Prepared for
Fabcot Pty Ltd
Prepared by
Ramboll Australia Pty Ltd
Date
13 April 2021
Project Number
318001137
Audit Number
LW-012

SITE AUDIT REPORT
REMEDIATION ACTION PLAN, 250 VICTORIA STREET, WETHERILL PARK, NSW

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ENVIRONMENT
& HEALTH

13 April 2021

Fabcot Pty Ltd
Attn.: Thomas Stock
1 Woolworths Way
Bella Vista NSW 2153

By email: tstock@woolworths.com.au

Dear Thomas

SITE AUDIT REPORT - REMEDIATION ACTION PLAN, 250 VICTORIA STREET, WETHERILL PARK, NSW

I have pleasure in submitting the Site Audit Report for the subject site. The Site Audit Statement, produced in accordance with the NSW *Contaminated Land Management Act 1997*, is included as Appendix B of the Site Audit Report. The Audit was commissioned by Fabcot Pty Ltd to assess the suitability of a remediation action plan.

This Site Audit Report is not currently required by regulation or legislation and is therefore a non-statutory audit.

Thank you for giving me the opportunity to conduct this Audit. Please call me on 9954 8100 if you have any questions.

Yours faithfully,
Ramboll Australia Pty Ltd

Louise Walkden
EPA Accredited Site Auditor 1903

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LIST OF ABBREVIATIONS

Measures

%	per cent
µg/L	Micrograms per Litre
ha	Hectare
km	Kilometres
m	Metre
mAHD	Metres Australian Height Datum
mbgl	Metres below ground level
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Litre
ppm	Parts Per Million

General

ABC	Ambient Background Concentration
AC	Asphaltic concrete
ACL	Added Contaminant Limit
ACM	Asbestos Containing Material
ADWG	Australian Drinking Water Guidelines
AEC	Area of Environmental Concern
AF	Asbestos Fines
AHD	Australian Height Datum
ANZG	Australian & New Zealand Guidelines
ASI	Additional Site Investigation
ASS	Acid Sulphate Soil
AST	Aboveground Storage Tank
ANZECC	Australian and New Zealand Environment and Conservation Council
BaP	Benzo(a)pyrene
BGL	Below Ground Level
BTEXN	Benzene, Toluene, Ethylbenzene, Xylenes & Naphthalene
CCME	Canadian Council of Ministers of the Environment
CEMP	Construction environment management plan
CLM Act	NSW Contaminated Land Management Act 1997
COC	Chain of Custody
Council	Fairfield City Council
CSM	Conceptual Site Model
DA	Development Application
DP	Deposited Plan
DQI	Data Quality Indicator
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EIS	Environmental Investigation Services
EMP	Environmental Management Plan
Envirolab	Envirolab Services Pty Ltd
EPA	Environment Protection Authority (NSW)
ESL	Ecological Screening Level
FA	Fibrous Asbestos
Fabcot	Fabcot Pty Ltd
FCF	Fibre cement fragment
GIL	Groundwater Investigation Level
GME	Groundwater Monitoring Event
HHRA	Human Health Risk Assessment
HIL	Health Investigation Level
HSL	Health Screening Level
IBC	Intermediate Bulk Container
JKE	JK Environments Pty LtdLEP Local Environment Plan
LOR	Limit of Reporting
Metals	As: Arsenic, Cd: Cadmium, Cr: Chromium, Cu: Copper, Ni: Nickel, Pb: Lead, Zn: Zinc, Hg: Mercury
ML	Management Limits
NATA	National Association of Testing Authorities

NC	Not Calculated
ND	Not Detected
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NL	Non-Limiting
OCPs	Organochlorine Pesticides
OH&S	Occupational Health & Safety
OPPs	Organophosphorus Pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PESA	Preliminary Stage 2 Environmental Site Assessment
PFAS	Per- and Poly-fluoroalkyl substances
pH	A measure of acidity, hydrogen ion activity
PID	Photoionisation Detector
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
Ramboll	Ramboll Australia Pty Ltd – previously Ramboll Environ Australia Pty Ltd and ENVIRON Australia Pty Ltd
RAP	Remediation Action Plan
RL	Relative Level
RPD	Relative Percent Difference
RRE	Resource Recovery Exemption
RRO	Resource Recovery Order
RWP	Remedial Works Plan
SAR	Site Audit Report
SAS	Site Audit Statement
SSDA	State Significant Development Application
SWL	Standing Water Level
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalence Quotient
TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
UST	Underground Storage Tank
VC	Vinyl Chloride
VENM	Virgin Excavated Natural Material
VOC	Volatile Organic Compounds
WHS	Work health and safety
-	On tables is "not calculated", "no criteria" or "not applicable"

1. INTRODUCTION

1.1 Audit Details

A site contamination audit has been conducted in relation to the site at 250 Victoria Street, Wetherill Park, NSW.

The Audit was conducted to provide an independent review by an EPA Accredited Auditor of the suitability and appropriateness of a remedial action plan (RAP) i.e. a "Site Audit" as defined in Section 4 (1) (b) (v) of the NSW *Contaminated Land Management Act 1997* (the CLM Act).

The site has historically been used for industrial purposes. Woolworths propose to develop the site for use as a warehouse and distribution facility. The proposed development includes major earthworks (cut/fill) over the majority of the site to achieve the development levels. It is understood that the development is being considered under a State Significant Development Application (SSDA) and that contaminated site investigations and preparation of a remediation action plan (RAP) have been undertaken to support the SSDA.

The Audit was initiated to provide an independent review of existing site contamination investigations and the RAP and is currently a non-statutory audit.

Details of the Audit are:

Requested by:	Thomas Stock of behalf of Fabcot Pty Ltd (Fabcot)
Request/Commencement Date:	2 March 2021
Auditor:	Louise Walkden
Accreditation No.:	1903

1.2 Scope of the Audit

The scope of the Audit included:

- Review of the following reports:
  - 'Report to Fabcot Pty Ltd on Preliminary Stage 2 Environmental Site Assessment for Due Diligance, Proposed Highbay Distribution Warehouse at 250 Victoria Street, Wetherill Park, NSW' 18 October 2018, Environmental Investigation Services (EIS) (*the PESA*)
  - 'Report to Fabcot Pty Ltd on Additional Site Investigation, Proposed Distribution Centre Development at 250 Victoria Street, Wetherill Park, NSW' 23 March 2021, JK Environments Pty Ltd (JKE, formerly EIS) (*the ASI*)
  - 'Report to Fabcot Pty Ltd on Acid Sulfate Soil Assessment, Proposed Distribution Centre Development at 250 Victoria Street, Wetherill Park, NSW' 16 March 2021, JKE (*the ASS Assessment*)
  - 'Report to Fabcot Pty Ltd on Remediation Action Plan, Proposed Distribution Centre Development at 250 Victoria Street, Wetherill Park, NSW' dated 30 March 2021 (and a draft dated 26 February 2021), JKE (*the RAP)*
- A site visit by the Auditor on 9 March 2021.
- Discussions with Fabcot, and with JKE who undertook the investigations.

2. SITE DETAILS

2.1 Location

The site locality is shown on Attachment 1, Appendix A.

The site details are as follows:

Street address:	250 Victoria Street, Wetherill Park, NSW
Identifier:	Lots 1 to 4 in DP 781975
Local Government:	Fairfield City Council
Owner:	Fabcot
Site Area:	Approximately 8.5 ha

The boundaries of the site are well defined by a fence line with adjoining properties, Victoria Street to the south and Redfern Street to the north.

2.2 Zoning

The current zoning of the site is IN1 General Industrial.

2.3 Adjacent Uses

The site is located within the southern portion of an area of commercial/industrial land use with residential land use to the south and southeast. The surrounding site uses include:

North: Redfern Street, with commercial/industrial land use beyond including hardware design and manufacturing warehouse (Alchin Long Group) and tissue manufacturing (ABC Tissue Products)

East: A heavy vehicle inspection station and concrete stormwater culvert with mixed commercial/industrial and residential land use beyond

South: Victoria Street, with Wetherill Park TAFE campus and residential land use beyond

West: light industrial complex with tenancies including automotive repairers and auto electricians, a joinery and ceiling panel manufacturer, a pool maintenance contractor and a horticultural chemical wholesaler.

JKE considered the adjacent auto service businesses to the west to be potential off-site contamination sources as they are located within 15 m of the up-gradient site boundary.

No sensitive environments are noted in the vicinity of the site. A concrete lined storm water channel is located to the east of the site and drains to Prospect Creek located approximately 600 m to the northeast of the site.

2.4 Site Condition

JKE describe the site conditions encountered during a site walkover on 5 February 2021 in the ASI report. Pertinent features are shown on Attachment 2 in Appendix A. JKE noted the following site features:

- The regional topography slopes to the east/northeast towards Prospect Creek. The site is located towards the middle of the hillside and parts of the site appear to have been levelled to accommodate the existing development. Fill was evident from exposed soil with inclusions of igneous, ironstone and sandstone gravel, brick, concrete and tile fragments.
- The eastern portion of the site was occupied by Austral Masonry as a storage and distribution centre, with the north-eastern portion of the site used by ABC Tissue Products for staff parking. A large warehouse of exposed aggregate (pebblecrete) construction was located in

the south-eastern portion of the site with storage areas and an open car park area to the north. The warehouse appeared to be in fair condition. A two-storey office building adjoined the warehouse to the south. A sign on the northern wall of the warehouse building indicated the warehouse was formerly used for heavy vehicle repairs.

- Asphaltic concrete (AC) and concrete pavements were located in the eastern and southern sections of the site. The AC pavement appeared in fair to poor condition, with evidence of cracking and heaving. The concrete pavements appeared in fair condition with minor cracking.
- The majority of the western portion of the site was unsealed and used for truck/trailer storage. The south-western portion of the site was occupied by a trucking company office (Double X Trucking) and a firewood supplier (Flamin' Firewood).
- In addition to the warehouse in the southeast, three other buildings were located within the southern portion of the site. Two single-storey buildings of brick and corrugated steel construction were located within the south-western portion of the site and a two-storey building of concrete-render and glass construction was located centrally within the southern portion. The buildings appeared in fair to good condition and were vacant.
- A concrete-lined vehicle wash bay was located to the north of the single-storey buildings in the southwest of the site. The wash bay appeared in serviceable condition, though it was not known whether the wash bay was used.
- Two suspected underground storage tanks (USTs) were located in the south-western portion of the site and a self-contained 35,500 L diesel tank was located within a shipping container to the south of the suspected USTs. A second containerised diesel tank (approx. 10,000 L capacity) was located within the east of the site, north of the pebblecrete warehouse.
- Several intermediate bulk containers (IBCs) were located in the north-western portion of the site. The labels on the IBCs indicated they were previously used for the storage of cleaning solvents and acids, though the contents were not confirmed. An IBC was also located centrally within the northern portion of the site and appeared to contain waste oil products. The protective cage of the IBC was damaged and residue was visible near the outlet.
- Several drums (244 L) were stored within the southwest of the site, adjacent to the west of the single-storey buildings. The drums appeared to contain oils and lubricants associated with vehicle/machinery maintenance. Several discarded vehicle components (brake shoes, drums and rotors) were located to the north of the drums.
- Two stockpiles of debris (steel, plastic, timber pallets) were located to the northeast of the warehouse, and one stockpile of soil was located to the south-east of the warehouse. This stockpile appeared to be a similar size, composition and location to a soil stockpile sampled during the PESA.
- Stormwater drainage was observed within paved areas and was presumed to discharge to regional stormwater infrastructure along Redfern and Victoria Streets. A concrete lined dish-drain was located within the northern portion of the site, adjacent to the western site boundary. The drain appeared to discharge to regional stormwater infrastructure to the north.
- An electrical substation kiosk, gas manifold and water mains manifold were located within the south of the site. A hydrant standpipe was located within the southwest of the site, adjacent to the western boundary.

The Auditor undertook a site visit on 9 March 2021 and observations were largely consistent with those made by JKE in the ASI. The following was noted by the Auditor during the site visit:

- The overall site topography slopes from west to east, however, the north-eastern portion of the site contains two artificially raised areas that were being used for storage of masonry items on pallets as part of the Austral Masonry operation.
- The storage pad areas were raised above the level of the southern portion of the site and appeared to have been formed by filling. The storage pad had grassed embankments with concrete slabs on the top. A concrete access road was present between the raised pads and was in relatively good condition.
- The area to the rear of the storage area was an AC car park used by Austral Masonry staff in poor to fair condition with several potholes.
- Masonry items were being stored along the western boundary of the Austral site (the central portion of the audit site) and the ground surface in this area was unsealed.
- The western portion of the site was still being used for truck storage and maintenance and the surface was largely unsealed compacted clay and gravel, except for concrete in the southern portion, around the buildings and the truck wash bay.
- The north-western portion of the site was slightly boggy with areas of standing water. Imported material comprising a shale gravel appeared to have been imported to level the north western area. Several wells that were installed in this area could not be located by the Auditor.
- The IBCs described by JKE were not observed.
- The fill points for the UST in the south-western portion of the site were observed.

2.5 Proposed Development

It is understood that the site is to be redeveloped by Fabcot as a warehouse and distribution facility. The proposed two-storey facility would comprise storage and distribution of goods. Both levels would include hardstand for loading bays for pick up and drop off of goods via rigid vehicles with ancillary car parking also provided. Ancillary offices, support space and staff amenities are also included on both levels. A basement car park is proposed below the southern end of the proposed warehouse.

JKE indicate that the proposed development includes major earthworks (cut/fill) over most of the site to achieve the development levels, with bulk excavation levels ranging from RL 33.20 metres Australian Height Datum (mAHD) to 41.30 mAHD. The maximum cut is anticipated to be approximately 7 metres below ground level (mbgl). A cut and fill plan is included as Attachment 3 in Appendix A.

For the purposes of this audit, the 'commercial/industrial' land use scenario will be assumed.

3. SITE HISTORY

JKE reviewed historical site information during the PESA and the ASI and provided a summary of the site history based on aerial photographs, site photographs, NSW EPA records, SafeWork NSW dangerous goods records and Certificates of Title. The Auditor has summarised the site history in Table 3.1.

Table 3.1: Site History

Date	Activity
Pre 1977	The site was a rural property and used for agricultural purposes. Subdivision of the site into four individual lots appears to have occurred between 1955 and 1961. Houses/buildings were present in the southern portion of each lot with northern areas remaining used for agriculture (market gardens).
1977-2010	The site was developed for industrial land uses with the current buildings in the south-western portion of the site constructed between 1971 and 1978 and the warehouse in the south-east by 1982 as well as hardstand and vehicle storage yards. The additional buildings were built in the central southern portion between 1991 and 1994. Activities at the site included the distribution and maintenance of motor vehicles. A commercial lithographic printer was listed on-site in the 1990s.
2010 - Present	The commercial/industrial land use continued. The raised storage pads in the eastern portion of the site were constructed between 2010 and 2015. The site was used for the manufacturing and distribution of paper products, storage and distribution of shipping containers, and later, masonry products. Since sometime after 2016, the western portion of the site was used for heavy vehicle parking.

The summary indicates that, since the 1970s, the site has largely been used for the storage of vehicles and manufacturing products. The UST located in the south-western portion of the site is thought to have been installed in 1978 and contained petrol. Above ground storage tanks (ASTs) containing diesel are also known to be present at the site. Two existing wells were identified on-site. No known contamination investigations have been completed at the site, prior to the PESA and the purpose of the wells is unclear, although JKE consider it likely that PMW2 is a potential cathodic protection measure associated with the USTs.

Possible sources of past contamination include leaks and spills of petroleum hydrocarbons and other chemicals from the USTs and ASTs, chemical storage areas and the truck wash bay, historical filling of the land, hazardous building materials and use of pesticides. Off-site sources of contamination include industrial use of land upgradient (west) of the site for activities including mechanics workshops, panel beating and spray painting and printing businesses.

JKE comment that most of the site history information was obtained from government organisations and that the veracity of the information from these sources is considered to be relatively high.

3.1 Auditor's Opinion

In the Auditor's opinion, the site history provides an adequate indication of past activities. Previous site uses with the most significant potential to cause contamination include storage and use of fuels and chemicals and filling of land. Uncertainties include the potential for additional USTs and filling history, however the Auditor considers that these have been compensated for by the investigation and the proposed remediation strategy.

4. CONTAMINANTS OF CONCERN

JKE provided a list of the contaminants of concern and potentially contaminating activities or areas of environmental concern (AECs), these have been tabulated in Table 4.1.

Table 4.1: Contaminants of Concern

Source / AEC	Potential Contaminants
Fill material – The site appears to have been historically filled to achieve the existing levels. The fill may have been imported from various sources and could be contaminated. Fill has been identified across the site, ranging from 0.2 mbgl to 3.4 mbgl. The depth of filling generally increased within the eastern portion of the site.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
Fuel/oil storage – At least one UST was identified at the site. Two ASTs were identified at the site that were used to store diesel. An IBC containing waste oil residue was located centrally within the north of the site.	Lead, TRH, BTEX and PAHs
Mechanics – part of the site may have been formerly used as a mechanics. Fuels, oils and solvents may have been used during this site use.	Heavy metals, TRH, naphthalene, BTEX and Per-and Polyfluoroalkyl Substances (PFAS).
Historical agricultural use – The site appears to have been used for grazing and market garden purposes. This could have resulted in contamination across the site via use of machinery, application of pesticides and building/ demolition of various structures. Irrigation pipes made from asbestos cement may also be associated with this AEC.	Heavy metals, TRH, PAHs, OCPs, PCBs and asbestos. JKE note that OCPs only became commercially available in the 1940s. Prior to this time pesticides were predominantly heavy metal compounds.
Use of pesticides – Pesticides may have been used beneath the buildings and/or around the site.	Heavy metals and OCPs
Hazardous Building Material – Hazardous building materials may be present as a result of former building and demolition activities. The historical aerial photographs indicate the former buildings were generally located within the south of the site, however, ancillary structures may also have been present in other areas. JKE note that a hazardous building material survey (HAZMAT) has previously been undertaken on the existing buildings and ACM was confirmed to be present.	Asbestos, lead and PCBs
Industrial/Commercial land use – The site was used for various commercial purposes, including vehicle storage, printing and manufacturing of paper products. The use of chemicals, fuels and paints during this period could have resulted in contamination. An electrical substation kiosk was located at the site.	Heavy metals, PAHs, TRH, Volatile Organic Compounds (VOCs), solvents, naphthalene, BTEX, PCBs and PFAS.
Off-site area – Several current and former automotive service and spray-painting businesses are located upgradient of the site and are considered to be potential sources of contamination.	Heavy metals, PAHs, TRH, VOCs, solvents, naphthalene, BTEX and PFAS.

4.1 Auditor's Opinion

The Auditor considers that the analyte list used by JKE adequately reflects the site history and condition. Asbestos in the form of asbestos containing material (ACM) and as friable asbestos and asbestos fibres (FA/AF) has been considered in the ASI. VOC and PFAS contamination has been

considered in groundwater only, however based on the high solubility of these contaminants this is considered appropriate.

5. STRATIGRAPHY AND HYDROGEOLOGY

5.1 Stratigraphy

JKE reviewed geological maps in the PESA and ASI and reported that the site is underlain by Bringelly Shale of the Wianamatta Group, which typically consists of shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.

Soil landscape information presented in the ASI report indicated the site is located within the Blacktown soils landscape, which is typically of residual origins.

JKE completed 29 boreholes across the site during the PESA and 46 sample locations during the ASI (18 test pits and 28 boreholes). The sub-surface profile of the site is summarised by the Auditor in Table 5.1. Investigation locations are shown on Attachment 4, Appendix A.

