneous gravel.	D			SCREEN: 3.48kg 0-0.1m NO FCF
									FILL: Silty clay, medium to high plasticity, brown, trace of ironstone and igneous gravel.	w<PL			SCREEN: 2.19kg 0.1-0.5m NO FCF
						1							INSUFFICIENT RETURN FOR BULK SCREEN
													SCREEN: 3.67kg 0.6-1.3m NO FCF
						1.5		CL-CI	Silty Sandy CLAY: low to medium plasticity, light brown mottled light grey, trace of ironstone gravel.	w<PL			RESIDUAL
									END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

SDUP2: 0-0.1

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

SPIRAL AUGER /
PUSH TUBE

R.L. Surface:

N/A

Date:

26/9/22

Datum:

-

Plant Type:

EZIPROBE

Logged/Checked by:

N.M./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE TION						0			FILL: Silty sandy clay, low to medium plasticity, brown, fine to medium grained sand, trace of igneous and ironstone gravel, roots and root fibres.	w<PL			GRASS COVER
						0.5			FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel, ash, roots and root fibres.	w<PL			SCREEN: 5.79kg 0-0.1m NO FCF SCREEN: 4.62kg 0.1-1.0m NO FCF
						1		CL-CI	Silty Sandy CLAY: low to medium plasticity, brown mottled light grey.	w<PL			RESIDUAL
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client:

HEALTH INFRASTRUCTURE

Project:

PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE

Location:

85-91 COWPER STREET, WARRAWONG, NSW

Job No.:

E34300PT2

Method:

HAND AUGER

R.L. Surface:

N/A

Date:

29/9/22

Datum:

-

Plant Type:

-

Logged/Checked by:

N.M./T.H.

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of sand, igneous gravel, plastic fragments, roots and root fibres.	w<PL			GRASS COVER
						0.5		CL-CI	FILL: Silty clay, medium to high plasticity, light brown, trace of sand and ironstone gravel.	w<PL			SCREEN: 9.89kg 0-0.1m NO FCF
												SCREEN: 3.28kg 0.1-0.3m NO FCF	
												SCREEN: 1.23kg 0.3-0.4m NO FCF RESIDUAL	
									Silty Sandy CLAY: low to medium plasticity, light brown mottled orange brown and grey.				
									END OF BOREHOLE AT 0.6m				
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

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ENVIRONMENTAL LOG



Log No.
BH31

1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE													
Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE													
Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2				Method: HAND AUGER				R.L. Surface: N/A					
Date: 28/9/22				Datum: -									
Plant Type: -				Logged/Checked by: N.M./T.H.									
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel, roots and root fibres. FILL: Silty sandy clay, low to medium plasticity, brown, trace of root fibres.	w<PL w≈PL			GRASS COVER
						0.5							SCREEN: 8.92kg 0-0.1m NO FCF SCREEN: 6.28kg 0.1-1.0m NO FCF
						1			END OF BOREHOLE AT 1.0m				REFUSAL ON OBSTRUCTION IN FILL
						1.5							
						2							
						2.5							
						3							
						3.5							