Table 5.1: Stratigraphy

Depth (mbgl)	Subsurface Profile
0.0 – depths of between 0.2 and 3.6	**Fill** comprising silty clay, silty gravelly sand and silty sand with inclusions of igneous, ironstone, sandstone and siltstone gravel, ash, slag, root fibres and building rubble (asphalt, bricks, concrete, glass, ceramic, tile and plastic fragments). Fill was encountered at the surface or beneath the pavement in all boreholes and extended to depths of between 0.2 mbgl and 3.6 mbgl. BH141 was terminated in the fill at a maximum depth of approximately 0.6 mbgl. Asphalt and concrete pavements were encountered at the surface in some locations and ranged in thickness from 30 mm to 500 mm.
0.2 to 3.6 – 8.0 (maximum extent of investigation)	**Residual soils.** Predominantly silty clay and, to a lesser extent, sandy clay and clayey sand were encountered below the fill oin each borehole.
0.4 to 5.8 – 8.0 (maximum extent of investigation)	**Weathered bedrock**. Claystone, siltstone and, to a lesser extent, sandstone bedrock was encountered in each borehole at depths between 0.4 m (BH119) and 5.8 m (BH12). JKE note that BH119 was in a proposed cut area in the southeast, whilst BH12 was located just behind the crest of a 2.5 m high fill batter on the eastern site boundary.

mbgl – metres below ground level

Fill material was thicker in the eastern portion of the site compared to the west as anticipated based on the surrounding topography. The thickest fill unit was encountered in the raised storage pad with fill generally between 1.6 and 3.6 m thick in the north-eastern portion of the site. Fill of a similar description and thickness was also encountered in the south-eastern portion (BH24, BH29 and MW103 at 2.5 m, 2.3 m and 2.5 m respectively). Fill encountered in these areas was generally described as silty clay with ironstone and sandstone gravel, anthropogenic inclusions of brick, metal, glass, slag and ash.

Fill in the western portion of the site was generally between 0.2 and 0.4 m thick and was described as silty sand and clay with minor inclusions of concrete and asphaltic concrete but generally no slag or ash.

JKE completed an acid sulfate soil (ASS) assessment for the site which included field screening and laboratory assessment. The assessment concluded that potential ASS and actual ASS had not been identified at the site and that an ASS management plan (ASSMP) was not necessary for the proposed development.

5.2 Hydrogeology

The Auditor undertook a search for registered bores (realtimedata.waternsw.com.au) on 30 March 2021 which identified no bores within a 500 m radius of the site.

JKE concluded in the PESA that the regional aquifer includes porous, extensive aquifers of low to moderate productivity. Based on the information from the ASI, JKE concluded that the subsurface

conditions at the site consist of relatively low permeability (residual) soils overlying shallow bedrock and that the potential for viable groundwater abstraction and use of groundwater under these conditions is considered to be low. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur. Use of groundwater is not proposed as part of the development.

During the ASI, JKE installed nine groundwater monitoring wells at the site to depths of between 5.5 and 8.0 mbgl and undertook one round of monitoring in February 2021. Wells were screened in natural clay and siltstone and standing water levels (SWLs) in the wells were between 1.5 to 5.13 mbgl, equating to groundwater elevations between approximately 39 mAHD to 27.4 mAHD. JKE noted that the excavation for the proposed basement (to minimum 33.20 mAHD) may intercept groundwater. JKE included a groundwater contour plan in the ASI which indicated that groundwater flow was interpreted to be to the east and southeast. However, it is noted that well elevations were extrapolated from the survey plan provided and were not surveyed precisely for elevation.

Two existing wells were also gauged and sampled (PMW1 and PMW2). PMW2 was a shallow well well considered to be associated with the UST infrastructure (considered a potential cathodic protection measure). A SWL of 0.32 mbgl was reported in this well and was not considered by JKE to be representative of groundwater.

Groundwater quality parameters were recorded during the February 2021 monitoring event and indicated the following:

- pH ranged from 5.90 to 7.17
- Electrical conductivity (EC) readings ranged from 6628 µS/cm to 23,668 µS/cm
- Redox potential (Eh) ranged from -23.1 mV to -52.4 mV
- Dissolved oxygen (DO) ranged from 0.3 ppm to 5.7 ppm.

5.3 Auditor's Opinion

The Auditor considers that the depth of fill and underlying stratigraphy have been generally characterised in the accessible areas of the site. However, most investigation locations were boreholes which limits visual assessment of the subsurface, hence, there is the potential for fill material containing a greater proportion of anthropogenic materials (including asbestos) to be present than indicated from the assessment. Data gaps also exist in the southern portion of the site within the building footprints.

The heterogeneity and extent of fill material has the greatest potential to impact the remediation of the site. Further investigation to characterise fill material is not considered necessary prior to demolition and remediation given the access restrictions due to site infrastructure and limitations of borehole investigations.

The Auditor considers that the site stratigraphy and hydrogeology are sufficiently well known for the purpose of remedial planning. Groundwater is encountered at shallow depths within the silty clay and weathered siltstone and has the potential to be contaminated by historical use of the site (discussed in Section 9). It is noted that survey of individual groundwater wells was not completed when determining groundwater flow direction, however, the interpreted groundwater flow to the east and southeast seems appropriate based on the groundwater contour data provided and local topography. Future groundwater investigation should include survey of well elevation to confirm groundwater flow direction.

Based on the relatively low permeability of the shallow aquifer and lack of abstraction bores in the area that intercept this aquifer, the Auditor agrees that the potential for groundwater to be abstracted for beneficial use in the vicinity of the site is low.

6. EVALUATION OF QUALITY ASSURANCE AND QUALITY CONTROL

The Auditor has assessed the overall quality of the investigation data by review of the information presented in the referenced reports. The data sources are summarised in Table 6.1.

Table 6.1: Summary of Investigations

Stage of Works	Field Data	Analytical Data
PESA (JKE 2018) *Fieldwork date: September 2018*	29 boreholes (BH1-BH29) to maximum depth of 7.5 mbgl. Soil sampling from all locations: 31 fill samples and 4 natural samples	**Soil:** 31 x Fill and 4 x Natural for Metals, TRH/BTEX, PAHs 27 x Fill and 2 x Natural for OCPs, OPPs, PCBs and asbestos (presence/absence).
ASI (JKE 2021) *Fieldwork date: February 2021*	18 test pits (TP101, TP102, TP104, TP114, TP115, TP117, TP120-122, TP124-126, TP130, TP132, TP133, TP135, TP136, TP144) to a maximum depth of 2.2 mbgl. 28 boreholes (BH103, 105-113, 116, 118, 119, 123, 127-129, 131, 134, 137-143, 145, 146) to a maximum depth of 8.0 mbgl. 9 boreholes were converted into groundwater monitoring wells (MW103, MW106, MW111, MW116, MW123, MW128, MW134, MW139, MW143). Well MW116 was dry and was not sampled. Two existing wells were also sampled (PMW1 and PMW2).	**Soil:** 54 x Fill and 2 x Natural for Metals, TRH/BTEX, PAHs 21 x Fill for OCPs, OPPs, PCBs and phenols 71 x asbestos visual bulk screen (<10 L) 39 x FA/AF in 500 ml sample 1 x fibre cement fragment (FCF) for asbestos **Groundwater:** 10 x TRH/ BTEXN, 8 x Metals, VOC, PFAS.

The Auditor's assessment of data quality follows in Tables 6.2 and 6.3.

Table 6.2: QA/QC – Sampling and Analysis Methodology Assessment

Sampling and Analysis Plan and Sampling Methodology	Auditor's Opinion
Data Quality Objectives (DQO) JKE defined specific DQOs in accordance with the seven-step process outlined in Schedule B2 of NEPM (2013) for the PESA and the ASI. The following decisions for the ASI were identified in the DQOs: • Did the site inspection, or does the historical information, identify potential contamination sources/AEC at the site? • Are any results above the site assessment criteria? • Do potential risks associated with contamination exist, and if so, what are they? • Is remediation required? • Is the site characterisation sufficient to provide adequate confidence in the above decisions? • Is the site suitable for the ongoing commercial/ industrial land use, or can the site be made suitable subject to further characterisation and/or remediation?	The identified DQOs were considered appropriate for the investigations conducted.
Sampling pattern and locations *Soil:* Investigation locations were spaced on a generally systematic sampling pattern in accessible areas to gain coverage of the majority of the site, excluding building footprints. *Groundwater:* Monitoring wells were placed on a judgmental basis to target the assumed upgradient (western) and down gradient (eastern) site boundary with one well located adjacent to the known UST in the south-western portion. No wells were located downgradient of the UST and truck wash and the extent	In the Auditor's opinion, the investigation locations were adequate to assess the site for remediation planning purposes, although it is noted that there are gaps in soil and groundwater data below building footprints and downgradient of the UST and truck wash in the southern portion of the site. Based on the site history, the southern portion of the site has the greatest potential for contamination due

Sampling and Analysis Plan and Sampling Methodology	Auditor's Opinion
of groundwater impacts has not been delineated by the wells installed (refer Section 9).	to the majority of current and former site infrastructure being located in this area and additional investigation is required to close out data gaps in this area.
Sampling density *Soil:* The sampling density of 85 locations over approximately 8.5 ha provides a 95% confidence of detecting a residual hot spot of approximately 37 m diameter. The NSW EPA (1995) *Sampling Design Guidelines* do not specify a sampling density for sites with an area greater than 5 ha (55 locations) but suggests subdivision of larger sites into smaller areas for effective sampling. Sampling targeted the fill material and analysis was undertaken for the main contaminants of concern comprising Metals, TRH, BTEX, PAH and asbestos, as listed in Table 6.1. Limited samples were collected from the natural silty clay and siltstone (6 samples) and submitted for analyses. Samples analysed for asbestos were not collected according to the density outlined in NEPM (2013) (Schedule B1) and 10 L volumes were not assessed as per NEPM (2013). *Groundwater*: A total of 9 groundwater wells were installed at the site. The density of groundwater sampling is relatively low based on site area, however, additional groundwater assessment is outlined in the RAP to address data gaps.	In the Auditor's opinion, the sampling density was sufficient to inform remediation planning. The low sampling density of natural soil is considered acceptable given the low concentrations of contaminants detected in the overlying fill material. There are data gaps beneath site buildings and related to the use of boreholes to visually assess for asbestos, as well as related to delineation of detected groundwater contamination, however, these data gaps are to be addressed through the additional investigation proposed in the RAP and are unlikely to significantly alter the recommended remediation strategy.
Sample depths Samples were collected and analysed from a range of depths, with the primary intervals being within the shallow fill (0.2-0.5 mbgl). The maximum depth of investigation was 8.0 mbgl and the maximum depth of sampling was 1.5-1.9 mbgl. During the PESA, 2 samples (SP1 and SP2) were collected from a stockpile of approximately 25 m^2 of soil located near the main entrance from Victoria Street. The depth of sampling from within the stockpile was not recorded.	In the Auditor's opinion, the sampling strategy was appropriate and adequate to characterise the primary material types present on site.
Well construction *Groundwater:* The monitoring wells were typically installed to depths of between 5.5 and 7.5 mbgl, with screen intervals of between 3 and 6.0 m within natural silty clay and weathered bedrock. Wells were constructed of 50 mm uPVC. A bentonite seal of 0.5-1.0 m thickness was placed above the screen and the well backfilled with sand and cement grout to the ground surface. The reported SWL intersects the screen interval in all wells.	In the Auditor's opinion, the well construction was acceptable. Wells PMW1 and PMW2 were existing wells encountered at the site and well installation details are not available for these wells.
Sample collection method *Soil*: Soil samples were collected from boreholes using a solid stem auger with a SPT split spoon sampler. Test pit samples were collected directly from the excavator bucket. Samples collected using the excavator were collected from the middle of the bucket to reduce the potential for cross contamination from the bucket. Stockpile samples were collected using hand tools. During the PESA, 50 g samples were collected for laboratory analysis for asbestos presence/absence. During the ASI, 500 mL samples were collected for laboratory analysis for AF/FA. Field screening of soil samples from boreholes and test pits for ACM was completed during the ASI through visual inspection of soils. Due to the cohesive nature of the soils, samples were placed on a contrasting surface (blue tarpaulin) and inspected for the presence of fibre cement. Any soil clumps/nodules were disaggregated. These samples were not screened in accordance with the asbestos quantification methodology outlined in NEPM (2013) (Schedule B1) as some sample sizes were less than the	Overall, in consideration of the contamination encountered, the sample collection method was found to be acceptable for remediation planning purposes. Field screening of soil samples for ACM >7mm was not completed in accordance with the asbestos quantification methodology outlined in NEPM (2013) (Schedule B1), however, was sufficient to provide qualitative information on the likelihood of ACM. The Auditor notes that full characterisation of fill for ACM is a data gap that will be addressed during the remediation.

Sampling and Analysis Plan and Sampling Methodology	Auditor's Opinion
10 L bulk sample recommended in the guidelines (sample weights were reported between 1.8 and 15.6 kg). *Groundwater*: Wells were installed by solid flight augers and developed with a submersible pump and samples were collected by peristaltic pump with dedicated sample tubing or by disposable HDPE bailer. A PFAS sampling protocol was completed.	
Decontamination procedures *Soil:* Sampling personnel used disposable nitrile gloves during sampling activities. Re-usable sampling equipment was reported to be decontaminated using Decon and potable water between sampling locations. Decontamination of augers between locations was not explicitly reported. *Groundwater*: Dedicated sampling equipment was used for each well. New gloves were reportedly used for each new sample.	Acceptable
Sample handling and containers Samples were placed into prepared and preserved sampling containers provided by the laboratory and chilled during storage and subsequent transport to the labs. Samples for asbestos analysis were placed in plastic zip-lock bags. It is not indicated whether groundwater samples to be analysed for dissolved heavy metals were field filtered. The metals concentrations reported may therefore be over- or under-estimated depending on the groundwater pH.	Acceptable. Based on the detected concentrations of metals in groundwater, the uncertainty over filed filtering is not considered to affect the overall conclusions drawn from the data.
Chain of Custody (COC) Completed COC forms were provided in the reports.	Acceptable
Detailed description of field screening protocols *Soil:* Field screening for volatiles was undertaken using a PID. Soil sub-samples were placed in ziplock plastic bags and the headspace measured for VOCs after allowing time for equilibration. *Groundwater:* Field parameters were measured during well sampling and development.	Acceptable
Calibration of field equipment The reports indicated that calibration had been undertaken prior to use and checks were performed during use. Calibration certificates from the equipment supplier were provided.	Acceptable
Sampling logs Soil logs are provided within the reports indicating sample depth, PID readings and lithology. The logs report no indications of contamination were found, however surface staining was reported in the body of the PESA report, below heavy machinery.Groundwater field sampling records were provided, indicating SWL, field parameters, methodology and observations.	Acceptable

Table 6.3: QA/QC – Field and Lab Quality Assurance and Quality Control

Field and Lab QA/QC	Auditor's Opinion
Field quality control samples Field quality control samples including trip blanks, trip spikes, rinsate blanks (ASI only for soil sampling using SPT), field intra-laboratory and inter-laboratory duplicates were undertaken.	Acceptable

Field and Lab QA/QC	Auditor's Opinion
Rinsate blanks were not required during groundwater sampling since dedicated sampling equipment was used for each location.	
Field quality control results The results of field quality control samples were generally within appropriate limits. The following exceptions were noted: During the PESA, relative percent difference (RPD) exceedances were reported for several PAH, metals and TRH duplicate pairs. JKE considered the exceedances were attributable to sample heterogeneity and the low concentrations of contaminants encountered in the samples. Where applicable, the higher duplicate value was adopted. During the ASI, RPD exceedances were reported for several PAH, metals and TRH duplicate pairs. JKE considered the exceedances were attributable to sample heterogeneity. Where applicable, the higher duplicate value was adopted.	Overall, in the context of the dataset reported, the elevated RPD results are not considered significant and the field quality control results are acceptable.
NATA registered laboratory and NATA endorsed methods Laboratories used included Envirolab in Chatswood NSW and in Croydon South VIC. Laboratory certificates were NATA stamped.	Acceptable
Analytical methods Analytical methods were included in the laboratory test certificates. Envirolab provided brief method summaries of in-house NATA accredited methods used based on USEPA and/or APHA methods (excluding asbestos) for extraction and analysis in accordance with the NEPM (2013). Asbestos identification was conducted by Envirolab using polarised light microscopy with dispersion staining by method AS4964-2004 *Method for the Qualitative Identification of Asbestos Bulk Samples*.	Acceptable
Holding times Review of the COCs and laboratory certificates indicate that the holding times had generally been met. The holding times for the analysis of pH and EC in groundwater during the ASI were beyond the recommended holding time by a few days. JKE consider it unlikely that significant physiochemical changes would have occurred during this period.	Acceptable. The exceedance of holding time for pH and EC analysis is not considered to impact the conclusions of the report.
Practical Quantitation Limits (PQLs) *Soil:* PQLs were less than the threshold criteria for the contaminants of concern. *Asbestos in soil:* The NATA approved limit of detection for asbestos in soil was 0.01% w/w although NEPM (2013) analyses were reported to 0.001% w/w for AF/FA. *Groundwater:* PQLs were less than the threshold criteria for the contaminants of concern except for: • vinyl chloride which had a PQL of 10 µg/L and human health criterion was 3 µg/L. • Benzo(a)pyrene PQL of 0.1 µg/L and human health criterion of 0.01 µg/L • Anthracene PQL of 0.1 µg/L and ecological criteria of 0.01 µg/L	*Soil (except asbestos):* Overall the soil PQLs are acceptable. *Asbestos:* In the absence of any other validated analytical method, the detection limit for asbestos is considered acceptable. *Groundwater*: The elevated PQLs were only marginally elevated above the trigger values and concentrations of other chlorinated hydrocarbons and PAHs were below the PQLs. Overall, these discrepancies do not materially affect the outcome of the audit.
Laboratory quality control samples Laboratory quality control samples including laboratory control samples, matrix spikes, surrogate spikes, blanks and duplicates were undertaken by the laboratory.	Acceptable
Laboratory quality control results	In the context of the dataset reported, the minor non-conformances in laboratory quality control results are not considered

Field and Lab QA/QC	Auditor's Opinion
The results of laboratory quality control samples were generally within appropriate limits, with some minor exceptions reported during the PESA and ASI.	significant and the laboratory quality control results are acceptable.
Data Quality Indicators (DQI) and Data Evaluation (completeness, comparability, representativeness, precision, accuracy) Predetermined DQIs were set for laboratory analyses including blanks, replicates, duplicates, laboratory control samples, matrix spikes and surrogate spikes and results were discussed by JKE in both the PESA and ASI. In the PESA, EIS concluded that "*EIS are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives. Non-conformances were reported for some field QA/QC samples and laboratory QA/QC analysis. These non-conformances were considered to be sporadic and minor and were not considered to be indicative of systematic sampling or analytical errors. On this basis, these non-conformances are not considered to materially impact the report findings.*" In the ASI, JKE concluded that "*JKE are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives*."	An assessment of the data quality with respect to the five category areas has been undertaken by the Auditor and is summarised below.

6.1 Auditor's Opinion

In considering the data as a whole, the Auditor concludes that:

- The data is likely to be representative.
- The data is largely complete, although there are data gaps in soil conditions beneath building footprints and groundwater conditions down gradient of the UST and truck wash. These data gaps are acknowledged and addressed in the RAP.
- There is a high degree of confidence that data is comparable for each soil sampling event. Only one groundwater monitoring event has been completed so no assessment of comparability can be completed for groundwater data.
- The laboratories provided sufficient information to conclude that data is of sufficient precision.
- The data is likely to be accurate.

7. ENVIRONMENTAL QUALITY CRITERIA

The Auditor has assessed the results against Tier 1 criteria from National Environmental Protection Council (NEPC) *National Environmental Protection (Assessment of Site Contamination) Measure 1999*, as Amended 2013 (NEPM, 2013). Other guidance has been adopted where NEPM (2013) is not applicable or criteria are not provided. Based on the proposed development, the human health and ecological criteria appropriate for 'commercial/industrial land use' were adopted.

7.1 Soil Assessment Criteria

7.1.1 Human Health Assessment Criteria

The Auditor has adopted human health assessment criteria from the following sources:

- NEPM (2013) Health Investigation Levels (HILs) for 'Commercial/Industrial' (HIL D) land use.
- NEPM (2013) Health Screening Levels (HSLs) for 'Commercial/Industrial' (HSL D) land use. The HSLs conservatively assumed a sand soil type. Depth to source adopted was <1 m as an initial screen.
- NEPM (2013) Management Limits (MLs) for petroleum hydrocarbons for 'Commercial/Industrial' land use and assuming coarse soil texture. Criteria are relevant for operating sites where significant sub-surface leakage of petroleum hydrocarbons has occurred and when decommissioning industrial and commercial sites.
- NEPM (2013) HSLs for Asbestos Contamination in Soil for 'Commercial/Industrial' (HSL D) land use where sampling in accordance with NEPM (2013) (AF/FA only) otherwise No Asbestos Detected.

7.1.2 Ecological Assessment Criteria

The Auditor has adopted ecological soil assessment criteria from the following sources:

- NEPM (2013) Ecological Screening Levels (ESLs) for 'Commercial/Industrial' land use, assuming coarse soil.
- NEPM (2013) Ecological Investigation Levels (EILs) for 'Commercial/Industrial' land use. In the absence of site-specific soil data on pH, clay content, cation exchange capacity and background concentrations in fill, the EILs were calculated using the most conservative soil-specific added contaminant limits (ACL) for aged contaminants and added background concentration (ABC) referenced from Olszowy et al (1995) (background concentration for high traffic, old suburbs in NSW).
- Canadian Council of Ministers of the Environment (CCME) (2010) *Canadian soil quality guidelines: carcinogenic and other polycyclic aromatic hydrocarbons (PAHs)* soil quality guideline (SQG) for benzo(a)pyrene for 'Commercial/Industrial' land use. The SQG has been adopted in place of the NEPM (2013) ESL as it is based on a larger and more up-to-date toxicity database than the low reliability NEPM (2013) ESL.

7.1.3 Soil Aesthetic Considerations

The Auditor has considered the need for soil remediation based on 'aesthetic' contamination as outlined in *Section 3.6 Aesthetic Considerations* of NEPM (2013) Schedule B1, which acknowledges that there are no chemical-specific numerical aesthetic guidelines. Instead, site assessment requires a balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity.

7.2 Groundwater Assessment Criteria

7.2.1 Human Health Assessment Criteria

The Auditor has adopted human health assessment criteria from the following sources:

- NEPM (2013) HSLs for 'Commercial/Industrial' (HSL D) land use. The HSLs conservatively assumed a sand soil type and a depth to groundwater of 2 to <4 m.
- NHMRC (2011) *National Water Quality Management Strategy, Australian Drinking-Water Guidelines* (ADWG), Version 3.5 Updated August 2018 where HSLs are not applicable due to shallow (<2 m) depth to groundwater.
- NHMRC (2008) *Guidelines for Managing Risks in Recreational Water* (GMRRW). The GMRRW indicates that a qualitative assessment of recreational use can be undertaken using 10 times the concentrations of chemicals stipulated in the ADWG. This is based on an assumed contribution for swimming equivalent to 10% of drinking water consumption. This adjustment only accounts for a reduced intake of groundwater, and therefore can only be applied to criteria derived based on health considerations and cannot be applied to criteria derived for aesthetic reasons (e.g. copper). The adjustment should also not be applied to volatile compounds (e.g. benzene) where inhalation is the primary pathway of concern. Where a 'health-based' and an 'aesthetic-based' criteria is provided, the 'health-based' criteria was adopted.
- HEPA (2020) *PFAS National Environmental Management Plan* for drinking water and recreational water criteria for PFOS/PFHxS and PFOA.
- USEPA Regional Screening Levels (RSLs) Residential Tap Water Criteria. Online database of assessment criteria that are current as of March 2021. Tap water assessment criteria derived for carcinogenic compounds were multiplied by a factor of 10 to adjust the target cancer risk level from 1:1,000,000 to 1:100,000 to be consistent with Australia's recommended target cancer risk level. For some chemicals, where a criteria has been derived using both non-cancer and cancer toxicity data, the lower criteria was adopted.
- WHO (2017) *Guidelines for Drinking-water Quality, Fourth Edition, incorporating the 1st addendum*.
- WHO (2008) *Petroleum Products in Drinking-water. Background document of WHO Guidelines for Drinking-water Quality* for petroleum hydrocarbons. (adopted in absence of health-based criteria in WHO (2017) because the taste and odour of petroleum products will in most cases be detectable at concentrations below those of health concern).

7.2.2 Ecological Assessment Criteria

The Auditor has adopted ecological groundwater assessment criteria from the following sources:

- ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (www.waterquality.gov.au/anz-guidelines). Criteria for freshwater water and 95% level of protection were adopted.
- HEPA (2018) PFOS/PFHxS and PFOA 'freshwater' criteria developed for the protection of 95% species protection for slightly to moderately disturbed systems.

7.3 Auditor's Opinion

The environmental quality criteria referenced by the Auditor are consistent with those adopted by EIS/JKE with the exception of the following:

- In the ASI, where the initial soil data screen identified EIL exceedances for metals, the impacted samples were analysed for pH and cation exchange capacity (CEC) and the data was used to calculate soil-specific EILs. When reviewing EIL exceedances noted in the PESA, JKE applied the lowest soil-specific EIL (for the corresponding soil type).

Given the results obtained, the Auditor considers that these discrepancies do not affect the overall conclusions reached by JKE and the Auditor.

8. EVALUATION OF SOIL RESULTS

8.1 Field Results

Fill material was encountered at all sample locations with the greatest thickness in the eastern portion of the site. Fill in this area included anthropogenic inclusions of ash, slag and building rubble (asphalt, bricks, concrete, glass, ceramic, tile and plastic fragments). No odours or staining were noted.

Field screening of soil samples was completed during both the PESA and the ASI using a PID to detect VOCs. Results were between 0 and 2 ppm isobutylene equivalents indicating a lack of VOC contamination.

Field screening of bulk soil samples was undertaken for visual assessment of ACM. The field procedure was not undertaken in accordance with the requirements within NEPM (2013) as the volume of the samples was less than 10 L (sample weights were reported between 1.8 and 15.6 kg). No ACM was detected during the field screening and the results have been considered qualitatively when reviewing the data.

Seepage of groundwater was noted in the boreholes BH22, BH106, BH107, TP125, BH129 and BH146 at depths of between approximately 1.0 mbgl to 4.0 mbgl. The remaining boreholes and test pits were dry during drilling/excavation.

8.2 Analytical Results

Soil samples were collected from 75 sample locations and analysed for a variety of contaminants including petroleum hydrocarbons, PAHs, asbestos and heavy metals. The results have been assessed against the environmental quality criteria. The majority of samples (85) were from the fill material and the results are summarised in Table 8.1. Six samples of natural material were also analysed and did not contain contaminants of concern above the criteria.

Soil sampling locations are shown as Attachment 4, Appendix A.

Table 8.1: Evaluation of Soil Analytical Results for Fill Material – Summary Table

Analyte	n	Detections	Maximum (mg/kg)	n > Human Health Screening Criteria	n > Terrestrial Ecological Screening Criteria
ACM >7 mm (bulk samples)*	71	0	ND	0 above HSL D 0.05%*	-
AF/FA (500 mL samples)	39	0	ND	0 above HSL 0.001%	-
Asbestos in soil (50 g samples)	27	0	ND	0 above 0.1 g/kg	
Asbestos in material	1	1 Chrysotile detected	N/A	-	-
Benzene	85	0	<PQL	0 above HSL D 0-1 m, sand 3 mg/kg	0 above ESL (commercial/industrial) (coarse) 75 mg/kg
Toluene	85	0	<PQL	0 above HSL D 0-1 m, sand NL	0 above ESL (commercial/industrial) 135 mg/kg
Ethylbenzene	85	0	<PQL	0 above HSL D 0-1 m, sand NL	0 above ESL (commercial/industrial) (coarse) 165 mg/kg

Analyte	n	Detections	Maximum (mg/kg)	n > Human Health Screening Criteria	n > Terrestrial Ecological Screening Criteria
Total Xylenes	85	0	<PQL	0 above HSL D 0-1 m, sand 230 mg/kg	0 above ESL (commercial/industrial) (coarse) 180 mg/kg
F1 (TRH C_6–C_{10} minus BTEX)	85	0	<PQL	0 above HSL D 0-1 m, sand 260 mg/kg	0 above ESL (commercial/industrial) 215 mg/kg
F2 (TRH >C_{10}–C_{16} minus naphthalene)	85	1	130	0 above HSL D 0-1 m, sand NL	-
TRH C_6–C_{10}	85	0	<PQL	0 above ML (commercial/industrial) 700 mg/kg	-
TRH >C_{10}–C_{16}	85	1	130	0 above ML (commercial/industrial) 1000 mg/kg	0 above ESL (commercial/industrial) 170 mg/kg
TRH >C_{16}-C_{34}	85	27	1600	0 above ML (commercial/industrial) 3500 mg/kg	0 above ESL (commercial/industrial) (coarse) 1700 mg/kg
TRH >C_{34}-C_{40}	85	25	540	0 above ML (commercial/industrial) 10,000 mg/kg	0 above ESL (commercial/industrial) (coarse) 3300 mg/kg
Naphthalene	85	0	<PQL	0 above HSL D 0-1 m, sand NL	0 above EIL (commercial/industrial) 370 mg/kg
Benzo(a)pyrene	85	17	0.4	-	0 above CCME SQG (commercial/industrial) 72 mg/kg
Benzo(a)pyrene TEQ	85	2	0.6	0 above HIL D 40 mg/kg	-
Total PAHs	85	40	6	0 above HIL D 4000 mg/kg	-
Total Phenols	21	0	<PQL	0 above HIL D 240,000 mg/kg	-
Arsenic	85	27	24	0 above HIL D 3000 mg/kg	0 above EIL (commercial/industrial) of 160 mg/kg
Cadmium	85	2	0.4	0 above HIL D 900 mg/kg	-
Chromium	85	85	95	0 above HIL D 3600 mg/kg	0 above most conservative ACL (commercial/industrial) 310 mg/kg
Copper	85	85	170	0 above HIL D 240,000 mg/kg	**1 above most conservative ACL (commercial/industrial) 85 mg/kg**
Lead	85	84	64	0 above HIL D 1500 mg/kg	0 above generic ACL (commercial/industrial) 1800 mg/kg
Mercury	85	0	<PQL	0 above HIL D 730 mg/kg	-
Nickel	85	85	130	0 above HIL D 6000 mg/kg	**6 above most conservative ACL**

Analyte	n	Detections	Maximum (mg/kg)	n > Human Health Screening Criteria	n > Terrestrial Ecological Screening Criteria
					(commercial/industrial) 55 mg/kg
Zinc	85	85	260	0 above HIL D 400,000 mg/kg	**3 above most conservative ACL (commercial/industrial) 110 mg/kg**
PCB	48	1	0.2	0 above HIL D 7 mg/kg	-
OCP	48	0	<PQL	0 above HIL D	0 above EIL
OPP	48	0	<PQL	0 above HIL D	-

n number of samples
* Some sample sizes screened by JKE during the ASI were less than 10 L therefore HSL not directly applicable. Results are included as a qualitative assessment.
- No criteria available/used
ND Not detected
NL Non-limiting
<PQL Less than the practical quantitation limit

In reviewing the analytical results, the Auditor notes the following:

- Concentrations of contaminants were generally no detect or below site assessment criteria indicating that widespread contamination of fill and soil is not present
- JKE identified one fragment of bonded FCF on the site surface and did not identify ACM or FA/AF in fill. As noted in Section 6, the sample size for field screening of bulk samples for ACM were not 10 L samples and hence the results are not strictly comparable to the HSL D criteria included in NEPM (2013). However, the results have been considered as qualitative data.
- Volatile petroleum hydrocarbons were not detected in soils at concentrations above LOR. Some detections within the TRH C16-C40 range were reported but were below screening criteria. However, JKE noted that localised impacts may be encountered in the tank pit back fill and immediately below the UST.
- Concentrations of copper, nickel and zinc were detected in a small proportion of soil samples at concentrations above the most conservative screening criteria for protection of terrestrial ecology.
- JKE reported that concentrations of nickel in 9 soil samples exceeded the waste criteria Contaminant Threshold (CT1) for General Solid Waste (non-putrescible) outlined in the NSW EPA (2014) *Waste Classification Guidelines*. Toxicity Characteristic Leaching Procedure (TCLP) testing was completed on six samples that exceeded the CT1 criteria. All TCLP results for nickel were below the TCLP1 criteria with a maximum concentration of 0.3 mg/L reported indicating a General Solid Waste classification.

8.3 Auditor's Opinion

In the Auditor's opinion, the soil analytical results are consistent with the site history and field observations and indicate widespread contamination of fill and natural soils is not present. Concentrations of heavy end TRH were reported at several locations, but concentrations were below the adopted assessment criteria. However, most of the sample locations (57) were completed using boreholes which limits the opportunity for visual assessment of the subsurface, and hence there is the potential for areas of fill material with a greater proportion of anthropogenic inclusions, including asbestos, to be present. This is particularly so in the southern portion of the site where placement of sample locations was limited by existing buildings and infrastructure. This portion of the site is likely to have the greatest potential for unidentified finds

as, historically, former buildings were located in this area. There is also the potential for localised impacted soils to be present around and below the known UST and the truck wash bay in the south-western portion of the site and within building footprints.

These data gaps have been considered in the RAP discussed in Section 11. The Auditor is satisfied that soil at the site has been adequately characterised for the purposes of remediation planning and that no further investigations are required prior to implementation of the RAP.

9. EVALUATION OF GROUNDWATER RESULTS

9.1 Field Results

Only one round of groundwater monitoring has been completed at the site in February 2021. Groundwater was encountered in eight of the nine newly installed wells and two existing wells (PMW1 and PMW2). Well MW116 (installed to a depth of 5.5 mbgl) was dry on completion and during the sampling event. The other eight new wells were installed to depths of between 7.0 and 8.0 mbgl and SWLs were between 1.5 to 5.13 mbgl.

Installation details for existing wells PMW1 and PMW2 were not available and total well depths were not provided in the ASI report. The SWL in PMW1 was 3.2 mbgl and in PMW2 at 0.32 mbgl. PMW2 was considered to be associated with the UST installed in the south-western portion of the site (considered a potential cathodic protection measure).

No odour or sheen was noted on field sheets for well development or during the monitoring event. Light non aqueous phase liquid (LNAPL) was not detected using the interface probe in any well during groundwater sampling.

9.2 Analytical Results

Groundwater samples were collected from ten wells in February 2021 and submitted for analyses for contaminants of concern. Groundwater well locations are shown on Attachment 4, Appendix A. The analytical results are summarised below in Table 9.1.

Table 9.1: Summary of Maximum Groundwater Investigation Analytical Results (µg/L)

Analyte	n	Detections	Maximum	n > Human health criteria	n > Ecological criteria
TRH C_6-C_{10} less BTEX (F1)	10	1	56	0 above HSL D, sand 2-<4 m (6,000) 0 above WHO 2017 (15,000)	-
TRH >C_{10}-C_{16} less naphthalene (F2)	10	3	100	0 above HSL D, sand 2-<4 m NL 0 above WHO 2017	-
TRH >C_{16}-C_{34} (F3)	10	1	540	0 above WHO 2017	-
TRH >C_{34}-C_{40} (F4)	10	0	120	0 above WHO 2017	-
Benzene	10	1	66	0 above HSL D, sand 2-<4 m (5,000) **1 above ADWG (1) (MW123)**	0 above GIL of 950
Toluene	10	1	4	0 above HSL D, sand 2-<4 m NL 0 above ADWG (800)	0 above GIL of 180
Ethylbenzene	10	0	<1	0 above HSL D, sand 2-<4 m NL 0 above ADWG (300)	0 above GIL of 80
Total Xylenes	10	0	<2	0 above HSL D, sand 2-<4 m NL 0 above ADWG (600)	0 above GIL of 75
Naphthalene	10	0	<1	0 above HSL D, sand 2-<4 m NL 0 above USEPA RSL (6.1)	0 above GIL of 16
Total PAH	8	0	<PQL	-	-

Analyte	n	Detections	Maximum	n > Human health criteria	n > Ecological criteria
Benzo(a)pyrene	8	0	<0.1	0 above ADWG of 0.01	0 above GIL of 0.1
Tetrachloroethene (PCE)	8	0	<1	0 above ADWG of 50	0 above GIL of 70
Trichloroethene (TCE)	8	0	<1	0 above WHO drinking water criteria of 20	0 above GIL 330
1,1,2-Trichloroethane	8	0	<1	-	0 above GIL of 6500
Cis-1,2-dichloroethene (DCE)	8	0	<1	0 above ADWG of 60	-
1,1-dichloroethene	8	0	<1	0 above ADWG of 30	0 above GIL of 700
Vinyl Chloride (VC)	8	0	<10	0 above ADWG of 3*	0 above GIL 0f 100
Chloromethane	8	1	17	0 above ADWG of 250	-
Arsenic (As III)	8	7	25	**1 above ADWG of 10 (MW134)**	**1 above GIL of 24 (MW134)**
Cadmium	8	4	0.7	0 above ADWG of 2	**2 above GIL of 0.2 (MW123, MW143)**
Chromium	8	4	16	0 above ADWG of 50	**1 above GIL of 3.3 (MW128)**
Copper	8	2	3	0 above ADWG of 2000	**2 above GIL of 1.4 (MW106, MW128)**
Lead	8	0	<PQL	0 above ADWG of 10	0 above GIL of 3.4
Mercury	8	1	0.07	0 above ADWG of 1	**1 above GIL of 0.06 (MW103)**
Nickel	8	8	76	**5 above ADWG of 20 (MW123, MW128, MW134, MW139, MW143)**	**5 above GIL of 11 (MW123, MW128, MW134, MW139, MW143)**
Zinc	8	8	66	-	**7 above GIL of 8**
PFHxS + PFOS	8	5	0.002	0 above HEPA drinking water 0.07	-
PFOS	8	5	0.002	-	0 above HEPA freshwater 95% species protection level 0.13
PFOA	8	7	0.002	0 above HEPA drinking water 0.56	0 above HEPA freshwater 95% species protection level 220

n number of samples
- No criteria available/used
<PQL Less than the practical quantitation limit
NL non limiting

In assessing the analytical results, the Auditor makes the following observations:

- Concentrations of petroleum hydrocarbons were detected in groundwater samples from well MW106, located in the southwest close to the UST, well MW123 in the centre of the site and well MW128 in the north-eastern portion of the site. Petroleum hydrocarbons were not detected in groundwater from wells MW111 and MW103 located on the south-eastern (down

gradient) site boundary suggesting that groundwater impacts are not migrating off-site in this direction.

- The concentration of benzene in well MW123 did not exceed the HSL for groundwater at depths of >2-4 mbgl but did exceed drinking water criteria. JKE conclude that, as the proposed development does not include the use of groundwater, and groundwater will be at least 4 m below the bulk excavation level in this area following development, a complete source-pathway-receptor (SPR) linkage does not exist for future on-site receptors and the benzene concentration does not pose a risk to future commercial site use.
- Concentrations of mid-fraction TRH F2 were detected in wells MW106, MW123 and MW128 at concentrations below the HSL. However, groundwater in well MW106 was less than 2 mbgl which does not allow for direct comparison with the HSLs. JKE indicate that the proposed development involves a reduction in the surface level in the vicinity of MW106 and that there is potential that TRH F2 may volatilise and pose a potential vapour intrusion risk within the proposed buildings. On this basis, JKE consider a complete SPR linkage may exist. JKE note that removal of the UST and bulk earthworks in accordance with the RAP in this portion of the site are likely to remove the source of the groundwater contamination.
- Groundwater data is not available for areas directly down gradient of the UST and the truck wash bay and the extent of petroleum hydrocarbon impacts reported in wells MW106, MW123 and MW128 has not been delineated. The source of impacts in MW123 and MW128 is also uncertain.
- Concentrations of arsenic, copper, nickel and zinc have been detected in groundwater at concentrations that exceed either the drinking water criteria or the ecological criteria. JKE concluded in the ASI that the concentrations of heavy metals within the groundwater are likely a regional issue and do not pose a risk to the on-site receptors in the context of the proposed development.
- Only one data set is available from the groundwater well network and hence no assessment of temporal variation in contaminant concentrations is possible.