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ENVIRONMENTAL LOG



Log No.
BH32
1/1

Environmental logs are not to be used for geotechnical purposes

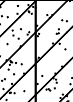
Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Date: 27/9/22 Plant Type: EZIPROBE			Method: SPIRAL AUGER / PUSH TUBE Logged/Checked by: N.M./T.H.				R.L. Surface: N/A Datum: -						
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0		-	ASPHALT: 50mm.t	w<PL			SCREEN: 8.71kg
									FILL: Gravelly clay, low to medium plasticity, grey, fine to coarse grained, igneous gravel, trace of sand.	w<PL			0.05-0.2m
								CL-CI	FILL: Silty clay, medium to high plasticity, grey, trace of igneous gravel.	w<PL			NO FCF
						0.5			Silty Sandy CLAY: low to medium plasticity, light brown mottled orange brown, trace of ironstone gravel.				SCREEN: 5.27kg
													0.2-0.3m
													NO FCF
													RESIDUAL
						1							
						1.5			END OF BOREHOLE AT 1.3m				
						2							
						2.5							
						3							
						3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Method: SPIRAL AUGER / PUSH TUBE R.L. Surface: N/A Date: 27/9/22 Datum: - Plant Type: EZIPROBE Logged/Checked by: N.M./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0			FILL: Silty clay, medium to high plasticity, dark brown, trace of sand, igneous gravel, roots and root fibres.	w≈PL			GRASS COVER SCREEN: 7.91kg 0-0.1m NO FCF SCREEN: 3.18kg 0.1-0.3m NO FCF 'TC' BIT REFUSAL ON OBSTRUCTION IN FILL
						0.5			END OF BOREHOLE AT 0.3m				
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Method: SPIRAL AUGER / PUSH TUBE R.L. Surface: N/A Date: 26/9/22 Datum: - Plant Type: EZIPROBE Logged/Checked by: N.M./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty sand, fine to medium grained, dark brown, with clay fines, trace of igneous and ironstone gravel, roots and root fibres. FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel, roots and root fibres.	M w<PL			GRASS COVER SCREEN: 4.91kg 0-0.1m NO FCF SCREEN: 2.91kg 0.1-1.1m NO FCF
						0.5							
						1							
						1.5		CL-CI	Silty Sandy CLAY: low to medium plasticity, light brown mottled orange brown, fine to medium grained sand, trace of ironstone gravel.	w<PL			RESIDUAL
									END OF BOREHOLE AT 1.6m				
						2							
						2.5							
						3							
						3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Method: SPIRAL AUGER / PUSH TUBE R.L. Surface: N/A Date: 26/9/22 Datum: - Plant Type: EZIPROBE Logged/Checked by: N.M./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE- TION						0		CI-CH	FILL: Silty sandy clay, low to medium plasticity, dark brown, trace of igneous gravel, roots and root fibres. Silty CLAY: medium to high plasticity, brown, trace of igneous gravel, roots and root fibres.	w≈PL w<PL			GRASS COVER SCREEN: 7.19kg 0-0.1m NO FCF RESIDUAL
						0.5							
						1		CL-CI	Silty Sandy CLAY: low to medium plasticity, light brown mottled orange brown, trace of ironstone gravel.	w<PL			RESIDUAL
						1.5			END OF BOREHOLE AT 1.1m				
						2							
						2.5							
						3							
						3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE Location: 85-91 COWPER STREET, WARRAWONG, NSW													
Job No.: E34300PT2 Method: SPIRAL AUGER / PUSH TUBE R.L. Surface: N/A Date: 26/9/22 Datum: - Plant Type: EZIPROBE Logged/Checked by: N.M./T.H.													
Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLE TION						0			ASPHALT: 100mm.t				ASPHALT COVER
								-	FILL: Sandy gravel, fine to coarse grained, grey, sub-angular, igneous gravel, fine to medium grained sand, trace of asphalt.	D			SCREEN: 1.12kg 0.1-0.25m NO FCF RESIDUAL
								CL-CI	Silty Sandy CLAY: low to medium plasticity, light brown mottled orange brown, trace of ironstone gravel. END OF BOREHOLE AT 0.4m	w<PL			
						0.5							
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH37
1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE	
Project: PROPOSED NEW WARRAWONG COMMUNITY HEALTH CENTRE	
Location: 85-91 COWPER STREET, WARRAWONG, NSW	
Job No.: E34300PT2	Method: SPIRAL AUGER / PUSH TUBE
Date: 26/9/22	R.L. Surface: N/A
Plant Type: EZIPROBE	Datum: -
Logged/Checked by: N.M./T.H.	

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty sandy clay, low to medium plasticity, brown, fine to medium grained, trace of igneous, ironstone and sandstone gravel, roots and root fibres.	w<PL			GRASS COVER
						0.5			FILL: Silty clay, medium to high plasticity, brown, trace of igneous and ironstone gravel, roots and root fibres.	w<PL			SCREEN: 5.62kg 0-0.1m NO FCF SCREEN: 3.28kg 0.1-0.6m NO FCF
						1	CL-CI	Silty Sandy CLAY: low to medium plasticity, light brown mottled orange brown, fine to medium grained sand, trace of ironstone gravel.	w<PL			RESIDUAL	
						1.5			END OF BOREHOLE AT 1.2m				
						2							
						2.5							
						3							
						3.5							



ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

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

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

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

DESCRIPTION AND CLASSIFICATION METHODS

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

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

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

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

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

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

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

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

INVESTIGATION METHODS

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

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

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

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

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

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

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

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

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

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is

described in Australian Standard 1289.6.3.1–2004 (R2016) ‘*Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)*’.