9.3 Auditor's Opinion

In the Auditor's opinion, the groundwater monitoring undertaken provides a general indication of the groundwater quality beneath the site and indicates that widespread groundwater contamination is not present beneath the site or likely to be migrating off-site. However, due to the low density of groundwater wells in the local aquifer (eight across an 8.5 ha area), there is the potential that localised plumes are present on-site associated with point sources of contamination.

There are no groundwater wells located down gradient of the known UST and truck wash bay and the source of the elevated benzene concentration in well MW123, in the centre of the site, is unknown. The potential for volatile contaminants in shallow groundwater to pose a vapour intrusion risk in areas of the site where groundwater may be close to final development surface levels or basements has not been fully assessed.

The quality of groundwater in the southern portion of the site is unknown due to access constraints and existing buildings and is a data gap that should be addressed during the remediation and development of the site.

Additional groundwater assessment is required to address these data gaps, including:

- Installation and sampling of wells down gradient of the UST and truck was bay in the southern portion of the site

- Installation and sampling of wells to delineate benzene impacts detected in MW123 and confirm the source is localised
- Additional groundwater monitoring of the groundwater well network to assess temporal variation in concentrations of contaminants
- Surveying of groundwater well elevations to confirm groundwater flow direction.

10. EVALUATION OF THE CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is a representation of the source, pathway and receptor linkages at a site. JKE developed a CSM and used it iteratively throughout the site assessment to inform decisions around investigation and remediation requirements. The CSM was initially developed following the PESA and has been updated as new information became available. Table 10.1 provides the Auditor's review of the final CSM used by JKE to inform the requirement for additional investigation and remediation.

Table 10.1: Review of the Conceptual Site Model

Element of CSM	Consultant	Auditor Opinion
Contaminant source and mechanism	Historically imported fill, USTs and associated infrastructure, hazardous building materials, historic industrial/commercial uses and off-site commercial/industrial land uses, as discussed in Section 4. Contaminants of concern for the RAP include heavy metals, asbestos in the form of surficial ACM, TRHs, BTEX and PAHs.	The known and potential sources of contamination and contaminants of concern have been identified. The ASI included analysis of additional contaminants of concern including OCPs, OPPs, phenols, PCBs and asbestos in soil and VOCs and PFAS in groundwater. The contaminants of concern identified for the RAP are considered appropriate based on the soil and groundwater investigation results.
Affected media	Soil, groundwater and soil vapour	The potentially affected media have been identified. There are data gaps associated with the extent of identified groundwater contamination and potential for vapour intrusion into future buildings. Soil conditions below existing buildings are unknown.
Receptor identification	Construction workers, intrusive maintenance workers and future site users. JKE conclude that the ASI did not identify any contamination that poses a risk to ecological receptors at or down gradient of the site and that following site development which includes major earthworks and construction across the site, the risks posed by contamination to ecological receptors is considered to be low.	Appropriate human and ecological receptors have been identified. Future site users would be users of the commercial development. The Auditor agrees that, based on the proposed commercial development, the risk to terrestrial ecological receptors from localised soil impacts is low.
Exposure pathways	Identified exposure pathways include primary contact and inhalation of asbestos dust and TRH/BTEX vapours. Exposure during future site use could occur via direct contact with asbestos (dust and incidental contact) during development works, inhalation, accumulation of soil vapour within confined spaces such as buildings.	The exposure pathways identified are appropriate. Dermal contact with petroleum hydrocarbons in soil and shallow groundwater by construction and intrusive site workers is also a potential exposure pathway.
Presence of preferential pathways for contaminant movement	Preferential pathways are not discussed by JKE in the CSM. Vapour intrusion into future buildings and basements is identified as a potentially complete exposure pathway.	Further assessment of the potential for vapour intrusion into future site buildings is required.
Potentially complete source-pathway-receptor (SPR)	The RAP identified potentially complete SPR linkages as being present related to detected	The identified potentially complete SPR linkages are appropriate. Exposure during development will be related to dermal

Element of CSM	Consultant	Auditor Opinion
linkages requiring remediation or management	petroleum hydrocarbon contamination in groundwater and asbestos in the form of ACM as follows: • Vapour intrusion into confined spaces including service trenches following development; • Vapour intrusion into buildings; and basements following development • Contact (dermal or inhalation) exposure to ACM during construction and excavation works and future site development works.	contact with petroleum hydrocarbons and inhalation of asbestos. Based on the current data set, the potential for vapour intrusion into future site buildings is low, however, there are several data gaps relating to the extent of petroleum hydrocarbon impacts in shallow groundwater, particularly as future design levels may intercept groundwater in the south-western portion of the site where a UST is located.
Evaluation of data gaps	Data gaps are identified by JKE in the RAP and are proposed to be investigated as part of the remediation and development of the site. Identified data gaps include: • Soil conditions beneath the existing building footprints and in areas where access was previously not available • Further investigation to better assess the potential risk to on-site receptors posed by TRH/BTEX in groundwater. JKE propose the data gaps are addressed through a data gap investigation following demolition of site buildings. Following the results of the data gap investigation, a site-specific human health risk assessment may be required. If the outcomes of the investigation identify a requirement for additional remediation, an addendum to the RAP or a remedial works plan (RWP) is to be prepared and reviewed by the Auditor.	The Auditor agrees with the identified data gaps and the requirement for additional investigation of soil conditions in the south of the site, below existing buildings and additional assessment of the extent and source of identified groundwater impacts.

10.1 Auditor's Opinion

The Auditor is of the opinion that the CSM is a reasonable representation of the contamination at the site and is considered an adequate basis for assessing additional investigation and remedial requirements.

11. EVALUATION OF REMEDIATION ACTION PLAN

11.1 Remediation Required

JKE determined remedial requirements based on review of investigation results against screening criteria and consideration of aesthetic issues.

ACM has been identified at the site surface and USTs require removal and validation. JKE also identified data gaps that require investigation including soil sampling below building footprints and additional groundwater investigation to determine appropriate management measures (if any) to mitigate any potential vapour intrusion risk.

The Auditor has summarised the issues identified as requiring additional investigation and remediation, and the preferred actions and remediation options considered in the RAP, in Table 11.1. Remedial works are proposed following removal and disposal of hazardous materials, demolition of the on-site buildings and exposure of underlying soil.

Table 11.1: Additional Investigation and Remediation Required and Preferred Options

Description	Extent of Investigation/ Remediation Required	Proposed Action/Remediation Option
Additional soil investigation beneath building footprints and previously inaccessible areas	Entire site in previously inaccessible areas to depth where natural soils encountered.	A test-pitting investigation following building demolition to address data gaps within building footprints, beneath ASTs, downgradient of USTs and truck wash bay and to increase general site coverage. Test pit locations shown on Attachment 5, Appendix A.
Additional groundwater investigation to delineate impacts detected in existing wells and assess groundwater conditions in previously inaccessible areas	Central and southern portions of the site to delineate groundwater impacts in wells MW106, MW123 and MW128 and provide data downgradient of USTs.	Installation of an additional 6 wells in locations shown on Attachment 5, Appendix A. The findings of the groundwater investigation may require preparation of a site-specific human health risk assessment (HHRA). Contingency remediation options for groundwater are provided in the RAP.
Remediation of surface ACM	Entire site following demolition of site buildings to depths of 100 mm below the existing surface level.	Hand pick and dispose of ACM off-site. Site inspection and clearance certificate.
Removal and validation of USTs (2) and associated infrastructure	The lateral extent of remediation will be guided by field observations. The vertical extent is anticipated by JKE to be 2 to 3 m.	Excavation and off-site disposal of tank and associated infrastructure. Validation of backfill sands, tank pit, bowser and pipeline excavations

11.2 Evaluation of RAP

The Auditor has assessed the RAP by comparison with the checklist included in NSW EPA (2020) *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land*. The RAP was found to generally address the required information, as detailed in Table 11.2, below.

Table 11.2: Evaluation of RAP

Remedial Action Plan (JKE, March 2021)	Auditor Comments
Remedial Goal The remediation goal is outlined in Section 1.2 of the RAP as being "*to render the site suitable for the*	In the Auditor's opinion, this goal is considered appropriate, with the aim being to validate the site as suitable for the proposed commercial site use.

Remedial Action Plan (JKE, March 2021)	Auditor Comments
proposed development from a contamination viewpoint. The primary aim of the remediation at the site is to reduce the human health and environmental risks posed by site contamination to an acceptable level."	
Discussion of the Extent of Remediation Required Remediation required for each area was discussed within Section 3.3 of the RAP as summarised in Table 11.1 above.	Acceptable. Data gaps related to soil conditions below buildings and in currently inaccessible areas and related to groundwater conditions are addressed through the proposed data gap assessment outlined in Section 4 of the RAP. The potential for additional remediation to be required is addressed through an unexpected finds protocol included in the RAP. The extent of potential groundwater remediation is currently unknown and will be determined based on the outcomes of the additional groundwater assessment and, if necessary, a HHRA. Preparation of a remediation works plan (RWP) is proposed if groundwater remediation is required and should be reviewed by the Auditor. Existing groundwater data suggests any identified groundwater impacts are likely to be localised within the site boundaries and that there is a low potential for significant off-site migration of contaminants in groundwater.
Remedial Options Remedial options for surficial ACM and soils associated with the UST were assessed and included on-site treatment of soils, off-site treatment of contaminated soils, containment and capping of soils, off-site disposal and long-term management. Remedial options for groundwater were included as contingencies and include insitu remediation and ongoing management and monitoring.	The Auditor considers that a reasonable range of options were considered although it is noted that engineering controls may be required if groundwater impacts are is found to present a risk to future building occupants.
Selected Preferred Option and Rationale Preferred options for soil remediation were discussed within the RAP and were on-site treatment of ACM through hand picking and off-site disposal of USTs and associated impacted soils. JKE reasoned that the preferred options for remediation were appropriate on the basis that: "*The ACM impacts identified have been limited to the site surface; the potential hydrocarbon impacts associated with the UST and associated infrastructure are anticipated to be localised; the UST and associated infrastructure will be removed from site, removing a potential source of hydrocarbon impacts; and the strategy is sustainable, economically viable, commensurate with the level of risk posed by the contaminants and technically achievable to implement concurrently with the proposed development works*." A preferred remediation option for groundwater was not outlined in the RAP as the selected method will depend on the outcomes of the additional groundwater assessment.	The Auditor considers the preferred options for remediation of surficial ACM and the UST to be technically feasible and practical remediation strategies. The remedial option for groundwater is not currently certain as the extent of the risk to future site users requires further assessment. This is considered acceptable as the RAP outlines potential remediation options that will provide a practical and technically feasible option for remediation of petroleum hydrocarbons in groundwater, should this be required. Preparation of an addendum to the RAP or a RWP will be required to document any proposed groundwater remediation and validation strategy and will be reviewed by the Auditor. It is noted that long-term management and monitoring is included as a potential management option for groundwater. This would require implementation of a long-term environmental management plan (EMP). An EMP would need to be acceptable to Council and notation on title may be required.
Description of Remediation to be Undertaken • Site establishment and demolition	The remediation process is considered acceptable. A hold point is required following building demolition and removal of hardstand to inspect the site surface for additional sources of contamination and

Remedial Action Plan (JKE, March 2021)	Auditor Comments
• Site inspection by an environmental consultant to identify any additional potential sources of contamination • Completion of the data gap assessment • Preparation of a RWP for the remediation or management of TRH/BTEX in groundwater, if required • Remediation of ACM-impacted surficial areas to be completed by a licensed asbestos removal contractor. The raking is to be undertaken with a manual or mechanical rake capable of probing to the remediation depth of 100mmBGL. Raking should occur in a north-south direction, then an east-west direction, on a 1m transect across the site. A minimum of three passes is required, with zero fragments of ACM encountered on the last pass. • Decommissioning and removal of the USTs, backfill and associated infrastructure, followed by excavation and off-site disposal of soils associated with the tank pit and other impacted areas. • Validation of the works will be undertaken progressively throughout the remediation program.	completion of the data gap assessment, prior to bulk earthworks commencing. Should the results of the data gap assessment indicate the requirement for a change in the soil remediation strategy, or should groundwater remediation be required, a revision to the RAP or a RWP will be required to be developed and approved by the Auditor.
Proposed Validation Criteria *ACM impacted soils:* • No visible ACM in top 100 mm of fill following at least three passes with the final two passes (perpendicular to each other) demonstrating no ACM. • The impacted area treated by raking should be inspected and cleared by an asbestos assessor. • HSLs for commercial/industrial land use for 10 L and 500 mL validation samples collected in accordance with NEPM (2013). • ACM not observed during surface clearance. *UST/Infrastructure:* • HSLs for commercial/industrial land use (TRH/BTEX) • HIL for commercial/industrial land use (lead) • Free of staining and odours • Waste classification in accordance with the procedures and criteria outlined in Part 1 of the EPA (2014) *Waste Classification Guidelines* and any other exemptions/approvals as required. *Groundwater:* • HSLs for a 'commercial/industrial' exposure scenario (HSL-D). • Site-specific assessment for the Tier 1 screening of human health risks posed by volatile contaminants in groundwater • Groundwater Investigation Levels (GILs) for 95% protection of freshwater species	The proposed validation criteria are acceptable to validate the site as suitable for commercial site use. The validation criteria for the soil data gap assessment are not included in the RAP but should be in accordance with the criteria adopted in the ASI.
Proposed Validation Testing *Data gap soil assessment:* One fill sample per sample location to be analysed for heavy metals, TRH/BTEX, PAHs, OCP, OPPs and	The proposed validation sampling for ACM impacted soils and USTs is acceptable. Sample return should be adequate for 10 L samples given test pits are proposed.

Remedial Action Plan (JKE, March 2021)	Auditor Comments
asbestos (500 ml quantification sample for AF/FA and a bulk 10 L sample for ACM (to extent achievable based on sample return)). One sample of the natural soil profile is to be collected from each sampling location and a selection of the samples (approximately 10 to 14) analysed for heavy metals, TRH/BTEX and PAHs for waste classification purposes. *Data gap groundwater assessment:* One groundwater sample per monitoring well (new and existing) are to be analysed for heavy metals, TRH/BTEX and PAHs. *ACM impacted soils:* Bulk sample (10 L field screening) of one sample per 20 m x 20 m grid for ACM and analysis of representative fill soil sample for asbestos quantification (500 mL). Sampling will be confined to the ACM impacted areas identified by the asbestos assessor. *UST/Infrastructure:* Excavation base minimum of two samples per UST and walls one sample per excavation wall and per vertical metre. Additional sampling is also proposed to target obvious indicators of contamination and changes in soil profile. Analysis for TRH, BTEX and lead. Pipe trenches – one sample per linear 5 m. Additional samples to target any areas of staining and odours. Analysis for TRH, BTEX and lead. Bowsers - one sample per bowser base. Additional samples to target any areas of staining and odours. Analysis for TRH, BTEX and lead. UST backfill sands and chase out spoil – one sample per 25 m^3 tested for heavy metals, TRH, BTEX, PAH and asbestos. TCLP if required for waste classification. *Imported material:* Imported VENM backfill - minimum of three samples per source for heavy metals, TRH, BTEX, PAH, OCP, PCBs and asbestos. Imported garden mix/topsoil and mulches - minimum of three samples per source, analysis as for VENM. Imported engineering materials such as recycled aggregate, road base etc or Excavated Natural Material (ENM) - minimum of three samples per source/material type. Additional testing may be required for ENM to meet the specification within the ENM Order. Imported materials are to be visually inspected upon importation to confirm it is consistent with documentation.	Groundwater samples from newly installed wells down gradient of the truck wash should include analysis for VOCs. A validation plan for groundwater is not included, however validation criteria are provided and any remediation and validation of groundwater required as a result of the findings of the data gap investigation and/or a HHRA should be documented in an addendum to the RAP or a RWP and approved by the Auditor. The Auditor notes that imported material must either be VENM, ENM or be classified under a Resource Recovery Exemption. The density of testing would need to be commensurate with the documentation provided and the consistency of the validation results.
Contingency Plan if Selected Remedial Strategy Fails A number of options have been provided for specific potential problems including repeated ACM remediation failure, identification of hydrocarbon	In the Auditor's opinion, the contingencies included in the RAP are technically feasible and practical. Retention of material onsite or any required groundwater remediation would require documentation in an addendum to the RAP or RWP

Remedial Action Plan (JKE, March 2021)	Auditor Comments
impacted soils that cannot be excavated for offsite disposal and failure to validate imported material. For failure to validate ACM, off-site disposal of ACM impacted soils is proposed. For retention of hydrocarbon impacted soils, management through a cap and containment contingency is included as a contingency. Contingency procedures are also provided for unexpected finds. Remediation contingencies are included for groundwater as outlined in the 'Remedial Options' row of this Table.	which must be reviewed and approved by the Auditor. Any revised remediation strategy that requires ongoing management of contamination will require implementation of an EMP which will need to be agreed by Council. The procedure for handling unexpected finds is appropriate and practical and can be implemented within the proposed remediation strategy. The Auditor should be informed of any unexpected finds or changes to the remediation strategy.
Interim Site Management Plan (before remediation) Not included in the RAP	The site is currently used for commercial site use and has hardstand cover over most of the site. ACM encountered at the site surface during the ASI was removed. Interim management of contamination is not considered to be required.
Site Management Plan (operation phase) including stormwater, soil, noise, dust, odour and WHS The RAP includes the requirements for site management during the remediation, including preparation of an asbestos management plan (AMP), a work health and safety (WHS) plan, soil and water management plan, noise and vibration control plan, dust and odour control plans and requirements for dewatering, air monitoring and waste management.	Acceptable. The Auditor anticipates that a detailed WHS plan and a construction environmental management plan (CEMP) will be prepared by the remediation contractor or consultant prior to the works commencing.
Remediation Schedule and Hours of Operation Hours of operation should be between those approved by the determining authority under the development approval process.	The remediation is to take place following building demolition and alongside site redevelopment. Hours of operation will be confirmed as part of development consent conditions.
Contingency Plans to Respond to Site Incidents The RAP includes contingency plans for site incidents and unexpected finds. These include notification to the validation consultant to enable the scope of remedial/validation works to be adjusted as required. It is also noted that, if any incident occurs at the site, the validation consultant should be advised to assess potential impacts on contamination conditions and the remediation/validation timetable.	The Auditor notes that the RAP provides management and contingency plans that are directly applicable for the proposed works. As noted above, the procedure for handling unexpected finds is appropriate and practical and can be implemented within the proposed remediation strategy. The Auditor should be informed of any unexpected finds or changes to the remediation strategy.
Licence and Approvals The RAP includes details on required regulatory requirements and approvals (i.e. SEPP55, Safe work NSW Code of Practice and POEO (Waste) Regulation 2014). The remediation works are identified as Category 2 works requiring notice to Council. The ACM removal is to be completed by a licensed asbestos contractor and the UST removed by appropriately licensed contractors. An appropriately licensed landfill should be selected and the material tracked from the site to the landfill.	Acceptable.
Contacts/Community Relations The RAP includes details of project contacts, roles and responsibilities.	Acceptable

Remedial Action Plan (JKE, March 2021)	Auditor Comments
Emergency procedures and contact numbers are to be displayed on signs located adjacent to the site access throughout the remediation program. The remediation contractor should provide details for managing community consultation and complaints within their CEMP.	
Long Term Environmental Management Plan An EMP is not proposed as part of the remediation strategy, however, it is noted that, depending on the outcomes of the additional investigation, an EMP maybe required if contingency remediation methods are required. Any change to the proposed remediation plan will be documented in a revised RAP and approved by the Site Auditor.	Implementation of an EMP will require approval by Council and the site owner. The mechanism for enforcement and notification of an EMP will need to be considered in a revised RAP if required.
Waste Management The RAP recommends that the remediation contractor develop a waste management or recycling plan to minimise the amount of waste produced by the site. Consideration should be given to re-use of material wherever possible. Waste disposed off-site is to be classified in accordance with relevant legislation and guidelines and disposed of to a licensed facility. Tracking and disposal documentation is to be provided to the validation consultant.	Acceptable.

11.3 Auditor's Opinion

In the Auditors' opinion, the RAP generally meets the guidelines prepared or endorsed by NSW EPA in particular the NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd Edition)* and the NSW EPA (2020) *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land*.

The proposed remediation works are practical, technically feasible and appropriate for the contamination identified. If adequately implemented, the RAP should be able to ensure that the site is suitable for the proposed land use through assessment of data gaps, removal of USTs and any other identified point sources of contamination and removal of surficial ACM. Successful validation will be required to confirm this.

It is noted that the RAP refers to the requirement for an addendum RAP or RWP should the results of the additional site investigation indicate the requirement for a change in the remediation strategy or should groundwater remediation be required. The terms addendum RAP and RWP are used interchangeably in the RAP. The Auditor considers that should the remediation strategy change significantly and/or require notification to Council (for example if an EMP is required), then a revision of the RAP, either as an addendum to the RAP or as a RWP should be developed and approved by the Auditor.

12. CONTAMINATION MIGRATION POTENTIAL AND ASSESSMENT OF RISK

12.1 Auditor's opinion

Based on the results of the previous site investigations and the scope of the proposed remediation works, the Auditor considers that here is a low potential for significant migration of contamination off-site. There is a potential for migration of dust during the development works, however, dust generation will be controlled through implementation of a CEMP.

Based on the results of previous investigations and the CSM, potentially complete SPR linkages have been identified for contamination at the site and include:

- Exposure to construction workers during development through potential dermal contact with petroleum hydrocarbons in soil and shallow groundwater and inhalation of asbestos fibres.
- Exposure to future commercial site users and intrusive maintenance workers from inhalation of asbestos and inhalation of volatile contaminants in indoor air.

Based on the current data set, the potential for vapour intrusion into future site buildings is low, however, there are several data gaps relating to the extent of petroleum hydrocarbon impacts in shallow groundwater, particularly as future building design levels may intercept groundwater. Further assessment of the potential vapour intrusion risk is proposed through the data gap assessment outlined in the RAP and, if necessary, preparation of a HHRA.

The proposed additional investigation, remediation and validation works reviewed herein are considered adequate to address the identified risks to human health under a commercial land use scenario based on the CSM. Any change to the remediation strategy based on the findings of the additional assessment will require revision of the RAP which should be reviewed and approved by the Auditor prior to implementation.

13. COMPLIANCE WITH REGULATORY GUIDELINES AND DIRECTIONS

13.1 General

The Auditor has used guidelines currently made and approved by the EPA under section 105 of the NSW *Contaminated Land Management Act 1997*.

The investigation and preparation of the RAP were generally conducted in accordance with SEPP 55 Planning Guidelines and reported in accordance with the NSW EPA (2020) *Consultants Reporting on Contaminated Land: Contaminated Land Guidelines*.

13.2 Notification

JKE indicate that the remediation works are classified 'Category 2' remediation works not requiring consent and that prior notice of the remediation work is to be provided to Council in accordance with Clause 16 of SEPP55. A notice of completion of remediation work is to be given to council within 30 days of completion of the work. The notice of completion of remediation works must be in accordance with Clause 18 of SEPP 55.

13.3 Development Approvals

The site is currently the subject of a SSDA which has not yet been determined.

13.4 Duty to Report

Consideration has been given to the requirements of the EPA (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*. JKE considered in the ASI that, based on the findings of the investigation, there was no requirement to notify the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997. Based on the findings of this Audit, the Auditor agrees that the site is not required to be notified under the Duty to Report requirements.

13.5 Licenses

Excavation and removal of the UST and removal of ACM is to be conducted by appropriately licensed contractors. Any soils disposed of off-site are to be disposed of to a waste facility licensed to accept the waste.

13.6 Conflict of Interest

The Auditor has considered the potential for a conflict of interest in accordance with the requirements of Section 3.2.3 of the NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd Edition)*.

The Auditor considers that there are no conflicts of interest, given that:

1. The Auditor is not related to a person by whom any part of the land is owned or occupied.
2. The Auditor does not have a pecuniary interest in any part of the land or any activity carried out on any part of the land.
3. The Auditor has not reviewed any aspect of work carried out by, or a report written by, the site auditor or a person to whom the site auditor is related.

14. CONCLUSIONS AND RECOMMENDATIONS

The site investigations and preparation of the RAP were generally conducted in accordance with SEPP 55 Planning Guidelines and reported in accordance with the NSW EPA (2020) *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land*.

JKE conclude in the RAP that "*The remediation methods outlined in the RAP are assessed to be sustainable, economically viable, commensurate with the level of risk posed by the contaminants and technically achievable to implement concurrently with the proposed development works. On this basis, JKE are of the opinion that the site can be made suitable for the proposed development provided this RAP (and any addendums or revisions) and any requirements under a RWP are implemented should a RWP be prepared.*"

In the Auditors opinion, the nature and extent of contamination has been sufficiently determined for remediation planning purposes, noting data gaps can be adequately addressed under the RAP framework. The Auditor considers the proposed remediation works are practical, technically feasible and appropriate for the contamination identified. If adequately implemented, the RAP should be able to ensure that the site is suitable for the proposed land use through closure of data gaps, removal of USTs and any other identified point sources of contamination and removal of surficial ACM. Successful validation will be required to confirm this.

Based on the information presented in the EIS and JKE reports, and observations made on site, and following the Decision-making process for assessing urban redevelopment sites in NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd Edition)*, the Auditor concludes that the site can be made suitable for the purposes of 'commercial/industrial' site use if remediated in accordance with the following RAP:

- 'Report to Fabcot Pty Ltd on Remediation Action Plan, Proposed Distribution Centre Development at 250 Victoria Street, Wetherill Park, NSW' dated 30 March 2021, JKE

Subject to compliance with the following conditions:

1. The data gap investigation is to be completed following building demolition and removal of hardstand and prior to commencement of bulk earthworks.
2. Should the results of the data gap investigation and/or a human health risk assessment indicate the requirement for a change in the remediation strategy, a revision to the RAP (either as an addendum to the RAP or as a RWP) will be required to be developed and approved by a NSW EPA Accredited Site Auditor.
3. Validation of the remediation works is required to be documented in a final site validation report prepared by a qualified environmental consultant confirming that the works have been undertaken in accordance with the RAP and certifying the suitability of the site for the proposed development.
4. Preparation of an EMP for the management of any contamination remaining on site following redevelopment that presents a risk to human health or the environment.
5. Preparation of a Section A Site Audit Statement by a NSW EPA Accredited Site Auditor reviewing the above information and confirming the suitability of the site for the intended use.

15. OTHER RELEVANT INFORMATION

This Audit was conducted on the behalf of Fabcot Pty Ltd for the purpose of assessing the suitability and appropriateness of a remedial action plan (RAP), i.e. a "Site Audit" as defined in Section 4 (definition of a 'site audit' (b)(v)) of the CLM Act.

This summary report may not be suitable for other uses. EIS and JKE included limitations in their reports. The Audit must also be subject to those limitations. The Auditor has prepared this document in good faith but is unable to provide certification outside of areas over which the Auditor had some control or is reasonably able to check.

The Auditor has relied on the documents referenced in Section 1 of the Site Audit Report in preparing the Auditors' opinion. If the Auditor is unable to rely on any of those documents, the conclusions of the audit could change.

It is not possible in a Site Audit Report to present all data which could be of interest to all readers of this report. Readers are referred to the referenced reports for further data. Users of this document should satisfy themselves concerning its application to, and where necessary seek expert advice in respect to, their situation.

APPENDIX A
ATTACHMENTS

Attachment 1: Site Locality
Attachment 2: Site Layout
Attachment 3: Cut and Fill Development Plan
Attachment 4: Sample Location Plan
Attachment 5: Data Gap Investigation Proposed Sample Location Plan

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

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

Title: **SITE LOCATION PLAN**

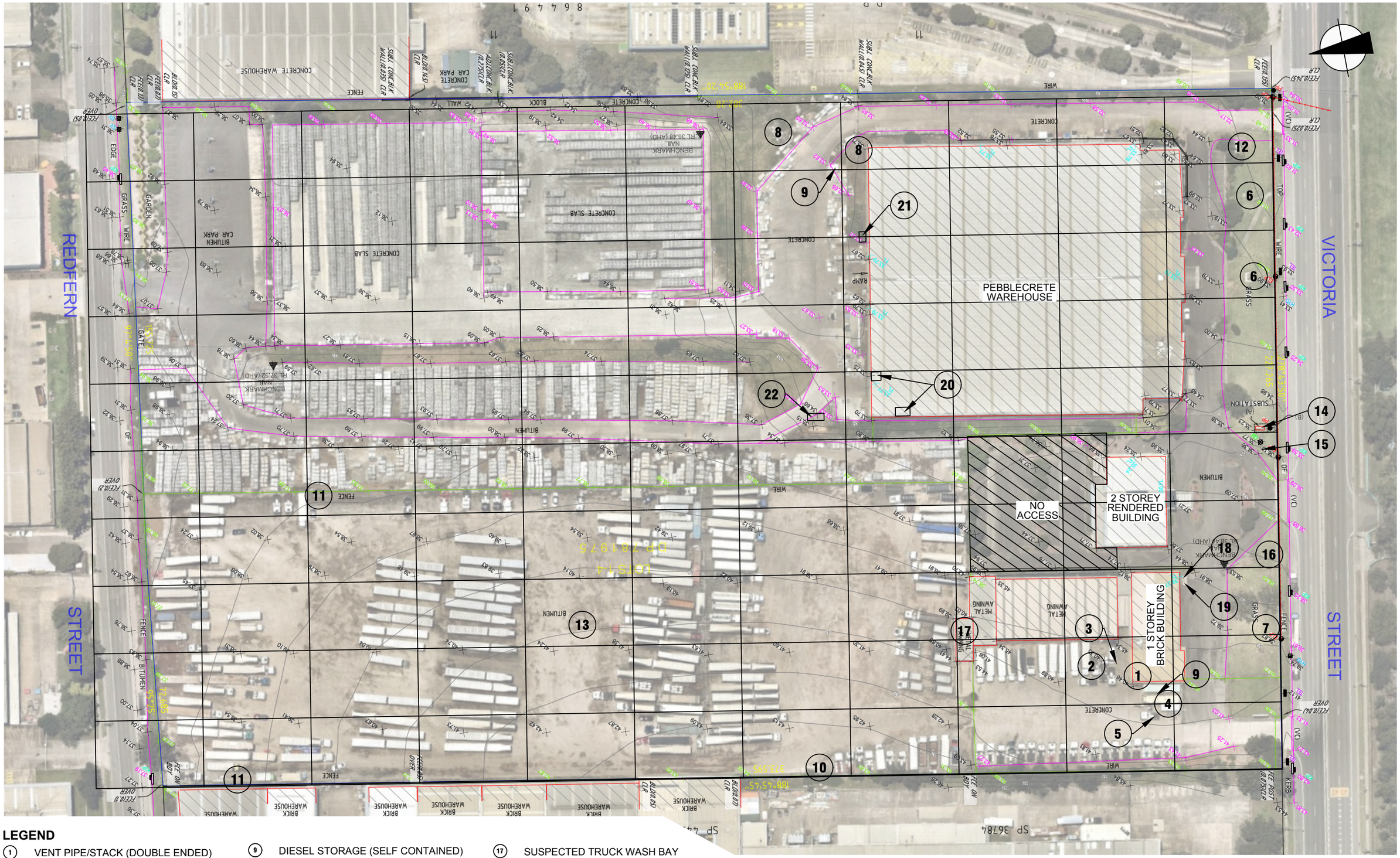
Location: 250 VICTORIA STREET
WETHERILL PARK, NSW

Project No: E31888BR

Figure No: 1

JKEnvironments

PLOT DATE: 26/02/2021 2:24:11 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\31000'S\E31888KD WETHERILL PARK\CAD\E31888BRE31888BR.DWG



LEGEND

1. VENT PIPE/STACK (DOUBLE ENDED)
2. 10,000L UST (PETROL)
3. FEED LINES
4. SHIPPING CONTAINERS
5. FORMER BOWSER PLINTH
6. FORMER SIGNAGE/LIGHTING
7. SUSPECTED FCF
8. STOCKPILE OF DEBRIS
9. DIESEL STORAGE (SELF CONTAINED)
10. HYDRANT
11. IBC
12. SOIL STOCKPILE
13. CONCRETE SLAB SEGMENTS
14. SUBSTATION KIOSK
15. GAS MANIFOLD
16. WATER HYDRANT/MAINS
17. SUSPECTED TRUCK WASH BAY
18. 500L KEROSENE AST (FORMER)
19. 500L DIESEL AST (FORMER)
20. 250L EACH, PETROL CABINETS (FORMER)
21. LPG CYLINDER STORAGE (FORMER)
22. 2,200L LPG TANK AST (FORMER)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 12 24 36 48 60

SCALE 1:1200 @A3 METRES

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

Title: **SITE FEATURES PLAN**

Location: 250 VICTORIA STREET WETHERILL PARK, NSW

Report No: E31888BR

Figure No: 2

JKEnvironments

PLOT DATE: 23/03/2021 2:21:11 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\31000'S\E31888KD WETHERILL PARK\CAD\E31888BR\E31888BR.DWG

PROPOSED PAD 1
BEL RL 33.20

PROPOSED PAD 2
BEL RL 41.30

PROPOSED PAD 3
BEL RL 33.70

PROPOSED PAD 4
BEL RL 37.30

NOMINAL STOCKPILE LOCATION
T.B.C ON SITE

CUT/FILL PLAN
SCALE 1:500

DEPTH RANGE				
	No.	FROM DEPTH	TO DEPTH	COLOUR
CUT	1	-8.000	-7.000	
	2	-7.000	-6.000	
	3	-6.000	-5.000	
	4	-5.000	-4.000	
	5	-4.000	-3.000	
	6	-3.000	-2.000	
	7	-2.000	-1.000	
	8	-1.000	0.000	
FILL	9	0.000	1.000	
	10	1.000	2.000	
	11	2.000	3.000	
	12	3.000	4.000	
	13	4.000	5.000	
	14	5.000	6.000	
	15	6.000	7.000	
	16	7.000	8.000	
	17	8.000	9.000	

LEVELS NOTE:

LEVELS SHOWN TO BE ±500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO MINOR VARIATIONS TO SUIT DETAILED DESIGN.

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY TITLED 50469 002DT REV A DATED 21/05/19.

- 50.00 – EXISTING CONTOUR (1.0m INTERVAL)
- 50.00 – B.E.L. CONTOUR (MAJOR 1.0m)
- 50.10 – B.E.L. CONTOUR (MINOR 0.25m)
- 50.00 – B.E.L. SPOT LEVEL

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR INFORMATION

ISSUED FOR INFORMATION	14.07.20	A
AMENDMENTS	DATE	ISSUE

AMENDMENTS	DATE	ISSUE

ARCHITECT watson young

CLIENT Woolworths the fresh food people

PROJECT
EARLY WORKS DA
250 - 266 VICTORIA STREET
WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	MdW	JULY '20	XC	B1	AS SHOWN	C013738.01-EW31

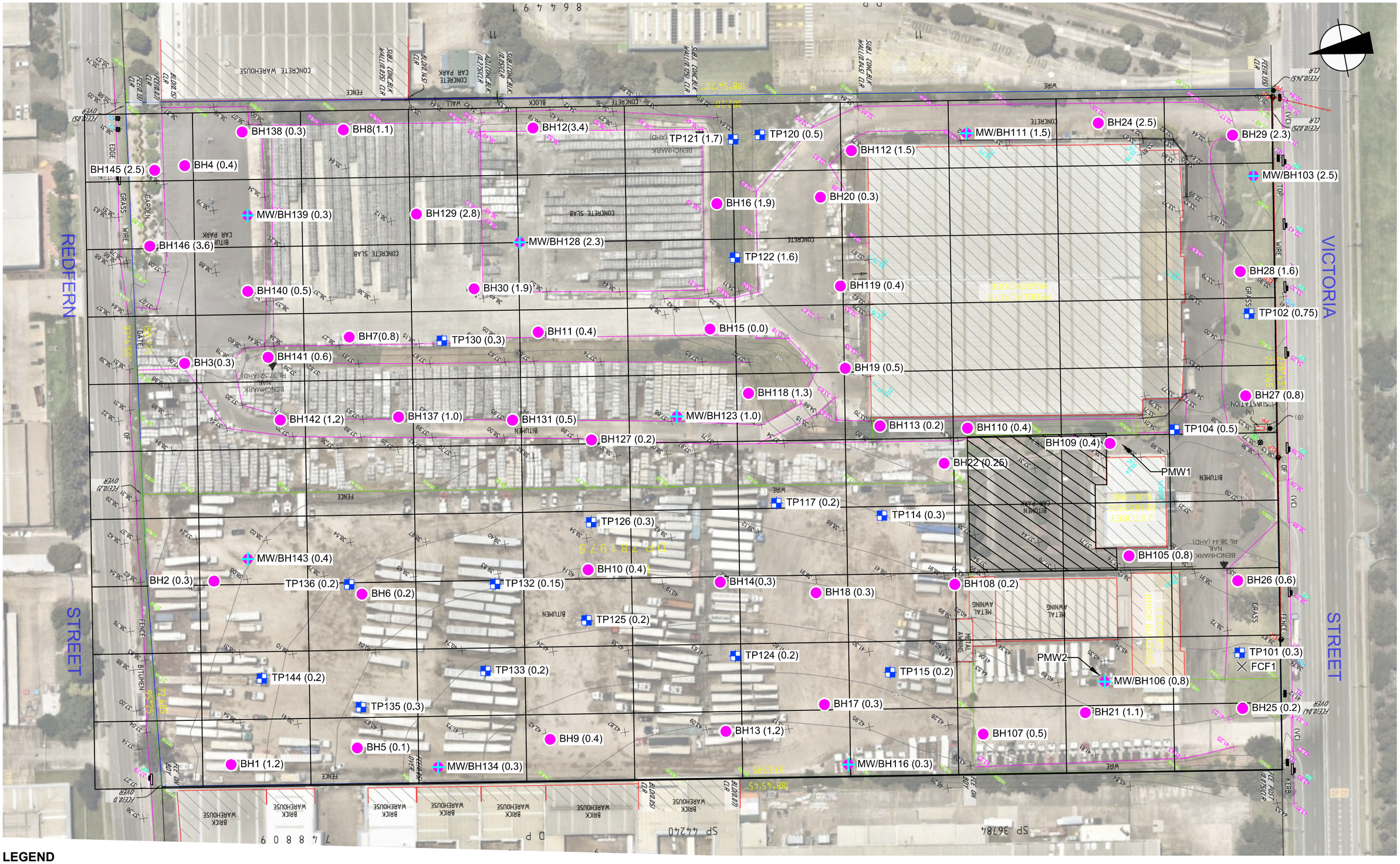
Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 695 449
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3721
email: mail@costinroe.com.au

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
CUT/FILL PLAN

DRAWING No C013738.01-EW31 ISSUE A



LEGEND

— — — —	APPROXIMATE SITE BOUNDARY
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
TP(Fill Depth)	TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
PMW	PREVIOUS MONITORING WELL LOCATION
FCF(Surface)	FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 12 24 36 48 60

SCALE 1:1200 @A3 METRES

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

Title: **SAMPLE LOCATION PLAN**

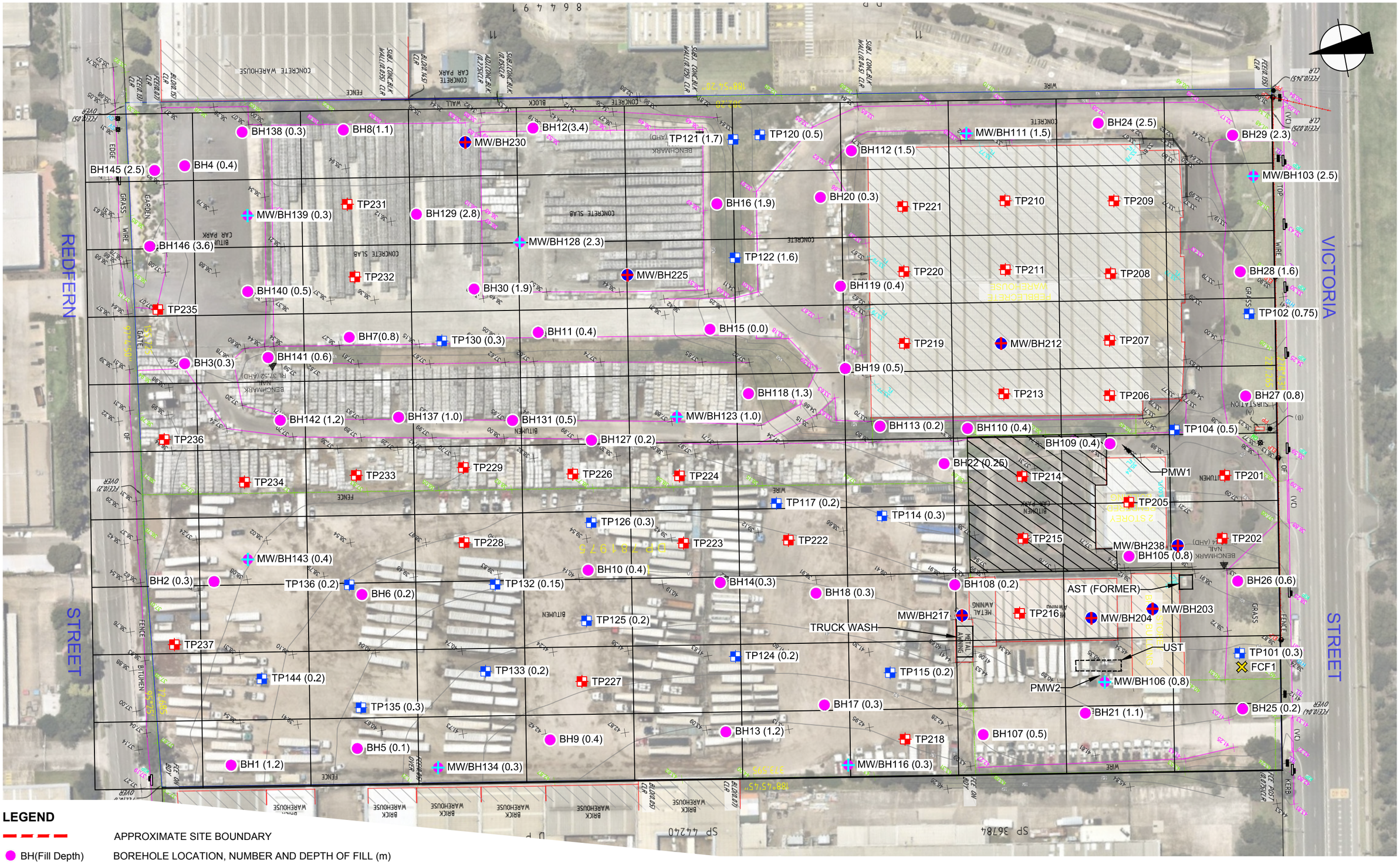
Location: 250 VICTORIA STREET WETHERILL PARK, NSW

Report No: E31888BR

Figure No: 3

JKEnvironments

PLOT DATE: 26/02/2021 1:44:07 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\31000'S\E31888KD WETHERILL PARK\CAD\E31888BR\E31888BR.DWG



LEGEND

— — — —	APPROXIMATE SITE BOUNDARY
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
TP(Fill Depth)	TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
PMW	PREVIOUS MONITORING WELL LOCATION
FCF(Surface)	FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)
TP	PROPOSED TEST PIT LOCATION AND NUMBER
BH/MW212	PROPOSED BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION AND NUMBER

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 12 24 36 48 60

SCALE 1:1200 @A3 METRES

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

Title: **PROPOSED DATA GAP SAMPLE LOCATION PLAN**

Location: 250 VICTORIA STREET WETHERILL PARK, NSW

Report No: E31888BR

Figure No: 6

JKEnvironments

PLOT DATE: 30/03/2021 1:01:43 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\31000'S\E31888KD WETHERILL PARK\CAD\E31888BR\E31888BR.DWG

APPENDIX B
SITE AUDIT STATEMENT

NSW Site Auditor Scheme

Site Audit Statement

A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the *Contaminated Land Management Act 1997* on 12 October 2017.

For information about completing this form, go to Part IV.

Part I: Site audit identification

Site audit statement no. LW-012

This site audit is a:

☐ statutory audit

☒ non-statutory audit

within the meaning of the *Contaminated Land Management Act 1997*.

Site auditor details

(As accredited under the *Contaminated Land Management Act 1997*)

Name	Louise Walkden
Company	Ramboll Australia Pty Ltd
Address	Level 3, 100 Pacific Highway, North Sydney
	Postcode 2060
Phone	02 9954 8100
Email	lwalkden@ramboll.com

Site details

Address: 250 Victoria Street, Wetherill Park, NSW

Postcode: 2164

Property description

(Attach a separate list if several properties are included in the site audit.)

Lots 1 to 4 in DP 781975

Local government area: Fairfield City Council

Area of site (include units, e.g. hectares): approximately 8.5 ha

Current zoning: IN1 General Industrial

Regulation and notification

To the best of my knowledge:

☐ **the site is** the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985,* as follows: (provide the no. if applicable)

- ☐ Declaration no.
- ☐ Order no.
- ☐ Proposal no.
- ☐ Notice no.

☒ **the site is not** the subject of a declaration, order, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

To the best of my knowledge:

☐ the site **has** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*

☒ the site **has not** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*.

Site audit commissioned by

Name: Thomas Stock

Company: Fabcot Pty Ltd

Address: 1 Woolworths Way, Bella Vista, NSW

Postcode: 2153

Phone: 0404 077 930

Email: tstock@woolworths.com.au

Contact details for contact person (if different from above)

Name: N/A

Phone:

Email:

Nature of statutory requirements (not applicable for non-statutory audits)

☐ Requirements under the *Contaminated Land Management Act* 1997 (e.g. management order; please specify, including date of issue)

☐ Requirements imposed by an environmental planning instrument (please specify, including date of issue)

☐ Development consent requirements under the *Environmental Planning and Assessment Act 1979* (please specify consent authority and date of issue)

☐ Requirements under other legislation (please specify, including date of issue)

Purpose of site audit

☐ **A1** To determine land use suitability

Intended uses of the land:

OR

☐ **A2** To determine land use suitability subject to compliance with either an active or passive environmental management plan

Intended uses of the land:

OR

(Tick all that apply)

☒ **B1** To determine the nature and extent of contamination

☒ **B2** To determine the appropriateness of:

- ☐ an investigation plan
- ☒ a remediation plan
- ☐ a management plan

☐ **B3** To determine the appropriateness of a **site testing plan** to determine if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*

☐ **B4** To determine the compliance with an approved:

- ☐ **voluntary management proposal** or
- ☐ **management order** under the *Contaminated Land Management Act 1997*

☒ **B5** To determine if the land can be made suitable for a particular use (or uses) if the site is remediated or managed in accordance with a specified plan.

Intended uses of the land: Commercial/Industrial

Information sources for site audit

Consultancies which conducted the site investigations and/or remediation:

Environmental Investigation Services Pty Ltd (EIS)

JK Environments Pty Ltd (JKE) (formerly EIS)

Titles of reports reviewed:

- 'Report to Fabcot Pty Ltd on Preliminary Stage 2 Environmental Site Assessment for Due Diligance, Proposed Highbay Distribution Warehouse at 250 Victoria Street, Wetherill Park, NSW' 18 October 2018, EIS
- Report to Fabcot Pty Ltd on Additional Site Investigation, Proposed Distribution Centre Development at 250 Victoria Street, Wetherill Park, NSW' 23 March 2021, JKE

- ‘Report to Fabcot Pty Ltd on Acid Sulfate Soil Assessment, Proposed Distribution Centre Development at 250 Victoria Street, Wetherill Park, NSW’ 16 March 2021, JKE
- ‘Report to Fabcot Pty Ltd on Remediation Action Plan, Proposed Distribution Centre Development at 250 Victoria Street, Wetherill Park, NSW’ 30 March 2021, JKE

Other information reviewed, including previous site audit reports and statements relating to the site:

Site audit report details

Title	Site Audit Report – Remediation Action Plan, 250 Victoria Street, Wetherill Park, NSW	
Report no.	LW-012 (Ramboll Ref: 318001137)	13 April 2021

Part II: Auditor's findings

Please complete either Section A1, Section A2 or Section B, not more than one section. (Strike out the irrelevant sections.)

- Use **Section A1** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **without the implementation** of an environmental management plan.
- Use **Section A2** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **with the implementation** of an active or passive environmental management plan.
- Use **Section B** where the audit is to determine:
    - (B1) the nature and extent of contamination, and/or
    - (B2) the appropriateness of an investigation, remediation or management plan[1], and/or
    - (B3) the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or
    - (B4) whether the terms of the approved voluntary management proposal or management order have been complied with, and/or
    - (B5) whether the site can be made suitable for a specified land use (or uses) if the site is remediated or managed in accordance with the implementation of a specified plan.

[1] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

Section A1

I certify that, in my opinion:

The **site is suitable** for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

☐ Residential, including substantial vegetable garden and poultry

☐ Residential, including substantial vegetable garden, excluding poultry

☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry

☐ Day care centre, preschool, primary school

☐ Residential with minimal opportunity for soil access, including units

☐ Secondary school

☐ Park, recreational open space, playing field

☐ Commercial/industrial

☐ Other (please specify):

~~OR~~

☐ I certify that, in my opinion, the **site is not suitable** for any use due to the risk of harm from contamination.

Overall comments:

Section A2

I certify that, in my opinion:

Subject to compliance with the **attached** environmental management plan[2] (EMP), the site is suitable for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

☐ Residential, including substantial vegetable garden and poultry

☐ Residential, including substantial vegetable garden, excluding poultry

☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry

☐ Day care centre, preschool, primary school

☐ Residential with minimal opportunity for soil access, including units

☐ Secondary school

☐ Park, recreational open space, playing field

☐ Commercial/industrial

☐ Other (please specify):

_____

EMP details

Title: _____

Author: _____

Date: _____ No. of pages: _____

EMP summary

This EMP (attached) is required to be implemented to address residual contamination on the site.

The EMP: (Tick appropriate box and strike out the other option.)

☐ requires operation and/or maintenance of **active** control systems[3]

☐ requires maintenance of **passive** control systems only[3].

[2] Refer to Part IV for an explanation of an environmental management plan.
[3] Refer to Part IV for definitions of active and passive control systems.

Purpose of the EMP:

Description of the nature of the residual contamination:

Summary of the actions required by the EMP:

How the EMP can reasonably be made to be legally enforceable:

How there will be appropriate public notification:

Overall comments:

Section B

Purpose of the plan[4] which is the subject of this audit:

Remediation Action Plan for remediation of the site to make it suitable for for commercial/industrial site use

I certify that, in my opinion:

(B1)

☒ The nature and extent of the contamination **has** been appropriately determined

☐ ~~The nature and extent of the contamination **has not** been appropriately determined~~

AND/OR (B2)

☒ The ~~investigation~~, remediation ~~or management~~ plan **is** appropriate for the purpose stated above

☐ ~~The investigation, remediation or management plan **is not** appropriate for the purpose stated above~~

~~AND/OR (B3)~~

☐ ~~The site testing plan:~~

- ☐ ~~**is** appropriate to determine~~
- ☐ ~~**is not** appropriate to determine~~

~~if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*~~

~~AND/OR (B4)~~

☐ ~~The terms of the approved voluntary management proposal* or management order** (strike out as appropriate):~~

- ☐ ~~**have** been complied with~~
- ☐ ~~**have not** been complied with.~~

~~*voluntary management proposal no.~~

~~**management order no.~~

AND/OR (B5)

☒ The site **can be made suitable** for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

- ☐ ~~Residential, including substantial vegetable garden and poultry~~
- ☐ ~~Residential, including substantial vegetable garden, excluding poultry~~
- ☐ ~~Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~

[4] For simplicity, this statement uses the term ‘plan’ to refer to both plans and reports.

~~☐ Day care centre, preschool, primary school~~

~~☐ Residential with minimal opportunity for soil access, including units~~

~~☐ Secondary school~~

~~☐ Park, recreational open space, playing field~~

☒ Commercial/industrial

~~☐ Other (please specify):~~

IF the site is remediated/~~managed*~~ in accordance with the following plan (**attached**):

*Strike out as appropriate

Plan title: 'Report to Fabcot Pty Ltd on Remediation Action Plan, Proposed Distribution Centre Development at 250 Victoria Street, Wetherill Park'

Plan author: JK Environments Pty Ltd

Plan date: 30 March 2021 No. of pages: 226

SUBJECT to compliance with the following condition(s):

1. The data gap investigation is to be completed following building demolition and removal of hardstand and prior to commencement of bulk earthworks.
2. Should the results of the data gap investigation and/or a human health risk assessment indicate the requirement for a significant change in the remediation strategy, a revision or addendum to the RAP will be required to be developed and approved by a NSW EPA Accredited Site Auditor.
3. Validation of the remediation works is required to be documented in a final site validation report prepared by a qualified environmental consultant confirming that the works have been undertaken in accordance with the RAP and certifying the suitability of the site for the proposed development.
4. Preparation of an Environmental Management Plan (EMP) for the management of any contamination remaining on site following redevelopment that presents a risk to human health or the environment.
5. Preparation of a Section A Site Audit Statement by a NSW EPA Accredited Site Auditor reviewing the above information and confirming the suitability of the site for the intended use.

Overall comments:

The site has historically been used for industrial purposes, including storage and distribution of vehicles and manufacturing of paper products (tissue). Previous site uses with the most significant potential to cause contamination include storage and use of fuels and chemicals in above and underground storage tanks and filling of land.

Fabcot Pty Ltd propose to develop the site for use as a warehouse and distribution facility. The proposed development includes major earthworks (cut/fill) over most of the site to achieve the required development levels.

Investigations completed by EIS/JKE identified a fragment of bonded asbestos containing material (ACM) at the site surface and underground storage tanks (USTs) that required removal and validation. JKE also identified data gaps with relation to soil conditions in currently inaccessible portions of the site and the requirement for additional groundwater investigation to determine appropriate management measures (if any) to mitigate any potential vapour intrusion risk. In the Auditor's opinion the nature and extent of the contamination has been appropriately determined for remediation planning purposes, noting data gaps can be adequately addressed under the RAP framework.

A remediation action plan (RAP) was prepared to address the identified contamination and data gaps, and the potential for unidentified sources of contamination to be encountered during the development. In the Auditor's opinion, the proposed remediation works are practical, technically feasible and appropriate for the contamination identified.

If adequately implemented, the RAP should be able to ensure that the site is suitable for the proposed land use through closure of data gaps, removal of USTs, and any other identified point sources of contamination, and removal of surficial ACM. Successful validation will be required to confirm this.

Part III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority (EPA) under the *Contaminated Land Management Act 1997.*

Accreditation no. 1903

I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997,* and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Signed: 

Date: 13 April 2021

Part IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

How to complete this form

Part I

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

Part II

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remediation plan or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use or uses of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A1 or Section A2 or Section B of Part II, **not** more than one section.

Section A1

In Section A1 the auditor may conclude that the land is *suitable* for a specified use or uses OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further investigation or remediation or management of the site was needed to render the site fit for the specified use(s). **Conditions must not be** imposed on a Section A1 site audit statement. Auditors may include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

Section A2

In Section A2 the auditor may conclude that the land is *suitable* for a specified use(s) subject to a condition for implementation of an environmental management plan (EMP).

Environmental management plan

Within the context of contaminated sites management, an EMP (sometimes also called a 'site management plan') means a plan which addresses the integration of environmental mitigation and monitoring measures for soil, groundwater and/or hazardous ground gases throughout an existing or proposed land use. An EMP succinctly describes the nature and location of contamination remaining on site and states what the objectives of the plan are, how contaminants will be managed, who will be responsible for the plan's implementation and over what time frame actions specified in the plan will take place.

By certifying that the site is suitable subject to implementation of an EMP, an auditor declares that, at the time of completion of the site audit, there was sufficient information satisfying guidelines made or approved under the *Contaminated Land Management Act 1997*

(CLM Act) to determine that implementation of the EMP was feasible and would enable the specified use(s) of the site and no further investigation or remediation of the site was needed to render the site fit for the specified use(s).

Implementation of an EMP is required to ensure the site remains suitable for the specified use(s). The plan should be legally enforceable: for example, a requirement of a notice under the CLM Act or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of *the Environmental Planning and Assessment Act 1979*.

Active or passive control systems

Auditors must specify whether the EMP requires operation and/or maintenance of active control systems or requires maintenance of passive control systems only. Active management systems usually incorporate mechanical components and/or require monitoring and, because of this, regular maintenance and inspection are necessary. Most active management systems are applied at sites where if the systems are not implemented an unacceptable risk may occur. Passive management systems usually require minimal management and maintenance and do not usually incorporate mechanical components.

Auditor's comments

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

Section B

In Section B the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or whether the terms of an approved voluntary management proposal or management order made under the CLM Act have been complied with, and/or whether the site can be made suitable for a specified land use or uses if the site is remediated or managed in accordance with the implementation of a specified plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement. The condition must not specify an individual auditor, only that further audits are required.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

Part III

In **Part III** the auditor certifies their standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to

- the **NSW Environment Protection Authority**:
  nswauditors@epa.nsw.gov.au or as specified by the EPA

  AND
- the **local council** for the land which is the subject of the audit.

REPORT TO

WOOLWORTHS GROUP LIMITED

ON

REMEDIATION ACTION PLAN

FOR

PROPOSED DISTRIBUTION CENTRE DEVELOPMENT

AT

250 VICTORIA STREET, WETHERILL PARK, NSW

Date: 30 March 2021

Ref: E31888BRrptRev1-RAP

JKEnvironments

www.jkenvironments.com.au

T: +61 2 9888 5000

JK Environments Pty Ltd

ABN 90 633 911 403

Report prepared by:

Craig Ridley
Senior Environmental Scientist

Report reviewed by:

Vittal Boggaram
Principal Associate | Environmental Scientist

For and on behalf of
JKE
PO BOX 976
NORTH RYDE BC NSW 1670

DOCUMENT REVISION RECORD

Report Reference	Report Status	Report Date
E31888BRrpt3-RAP	Draft Report	8 March 2021
E31888BRrpt3-RAP	Final Report	23 March 2021
E31888BRrpt3Rev1-RAP	Revision 1	30 March 2021

Executive Summary

Woolworths Group Limited ('the client') commissioned JK Environments (JKE) to prepare a Remediation Action Plan (RAP) for the proposed distribution centre development at 250 Victoria Street, Wetherill Park, NSW. For the purpose of this RAP, 'the site' includes Lots 1 to 4 in DP 781975 as shown on Figures 1 and 2 in Appendix A.

Previous investigation at the site have identified fibre cement fragment (FCF) containing asbestos (ACM) at the site surface and groundwater impacted by mid fraction (TRH F2) hydrocarbons. At least one underground Storage Tank (UST) was also previously in use around the 1980-1990s and it is believed the UST/s remains beneath the pavement in the south-western section of the site. A summary of previous investigations and site information is included in Section 2.

This RAP has been prepared to support the lodgement of a State Significant Development Application (SSDA) and address Standard Secretary Environmental Assessment Requirements (SEARs). The remediation and validation will be audited by Louise Walkden (Ramboll Australia Pty Ltd), NSW EPA accredited site auditor with regards to the Contaminated Land Management (CLM) Act (1997).

The proposed development includes the construction of a high-bay distribution centre over the majority of the site, and includes major earthworks (cut/fill) over the majority of the site to achieve the development levels. The early works DA plans indicate four building pads will be constructed, with bulk excavation levels ranging from RL 33.20m Australian Heights Datum (AHD) to 41.30mAHD. The maximum cut is anticipated to be approximately 7m below ground level (BGL). Selected plans issued to JKE are attached in the appendices.

The goal of the remediation is to render the site suitable for the proposed development from a contamination viewpoint. The primary aim of the remediation at the site is to reduce the human health and environmental risks posed by site contamination to an acceptable level.

The primary objectives of the RAP are to:

- Summarise previous investigations and historical contamination data;
- Provide a methodology to remediate and validate the site;
- Provide a contingency plan and unexpected finds protocol for the remediation works; and
- Outline site management procedures to be implemented during remediation.

For the purpose of the RAP, the extent of remediation includes the entire site and to the cadastral boundaries. The vertical extent for remediation of any identified surficial ACM will be to a depth of approximately 100mm below existing surface levels. The extent of remediation (horizontal and vertical) associated with the UST/s and associated infrastructure will be guided by the validation. It is anticipated that the tank pit could be approximately 2-3m deep. The extent for remediation of groundwater (if required) will be based on the findings of the data gap investigation outlined in Section 4.

Based on the information available, hydrocarbons (specifically total recoverable hydrocarbons - TRH F2) within the groundwater may present a risk to future site users and may require long-term management. Additional investigation is required to delineate the impacts and better assess the risks posed by TRH F2 in groundwater in order to determine the appropriate management measures (if required). Following the additional investigation, a Human Health Risk Assessment (HHRA) should be undertaken to assess the potential for health risks associated with the TRH. In the event the HHRA indicates there is a risk to human health, long-term management of groundwater may be required.

The preferred option for remediation of surficial ACM is on-site treatment (Option 1 of Table 5-1). The preferred option for remediation of the UST, UST backfill and associated infrastructure is removal of the material to an appropriate facility (Option 4). The preferred option for groundwater is considered to be long-term management and monitoring natural attenuation (MNA) (Option 3 of Table 5-2). This will be addressed in the amended RAP based on the results of the HHRA.

The preferred options for remediation are considered to be appropriate on the basis that:

- The ACM impacts identified have been limited to the site surface (localised to a small area);
- Considerable earthworks (cut/fill) are required to achieve design levels;
- The potential hydrocarbon impacts associated with the UST and associated infrastructure are anticipated to be localised;

- The UST and associated infrastructure will be removed from site, removing a potential source of hydrocarbon impacts; and
- The strategies are sustainable, economically viable, commensurate with the level of risk posed by the contaminants and technically achievable to implement concurrently with the proposed development works.

The RAP includes a methodology to remediate and validate the site. A contingency plan for remediation is included together with site management procedures and an unexpected find protocol (UFP) to be implemented during remediation.

A site validation report is to be prepared on completion of remediation activities and submitted to the determining authority (SSDA/planner/council) to demonstrate that the site is suitable for the proposed development.

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

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Attachments

Abbreviations

Ambient Background Concentrations	**ABC**
Asphaltic Concrete	**AC**
Australian Business Number	**ABN**
Added Contaminant Limits	**ACL**
Asbestos Containing Material	**ACM**
Additional Site Investigation	**ASI**
Australian Company Number	**CAN**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Below Ground Level	**BGL**
Benzo(a)pyrene Toxicity Equivalent Factor	**BaP TEQ**
Bureau of Meteorology	**BOM**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Cation Exchange Capacity	**CEC**
Construction Environment Management Plan	**CEMP**
Contaminated Land Management	**CLM**
Chain of Custody	**COC**
Conceptual Site Model	**CSM**
Development Application	**DA**
Data Quality Indicator	**DQI**
Data Quality Objective	**DQO**
Ecological Investigation Level	**EIL**
Environmental Investigation Services	**EIS**
Ecological Screening Level	**ESL**
Environmental Management Plan	**EMP**
Excavated Natural Material	**ENM**
Environment Protection Authority	**EPA**
Environment Protection Licence	**EPL**
Environmental Site Assessment	**ESA**
Ecological Screening Level	**ESL**
Excavated Natural Material	**ENM**
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Health Investigation Level	**HILs**
Health Screening Level	**HSL**
Intermediate Bulk Container	**IBC**
JK Environments	**JKE**
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Long Term EMP	**LTEMP**
Map Grid of Australia	**MGA**
Monitored Natural Attenuation	**MNA**
National Association of Testing Authorities	**NATA**
National Environmental Protection Measure	**NEPM**
Organochlorine Pesticides	**OCP**
Organophosphate Pesticides	**OPP**
Polycyclic Aromatic Hydrocarbons	**PAH**
Polychlorinated Biphenyls	**PCBs**
Photo-ionisation Detector	**PID**
Protection of the Environment Operations	**POEO**
Practical Quantitation Limit	**PQL**
Quality Assurance	**QA**
Quality Control	**QC**
Remediation Action Plan	**RAP**
Relative Percentage Difference	**RPD**

Remediation Works Plan	**RWP**
Site Assessment Criteria	**SAC**
Sampling, Analysis and Quality Plan	**SAQP**
Secretary Environmental Assessment Requirements	**SEARs**
Source, Pathway, Receptor	**SPR**
State Significant Development Application	**SSDA**
Standing Water Level	**SWL**
Total Recoverable Hydrocarbons	**TRH**
Upper Confidence Limit	**UCL**
United States Environmental Protection Agency	**USEPA**
Underground Storage Tank	**UST**
Validation Assessment Criteria	**VAC**
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**
Percentage	**%**
Percentage weight for weight	**%w/w**

1 INTRODUCTION

Woolworths Group Limited ('the client') commissioned JK Environments (JKE) to prepare a Remediation Action Plan (RAP) for the proposed distribution centre development at 250 Victoria Street, Wetherill Park, NSW. For the purpose of this RAP, 'the site' includes Lots 1 to 4 in DP 781975 as shown on Figures 1 and 2 in Appendix A.

Previous investigation at the site have identified Asbestos Containing Material (ACM) at the site surface localised to a small section, and groundwater impacted by mid fraction total recoverable hydrocarbons (TRH) F2 hydrocarbons. At least one underground Storage Tank (UST) was also previously in use around the 1980-1990s and it is believed the UST/s remains beneath the pavement in the south-western section of the site. A summary of previous investigations and site information is included in Section 2.

The RAP has been prepared to support the lodgement of a State Significant Development Application (SSDA) and address Standard Secretary Environmental Assessment Requirements (SEARs). The remediation and validation will be audited by Louise Walkden (Ramboll Australia Pty Ltd), NSW EPA accredited site auditor with regards to the Contaminated Land Management (CLM) Act (1997)[1].

1.1 Proposed Development Details

The proposed development includes the construction of a high-bay distribution centre over the majority of the site, and includes major earthworks (cut/fill) over the majority of the site to achieve the development levels. The early works DA plans indicate four building pads will be constructed, with bulk excavation levels ranging from RL 33.20m Australian Heights Datum (AHD) to 41.30mAHD. The maximum cut is anticipated to be approximately 7m below ground level (BGL). Selected plans issued to JKE are attached in the appendices.

1.2 Remediation Goal, Aims and Objectives

The goal of the remediation is to render the site suitable for the proposed development from a contamination viewpoint. The primary aim of the remediation at the site is to reduce the human health and environmental risks posed by site contamination to an acceptable level.

The primary objectives of the RAP are to:

- Summarise previous investigations and historical contamination data;
- Provide a methodology to remediate and validate the site;
- Provide a contingency plan and unexpected finds protocol for the remediation works; and
- Outline site management procedures to be implemented during remediation.

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

1.3 Scope of Work

The RAP was prepared generally in accordance with a JKE proposal (Ref: EP53311B) of 7 January 2021 and written acceptance from the client of 1 March 2021. The scope of work included consultation with the client, a review of previous reports and Conceptual Site Model (CSM), and preparation of the RAP.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)[2], State Environmental Planning Policy No.55 – Remediation of Land (1998)[3] and other guidelines made under or with regards to the CLM Act 1997, including the Consultants Reporting on Contaminated Land (2020)[4] guidelines.

A list of reference documents/guidelines is included in the appendices.

[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] *State Environmental Planning Policy No. 55 – Remediation of Land 1998* (NSW) (referred to as SEPP55)

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

2 SITE INFORMATION

2.1 Background / Summary of Site History

2.1.1 Preliminary Stage 2 Environmental Site Assessment (ESA)

A preliminary Stage 2 ESA was previously undertaken by EIS in 2018[5]. The ESA included a review of site information, site history information, a site inspection and soil sampling from 29 locations throughout the site and two samples from a soil stockpile. The sampling locations are shown on the attached Figure 2 in Appendix A.

The site history information identified that the site was used for agricultural purposes until Circa c1977, after which the site was developed for industrial land uses. Between 1977 and 2010, the site was used for vehicle storage (holding yard) and for vehicle repairs. From 2010, the site history information indicated the site was used for the distribution of paper products, such as tissues.

The site inspection identified the following sources of site contamination/areas of environmental concern (AEC):

- Historical filling of the site;
- Historical agricultural use;
- Industrial/commercial activities on-site; and
- Hazardous building materials in current and former structures.

The ESA identified copper concentrations in one location and nickel concentrations in two locations above the ecological site assessment criteria (SAC). The report considered the elevated concentrations did not pose a risk to environmental receptors, as the exceedances were located in areas sealed with pavements, the site history did not indicate any ecological or environmental sensitive receptors at the site, and the site was proposed for on-going commercial/industrial land uses with limited landscaping. All results were below the respective human health SAC.

The ESA concluded that the site was suitable for on-going commercial/industrial land use. To assess the site suitability for future development, the report recommended the following:

- Undertake a data gap assessment, including additional soil and groundwater sampling and analysis; and
- Prepare a RAP if the data gap assessment identified any contamination issues.

2.1.2 Additional Site Investigation (ASI)

An Additional Site Investigation (ASI) was previously undertaken by JKE in 2021[6]. The ASI included a review of site information and site history information (including the EIS 2018 report and SafeWork NSW records),

[5] Environmental Investigation Services, (2018). *Report to Fabcot Pty Ltd on Preliminary Stage 2 Environmental Site Assessment for Due Diligence, Proposed Highbay Distribution Warehouse at 250 Victoria Street, Wetherill Park, NSW.* (Ref: E31888KD) (referred to as EIS 2018)

[6] JK Environments, (2021). *Report to Woolworths Group Limited on Additional Site Investigation for Proposed Distribution Centre Development at 2510 Victoria Street, Wetherill Park, NSW.* (Ref: E31888BRrpt2) (Referred to as ASI)

soil sampling from 46 locations throughout the site and groundwater sampling from eight monitoring wells installed on-site.

The review of SafeWork NSW records for the storage of dangerous goods at the site identified several licences/applications for the storage of dangerous goods between 1978 and 1998. The records indicated that above-ground storage tanks (ASTs) and cabinets were used on-site for the storage of petroleum, liquified petroleum gas (LPG), kerosene and diesel products. The ASTs and cabinets ranged in capacity from 126kg to 2,200L. USTs were also identified and were used to store unleaded and leaded (super) petroleum, and ranged in capacity from 10,000L to 28,000L. The ASTs and USTs were considered to represent potential sources of site contamination. The approximate locations of these tanks are shown on Figure 2 attached in the appendices.

The site history information and the site inspection confirmed the potential sources of site contamination/AEC identified in the EIS 2018 report, and identified several current and former automotive services and spray-painting businesses up-gradient of the site which may represent potential off-site sources of contamination.

The ASI identified asbestos within a FCF located at the surface within the south-west of the site. The FCF was visually assessed to be in good condition and was considered to be bonded (i.e. non-friable asbestos) ACM. The ACM was removed from site (for analysis) and no other FCF were visibly observed at the site surface. However, JKE noted that localised impacts may be present. Due to the bonded condition of the ACM and the lack of other identified FCF, JKE considered it unlikely that a complete SPR linkage to asbestos fibres existed in the current site configuration and use. Though the risk of exposure to asbestos in ground was considered low, interim measures were recommended so that potential risks remained low.

The site inspection identified at least one UST within the south-west of the site. The UST/s, associated infrastructure and surrounding area were considered to potential sources of hydrocarbon contamination however, JKE noted that the borehole observations and soil analysis results indicated the potential for extensive impacts from the UST/s was relatively low. Localised impacts may be encountered in the vicinity of the UST and associated infrastructure.

The ASI identified heavy metals in groundwater at concentrations above the ecological SAC. The concentrations of heavy metals within the soils indicated the site was unlikely to be the source of the heavy metals within the groundwater. JKE were of the opinion that the concentrations were likely a regional issue and noted that the concentrations did not pose a risk to on-site receptors in the context of the proposed development.

The ASI identified TRH F2 in groundwater collected from MW106 and MW128 at concentrations above the human health SAC. The concentrations in MW106 were considered likely associated with the UST/s in the vicinity, whilst the concentrations in MW128 were considered likely associated with a localised spill/release of fuel. Given the shallow groundwater depth in comparison to the elevations of the proposed development, JKE were of the opinion that a complete SPR linkage may exist.

The ASI identified benzene in groundwater collected from MW123 at concentrations above the human health (recreational) SAC. Traces of light fraction (TRH F1) and toluene were also detected at concentrations below the SAC. These concentrations indicated a localised spill of petroleum product may have occurred in the vicinity of MW123 which could have seeped into the sub-surface. The risk posed by the benzene concentrations related to incidental contact/recreational use. Considering the proposed development does not include the use of groundwater as a resource and the provided plans indicated the groundwater would be at least 4m below the bulk excavation level in this area, JKE were of the opinion that a complete SPR linkage did not exist.

The ASI concluded that further investigation was required to assess the impact and risk of hydrocarbon concentrations to inform the CSM and the RAP.

Based on the findings of the investigation, the report concluded that the site could be made suitable for the proposed development, subject to the implementation of the following recommendations:

- A suitably qualified/licensed contractor should carry out an 'emu pick' to remove all visible FCF from the areas of the site with exposed soils. A surface clearance certificate should be issued by a Licensed Asbestos Assessor;
- Prepare a RAP to address the contamination issues identified at the site.
- Undertake a data gap investigation; and
- Undertake a validation assessment documenting the remediation works.

2.2 Site Identification

Table 2-1: Site Identification

Current Site Owner:	Woolworths Group Limited
Site Address:	250 Victoria Street, Wetherill Park, NSW
Lot & Deposited Plan:	Lots 1 to 4 DP781975
Current Land Use:	Trucking Yard, Masonry Distribution and Carpark
Proposed Land Use:	Distribution Warehouse
Local Government Authority:	Fairfield City Council
Current Zoning:	IN1 – General Industrial
Site Area (m^2) (approx.):	85,000
RL (AHD in m) (approx.):	31-43
Geographical Location (decimal degrees) (approx. south-eastern corner boundary):	Latitude: -33.84795 Longitude: 151.917456
Site Location Plan:	Figure 1

Site Features Plan:	Figure 2

2.3 Site Condition and Surrounding Environment

2.3.1 Location and Regional Setting

The site is located in a predominantly commercial and industrial area of Wetherill Park and is bound by Redfern Street to the North and Victoria Street to the South. The site is located approximately 590m to the south-west of Prospect Creek. A concrete lined stormwater drain is located approximately 30m to the east of the site.

2.3.2 Topography

The regional topography is characterised by an east/north-east facing hillside that falls towards Prospect Creek. The site is located towards the middle of the hillside and has a gentle slope towards the east at approximately 5° and to the south at approximately 1°. Parts of the site appear to have been levelled to account for the slope and accommodate the existing development.

2.3.3 Site Inspection

A walkover inspection of the site was undertaken by JKE on 5 February 2021 as a component of the ASI. At the time of the inspection, the site was predominantly used as a distribution centre for masonry products and for heavy vehicle parking/storage. Four buildings (1-2 storey buildings and a large warehouse) were located within the south of the site. The buildings appeared in fair to good condition.

Asphaltic concrete (AC) and concrete pavements were located in the eastern and southern portions of the site. The AC pavements appeared in fair to poor condition, with visible evidence of cracking and heaving. The concrete pavements appeared in fair condition with minor cracking. The western section of the site was predominantly unsealed.

The site was fenced on all sides with chain-link fencing and upper barbed-wire strands. The site was accessible via two driveways in the south (from Victoria Street) and one driveway in the north-east (from Redfern Street). Steel gates were located at each driveway to secure the site. No visible evidence of erosion was observed at the site perimeters. A depression trending in a north/south orientation was observed within the centre of the site.

Several intermediate bulk containers (IBCs) were located in the north-west of the site. The labels on the IBCs indicated they were previously used for the storage of cleaning solvents and acids, though the current contents were not confirmed. Another IBC was located centrally within the north the site. The IBC appeared to contain waste oil products. The protective cage of the IBC was damaged and residue was visible near the outlet. Several drums (244L) were stored within the south-west of the site. The drums appeared to contain oils and lubricants associated with vehicle/machinery maintenance. Several discarded vehicle components (brake shoes, drums and rotors) were located to the north of the drums. Two suspected USTs were located

in the south-west of the site. A 35,500L diesel tank was located within a shipping container to the south of the suspected UST/s, and was self-contained. A second containerised diesel tank (approx. 10,000L capacity) was located within the east of the site, north of the warehouse building.

Two stockpiles of debris (steel, plastic, timber pallets) were located to the north-east of the warehouse, and one stockpile of soil was located to the south-east of the warehouse.

An electrical substation kiosk, gas manifold and water mains manifold were located within the south of the site. A hydrant standpipe was located within the south-west of the site, adjacent to the western boundary. Local water, lighting and power connections were observed throughout the site, with services conduits above and below ground. The lighting within the north-eastern carpark appeared solar powered, though may have included electrical back-up connections.

Sensitive environments such as wetlands, ponds, creeks or extensive areas of natural vegetation were not identified on site or in the immediate surrounds. Exotic grasses and trees were located in the east and south of the site, and within formed gardens in the north-east. The vegetation within the north-east and south appeared in good condition (though overgrown in sections) based on a cursory inspection. The vegetation adjacent to the eastern boundary appeared in poor condition, with patches of bare earth. The condition of the vegetation appeared related to a lack of upkeep/maintenance rather than an indication of significant contamination.

2.3.4 Surrounding Land Use

During the JKE inspection, the following land uses were identified in the immediate surrounds:

- North – Redfern Street, with hardware design and manufacturing warehouse (Alchin Long Group) and tissue manufacturing (ABC Tissue Products);
- South – Victoria Street, with Wetherill Park TAFE and residential beyond;
- East – Heavy vehicle inspection station (RMS); and
- West – light industrial complexes. Tenancies include: automotive repairers and tuners; auto electricians; joinery and ceiling panel manufacturer; pool maintenance contractors; information technology (IT) offices; and a horticultural chemical wholesaler (Colin Campbell (Chemicals) Pty Ltd).

2.3.5 Climatic Conditions

Weather conditions were fine and sunny at the time of the JKE ASI inspection, though had been overcast and rainy in the days prior. Key meteorological data for Prospect Reservoir weather station available on the Bureau of Meteorology (BOM)[7] indicated that:

- The highest mean rainfall occurs in February, with a total of 99.2mm;
- The lowest mean rainfall occurs in September, with a total of 46.4mm; and
- In the week lead up to the JKE soil sampling event, a total of 24mm of rainfall was recorded. Approximately 50mm of rainfall was recorded during the soil sampling event; and

[7] http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=136&p_display_type=dailyDataFile&p_startYear=&p_c=&p_stn_num=067019 visited on 2 March 2021

- In the week lead up to the JKE groundwater sampling event, a total of 32mm of rainfall was recorded. Approximately 26mm of rainfall was recorded during the groundwater sampling event.

2.4 Summary of Geology, Soils and Hydrogeology

2.4.1 Regional Geology

Regional geological information included in the ASI report indicated that the site is underlain by Bringelly Shale of the Wianamatta Group, which typically consists of shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.

Soil landscape information presented in the ASI report indicated the site is located within the Blacktown soils landscape, which is typically of residual origins.

A summary of the subsurface conditions encountered in the ASI boreholes is provided below:

Table 2-2: ASI Summary - Subsurface Conditions

Profile	Description
Pavement	AC and concrete pavements were encountered at the surface in BH105, BH106, BH107, BH108, BH111, BH116, BH119, BH128, BH129, BH138, BH139 and BH140 and ranged in thickness from 30mm to 500mm.
Fill	Fill was encountered at the surface or beneath the pavement in all boreholes and extended to depths of approximately 0.2m below ground level (BGL) (BH108) to 3.6mBGL (BH146). BH141 was terminated in the fill at a maximum depth of approximately 0.6mBGL. The fill typically comprised silty clay, silty gravelly sand and silty sand with inclusions of igneous, ironstone, sandstone and siltstone gravel, ash, slag, root fibres and building rubble (asphalt, bricks, concrete, glass, ceramic, tile and plastic fragments). Organic odours were encountered in BH106 at a depth of approximately 0.5mBGL to 0.8mBGL.
Natural Soil	Residual silty clay was encountered beneath the fill in BH/TP101 to BH/TP118, BH/TP120 to BH/TP140 and BH/TP142 to BH/TP144 at depths of approximately 0.2mBGL (BH108) to 2.8mBGL (BH129).
Bedrock	Siltstone/sandstone bedrock was encountered beneath the fill in BH119, BH145 and BH146, and beneath the residual silty clay in BH103, BH106, BH107, BH109, BH111, BH116, BH118, BH123, TP124, TP126, BH128, BH134, BH138 to BH140 and BH143 at depths of approximately 0.4mBGL (BH119) to 3.6mBGL (BH146).
Groundwater	Groundwater seepage was encountered in the boreholes BH106, BH107, TP125, BH129 and BH146 at depths of approximately 1.0mBGL to 4.0mBGL. The remaining boreholes and test pits were dry during and a short time after completion of drilling and/or excavation.

2.4.2 Acid Sulfate Soil (ASS) Risk and Planning

Acid sulfate soil (ASS) information presented in the ASI report indicated the site is not located in an ASS risk area. The site is classed as having extremely low probability of ASS occurrence.

2.4.3 Hydrogeology

hydrogeological information included in the ASI report indicated that:

- The subsurface conditions at the site are expected to consist of relatively low permeability (residual) soils overlying shallow bedrock. The potential for viable groundwater abstraction and use of groundwater under these conditions is considered to be low. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur. Use of groundwater is not proposed as part of the development; and
- The site location and regional topography indicates that surface water flows through the site are expected to eventuate in the on-site stormwater drainage system, which likely discharge into the stormwater culvert to the east of the site, which in turn flows into Prospect Creek. This water body is considered to be the closest potential ecological receptor.

A summary of the field screening results during groundwater sampling in the ASI is presented in the following table:

Table 2-3: ASI Summary - Groundwater Field Screening

Aspect	Details
Groundwater Depth & Flow	SWLs measured in the monitoring wells installed at the site ranged from 1.5mBGL to 5.13mBGL. Groundwater RLs calculated on these measurements ranged from approximately 39mAHD to 27.4mAHD. The groundwater RLs indicate that excavation for the proposed basement may intercept groundwater. PMW2 recorded a SWL of 0.32mBGL. PMW2 was considered a component of the UST infrastructure (likely a cathodic protection measure) and may not be indicative of the groundwater conditions.
Groundwater Field Parameters	Field measurements recorded during sampling were as follows: - pH ranged from 5.90 to 7.17; - EC ranged from 6628µS/cm to 23668µS/cm; - Eh ranged from -23.1mV to -52.4mV; and - DO ranged from 0.3ppm to 5.7ppm.
Light non-aqueous phase liquids (LNAPL) e.g. petroleum hydrocarbons	Phase separated product (i.e. LNAPL) were not detected using the interphase probe during groundwater sampling. No sheens were visibly observed using dedicated bailers.

2.4.4 Receiving Water Bodies

Information included in the ASI report indicated that the receiving water bodies included the stormwater channel to the east of the site, and Prospect Creek. Surface water would be anticipated to eventuate in stormwater drainage and discharge into the stormwater channel to the east of site, and ultimately discharge to Prospect Creek. Some surface water infiltration would be expected within the unsealed areas, particularly within the west of the site.

3 SITE CHARACTERISATION AND CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the previous investigation data, site history and site information presented in Section 2.

3.1 Summary of Contamination (Site Characterisation)

A copy of the soil and groundwater data summary tables and borehole logs from the ASI report is included in Appendix B. The SAC exceedances are shown on Figure 4 in Appendix A. The following exceedances of the SAC were reported during the ASI:

- Non-friable asbestos in the form of ACM in the south-west of the site;
- Concentrations of heavy metals (arsenic, cadmium, chromium, copper, mercury, nickel, and/or zinc) above the ecological SAC in MW103, MW106, MW111, MW123, MW128, MW134, MW139 and MW143;
- Concentrations of TRH F2 of 100µg/L and 85µg/L above the human health-based (vapour-intrusion) SAC in groundwater samples collected from MW106 and MW128; and
- A concentration of benzene (66µg/L) above the human health-based (recreational) SAC in a groundwater sample collected from MW123.

The UST/s and associated infrastructure were also considered potential source/s of localised hydrocarbon impacts.

3.2 CSM

The table below includes a review of the CSM which has been used to design the remediation strategy. The CSM will require further review if additional site data becomes available.

Table 3-1: CSM

Contaminant source(s) and contaminants of concern	Contamination sources: historically imported fill soil; USTs and associated infrastructure; hazardous building materials; historic industrial/commercial uses; and off-site commercial/industrial land uses. Contaminants of concern for the RAP include: Heavy metals, asbestos in the form of surficial ACM; TRHs; BTEX; and PAHs. The Contamination of Potential Concern (CoPC) for the ASI included: heavy metals, BTEX, TRH, PAHs, organochlorine pesticides (OCPs), organophosphorus pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos. The ASI included analysis of groundwater samples for PFAS.
Affected media	Soil (ACM in fill surface), groundwater and soil vapour. The groundwater has been impacted by heavy metals and TRH/BTEX. The heavy metal concentrations were considered likely a regional/background issue. The source of the TRH/BTEX was considered likely to be associated with the UST and indicative of a potential groundwater plume which requires further investigation.

	This is discussed in Section 4. Based on the results of the data gap investigation, consideration should be made for assessing soil vapour conditions.
Receptor identification	Human receptors include construction workers, intrusive maintenance workers and future site users. The risk of TRH/BTEX to future site users (including accumulating in confined spaces and buildings) should be addressed in relation to the proposed development. The ASI did not identify any contaminant of potential concern that pose a risk to ecological receptors at the site. Considering the proposal development will include major earthworks at the site, following development the risks posed by soil contamination to ecological receptors is considered to be low.
Exposure pathways and mechanisms	Potential exposure pathways relevant to the human receptors include primary contact and inhalation of asbestos dust and TRH/BTEX vapours. The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Exposure during future site use could occur via direct contact with asbestos (dust and incidental contact) during development works, inhalation, accumulation of soil vapour within confined spaces such as buildings. The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into confined spaces including service trenches; • Vapour intrusion into buildings; and • Contact (dermal or inhalation) exposure to ACM.
Evaluation of data gaps	The ASI recommended further investigation to assess soil conditions beneath existing structures and additional groundwater monitoring as outlined in Section 4.

3.3 Remediation Extent

For the purpose of the RAP, the extent of remediation includes the entire site and to the cadastral boundaries. The vertical extent for remediation of any identified surficial ACM will be to a depth of approximately 100mm below existing surface levels.

The extent of remediation (horizontal and vertical) associated with the USTs and associated infrastructure will be guided by the validation. It is anticipated that the tank pits could be approximately 2-3m deep.

The groundwater has been impacted by petroleum hydrocarbons. The ASI identified that the groundwater at the site generally flow towards the east/south-east. The ASI did not identify the source of the hydrocarbon however, the data indicated a local plume of contamination may exist beneath the site. It is noted that groundwater monitoring wells were not installed in down-gradient locations in the vicinity of the UST and truck wash bay due to access constraints. Additional investigation of groundwater conditions is required in order to confirm the extent of groundwater impacted by petroleum hydrocarbons and assist to identify the potential source/s.

Following the additional investigation, a Human Health Risk Assessment (HHRA) should be undertaken to assess the potential for health risks associated with the TRH. In the event the HHRA indicates there is a risk to human health, long-term management of groundwater may be required. Potential options for the remediation and management of groundwater are discussed in Section 5.2.

4 DATA GAP INVESTIGATION

The ASI recommended further investigation to close out the identified data gaps. The data gaps included that soil sampling was undertaken at approximately 75% of the minimum sampling density recommended in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)[8] and that the sampling plan did not target potential point sources of contamination on-site. It is noted that the additional investigation should also delineate the extent of groundwater impacts detected. The data gap investigation is to be undertaken post-demolition of the existing structures.

To close out the data gaps, the investigation will include soil sampling from 38 sampling locations (as a minimum) as nominated on Figure 6 in Appendix A (BH/TP201 to BH/TP238 inclusive). Monitoring wells are also to be installed in six of the locations (BH203, BH204, BH212, BH225, BH230 and BH238). Additional samples are also to be collected if any visual or olfactory indicators of potential contamination are observed in other areas. The rationale for the selection of the locations is as follows:

- 201 to 202, 214 to 215, 218, 222 to 224, 226 to 229 and 231 to 237 – general site coverage;
- 203, 204 and 238 – down-gradient of the UST and former ASTs in the south-west of the site;
- 205 to 213, 216 and 219 to 221 – building footprints;
- 217 – down-gradient of truck wash bay; and
- 225 and 230 – down-gradient of potential hydrocarbon plume in groundwater.

Soil sampling is to be undertaken from test pits using an excavator (where possible). The use of a drill rig and/or hand tools may be necessary due to access in some areas (i.e. sloping ground). The monitoring well locations (BH203, BH212, BH225, BH230 and BH238) are to be drilled using a drill rig to a minimum depth of approximately 8mBGL considering the depth of earthworks and occurrence of groundwater. The wells are to be constructed as follows:

- 50mm diameter Class 18 PVC (machine slotted screen) is to be installed in the lower section of the well to intersect the groundwater;
- 50mm diameter Class 18 PVC casing is to be installed in the upper section of the well (screw-fixed);
- The rubber O-rings located within the screw-fixed joints (if present) are to be removed;
- A 2mm sand filter pack will be placed around the screen section for groundwater infiltration;
- A hydrated bentonite seal/plug is to be used on top of the sand pack to seal; and
- The well is to be finished with a concreted gatic cover, monument or similar to limit the inflow of surface water.

One soil sample per fill profile encountered (at each location) is to be analysed for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH/BTEX, PAHs, OCPs, OPPs and asbestos (500mL quantification sample). A bulk (10L) sample (to the extent achievable based on sample return) from each fill profile encountered (at each location) is to be screened in the field for the presence of ACM.

One sample of the natural profile is to be collected from each sampling location. A selection of the samples (approximately 10 to 14 samples) is to be analysed for heavy metals, TRH/BTEX and PAHs for waste classification purposes. The samples are to be selected based on the results of the fill soil analysis and field

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

observations. One groundwater sample per monitoring well (new and existing) are to be analysed for heavy metals, TRH/BTEX and PAHs. In the event that the existing groundwater monitoring wells cannot be located or are unserviceable (i.e. compromised, destroyed) after demolition works, replacement monitoring wells are to be installed in accordance with the above methodology within close proximity (i.e. 5m) from the existing wells. All monitoring wells are to be surveyed to determine the groundwater flow directions. QA/QC samples are to be obtained to meet the NEPM 2013 requirements (outlined in Section 7.3).

A record of any additional USTs and/or potential point source/s of contamination identified after demolition is to be maintained. After removal of the infrastructure/point source, the USTs and/or point source/s of contamination are to be assessed in accordance with the validation plan outlined in Section 7.1.

On completion of the data gap investigation, a stand-alone report should be prepared in accordance with the Consultants Reporting Guidelines. Based on the findings of the data gap investigation, a HHRA may be prepared to better assess the risks posed by the groundwater and outline specific remediation measures to be implemented during the proposed development in order to mitigate the risk posed to site receptors (if required). A stand-alone amended RAP is to be prepared to confirm the remedial approach in consideration of the data gap investigation and HHRA (if required).

5 REMEDIATION OPTIONS

5.1 Soil Remediation

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 Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009)[9] 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)[10] provides the following additional requirements to be taken into consideration:

- 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 and assesses a range of soil remediation options:

Table 5-1: Consideration of Soil Remediation Options

Option	Discussion	Assessment/Applicability
Option 1 **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,	Potentially applicable for the contaminants of concern associated with the USTs. However, treatment is unlikely to be viable on such a small scale

[9] Western Australian (WA) Department of Health (DoH), (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia. (referred to as WA DoH 2009)

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

Option	Discussion	Assessment/Applicability
	thermal desorption and physical removal of bonded ACM fragments. Depending on the treatment option, licences 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.	and would not be the preferred option due to the extent of earthworks proposed. Physical removal of bonded ACM fragments is technically feasible and economically viable. Due to the limited identified impacts, this is the preferred method for remediation of the bonded ACM.
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 feasible option for the treatment of ACM.
Option 3 **Consolidation and isolation of impacted soil by cap and containment**	This would include the consolidation of ACM-impacted and/or hydrocarbon impacted 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) will be required and will 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).	Technically feasible however given the likely small-scale of ACM-impacted and/or hydrocarbon impacted soil, this would not be the preferred option due to the ongoing liabilities associated with complying with the EMP.
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 (which may be significant) would apply in addition to transport costs.	This option is the most applicable for the remediation of the USTs/infrastructure as it: aligns with the construction work (i.e. bulk excavation is required in the vicinity of the UST); is technically feasible; and economically viable. Physical removal of bonded ACM is considered viable under this option.

Option	Discussion	Assessment/Applicability
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.	Not applicable given the extent of the proposed development.

5.2 Groundwater Remediation

The preferred order for the remediation and management of contaminated groundwater presented in the NSW EPA Contaminated Sites Guidelines for the Assessment and Management of Groundwater Contamination (2007)[11] is outlined below:

1. Clean-up so that the natural background water quality is restored;
2. Clean-up to protect the environmental, human and ecological health; and
3. Clean-up to the extent practicable.

The remediation options for consideration are outlined in the following table:

Table 5-2: Consideration of Groundwater Remediation Options

Option	Discussion	Assessment/Applicability
Option 1 In-Situ Treatment	In-situ treatment options may include: Bio-remediation: Addition of oxygen and nutrient compounds to accelerate the natural process of organic compound decay within the environment. Chemical Oxidation: Addition of chemical compounds to oxidise the hydrocarbons in groundwater into compounds that are less harmful to the environment. Air Sparging and Extraction: Air is forced through the contaminated groundwater system to volatilise organic compounds. The air is then extracted and captured for treatment leaving reduced contaminant concentrations within the sub-strata.	Bio-remediation and air sparging is feasible for the treatment of the hydrocarbon impacted water, as the data indicates the impacts are generally light to mid-fraction hydrocarbons, which would volatilise more readily. The set-up and on-going costs and licencing requirements would need further consideration to assess the viability of these options.

[11] NSW EPA, (2007). *Contaminated Sites Guidelines for the Assessment and Management of Groundwater Contamination.* (referred to as Groundwater Contamination Guidelines 2007)

Option	Discussion	Assessment/Applicability
Option 2 **Ex-Situ Treatment**	Ex-situ treatment options may include: Washing: Groundwater is stripped of contaminants via a leaching process, with the concentrated contaminated liquid product retained for disposal or additional treatment. Bioreactors: Groundwater is pumped into an above-ground tank and treated with inorganic nutrients. Oxygen is introduced into the tank by sparging. Hydrocarbons are broken down by naturally occurring bacteria. Off-site Treatment: Contaminated groundwater is transported to an approved/licensed treatment facility, treated to remove/stabilise the contaminants then returned to the subject site or transported to an alternative facility for disposal.	As above. The costs involved in transporting of contaminated groundwater off-site for treatment and/or disposal would be expensive and likely not viable for this project.
Option 3 **On-going Management & Monitoring**	Measures to manage groundwater contamination may include: • Notifying appropriate government agencies, owners of subsurface facilities and any other appropriate parties of the presence of groundwater contamination; • Plume containment; • Active or passive clean-up of contaminated groundwater; • Ongoing monitoring of natural attenuation; • Implementing management or contingency plans to reduce risks; and • Restricting groundwater use in and down-gradient of the contaminated plume.	This option would require the implementation of a legally enforceable long-term environmental management plan (LTEMP). The implementation of an LTEMP is technically feasible, sustainable, economically viable and commensurate with the risks posed by the contaminants in the context of the proposed development. This option would likely be the preferred remediation approach.

5.3 Rationale for the Preferred Option for Remediation

The preferred soil remediation approach is Option 1 which includes on-site treatment of ACM and Option 4 which includes excavation and off-site disposal of the UST and the associated infrastructure including any backfill and ACM identified in other parts of the site surface. The preferred groundwater remediation approach (if required) is likely to be Option 3 which includes on-going management and monitoring.

The preferred options for remediation are considered to be appropriate on the basis that:

- The ACM impacts identified have been limited to the site surface;
- The potential hydrocarbon impacts associated with the UST and associated infrastructure are anticipated to be localised;
- The UST and associated infrastructure will be removed from site, removing a potential source of hydrocarbon impacts; and

- The strategies are sustainable, economically viable, commensurate with the level of risk posed by the contaminants and technically achievable to implement concurrently with the proposed development works.

6 REMEDIATION DETAILS

6.1 Roles and Responsibilities

Table 6-1: Roles and Responsibilities

Role	Responsibility
Client / Developer	Woolworths Group Limited Contact: Thomas Stock The client/developer is required to appoint the project team for the remediation and must provide all investigation reports including this RAP to the project manager, remediation contractor, consent authority and any other relevant parties involved in the project.
Project Manager	To be appointed. 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).
Remediation Contractor	To be appointed. The remediation contractor is required to review all documents prepared for the project, apply for any relevant removal licences or permits and implement the remediation requirements outlined in this RAP. The remediation contractor may also be the construction contractor. The remediation contractor is required to collect all necessary documentation associated with the remediation activities and forward this documentation onto the client, project manager and validation consultant as they become available. The remediation contractor is required to advise the validation consultant at key points in the remediation and validation program, and implement various aspects of the validation plan assigned to them.
Validation Consultant	JKE – Subject to formal engagement Contact: Vittal Boggaram The validation consultant[12] provides consulting advice and validation services in relation to the remediation, and prepares the site validation report, and any other associated documentation such as the Asbestos Management Plan (AMP). The validation is required to review any deviation to this RAP or in the event of unexpected finds if and when encountered during the site work. It is recommended that the validation consultant has a Licensed Asbestos Assessor on staff. The validation consultant is required to liaise with the client, project manager and remediation contractor on all matters pertaining to the site contamination, remediation and validation, carry out the required site inspections during capping, and collect validation samples for imported materials.

[12] It is recommended that the consultant be a certified practitioner (specialising in site contamination), under one of the NSW EPA endorsed certification schemes

Role	Responsibility
Site Auditor	Louise Walkden (Ramboll Australia) The site auditor would review the information provided by the validation consultant, including (but not limited to) the site validation report. The auditor is to be engaged to review the RAP prior to commencement of the remediation. The developer, project manager and validation consultant are to consult with the auditor in the event of unexpected finds and/or deviations to the RAP.

6.2 Pre-commencement

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) should be reviewed by the project manager and remediation contractor, and appropriate steps are to be taken to ensure the adequate implementation of the plan.

6.3 Remediation and Associated Tasks

The following general sequence of works is anticipated:

- Preparation of Asbestos Management Plan (AMP) for the proposed development;
- Site establishment and demolition;
- **Hold Point** – A site inspection should be completed by the validation consultant on completion of demolition to identify any additional sources of contamination such as ACM, USTs etc. Any such areas identified should be targeted as part of the data gap investigation;
- Completion of