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

The test results are reported in the following form:

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

N = 13
4, 6, 7

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

N > 30
15, 30/40mm

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

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

LOGS

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

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

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

GROUNDWATER

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

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

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

FILL

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

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

LABORATORY TESTING

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

SYMBOL LEGENDS

SOIL



FILL



TOPSOIL



CLAY (CL, CI, CH)



SILT (ML, MH)



SAND (SP, SW)



GRAVEL (GP, GW)



SANDY CLAY (CL, CI, CH)



SILTY CLAY (CL, CI, CH)



CLAYEY SAND (SC)



SILTY SAND (SM)



GRAVELLY CLAY (CL, CI, CH)



CLAYEY GRAVEL (GC)



SANDY SILT (ML, MH)



PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK



CONGLOMERATE



SANDSTONE



SHALE/MUDSTONE



SILTSTONE



CLAYSTONE



COAL



LAMINITE



LIMESTONE



PHYLLITE, SCHIST



TUFF



GRANITE, GABBRO



DOLERITE, DIORITE



BASALT, ANDESITE



QUARTZITE

OTHER MATERIALS



BRICKS OR PAVERS



CONCRETE



ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 60% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm)	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	‘Dirty’ materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	‘Dirty’ materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	‘Dirty’ materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	‘Dirty’ materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Laboratory Classification Criteria

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

$$C_u = \frac{D_{60}}{D_{10}} \quad \text{and} \quad C_c = \frac{(D_{30})^2}{D_{10} D_{60}}$$

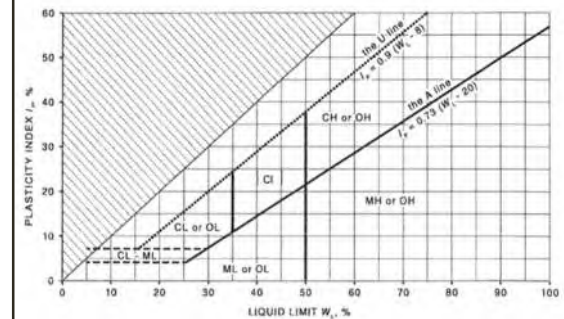
Where D_{10} , D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

- For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.
- Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.
- Clay soils with liquid limits $> 35\%$ and $\leq 50\%$ may be classified as being of medium plasticity.
- The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

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

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





LOG SYMBOLS

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



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

Classification of Material Weathering

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

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

Rock Material Strength Classification

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



Appendix C: Pre-Remediation (Data Gap) Location Coordinates

GDA 94 - MGA56**DGI Location Coordinates**

Location	Easting	Northing
TP301	305453.9198	6181927.222
TP302	305463.9198	6181927.222
TP303	305473.9198	6181927.222
TP304	305483.9198	6181927.222
TP305	305453.9198	6181917.222
TP306	305463.9198	6181917.222
TP307	305473.9198	6181917.222
TP308	305483.9198	6181917.222
TP309	305453.9198	6181907.222
TP310	305463.9198	6181907.222
TP311	305473.9198	6181907.222
TP312	305483.9198	6181907.222
TP313	305453.9198	6181897.222
TP314	305463.9198	6181897.222
TP315	305473.9198	6181897.222
TP316	305483.9198	6181897.222
TP317	305461.6078	6181941.512
TP318	305475.6377	6181946.819
TP319	305489.6676	6181952.126
TP320	305485.5242	6181934.418
TP322	305503.3132	6181932.116
TP323	305508.6378	6181917.418
TP324	305512.6221	6181903.479
TP325	305511.2199	6181895.932
TP326	305504.1367	6181885.607
TP327	305495.5779	6181873.29
TP328	305468.6052	6181874.151
TP329	305459.8129	6181858.064
TP330	305451.0951	6181851.733
TP331	305460.1895	6181811.529
TP332	305444.1697	6181794.92
TP333	305434.4799	6181781.107
TP334	305433.5858	6181774.851



Appendix D: Example Imported Materials and Waste Tracking Registers

Exported (Waste) Materials Register									
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[illegible]

Imported Materials Register									
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[illegible]



Appendix E: Report Explanatory Notes



QA/QC Definitions

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)¹⁷ methods and those described in *Environmental Sampling and Analysis, A Practical Guide*, (1991)¹⁸. The NEPM (2013) is consistent with these documents.

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

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

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

B. Precision

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

C. Accuracy

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

D. Representativeness

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

E. Completeness

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

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

¹⁷ US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. (US EPA SW-846)

¹⁸ Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*

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

F. Comparability

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

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

G. Blanks

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

H. Matrix Spikes

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

$$\frac{(\text{Spike Sample Result} - \text{Sample Result}) \times 100}{\text{Concentration of Spike Added}}$$

I. Surrogate Spikes

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

J. Duplicates

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

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



Appendix F: Guidelines and Reference Documents

Contaminated Land Management Act 1997 (NSW)

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

NSW EPA, (1995). Contaminated Sites Sampling Design Guidelines

NSW EPA, (2014). Waste Classification Guidelines - Part 1: Classifying Waste

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

NSW EPA, (2020). Consultants Reporting on Contaminated Land, Contaminated Land Guidelines

National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

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

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy (Resilience and Hazards) 2021 (NSW)

Western Australia Department of Health, (2021). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia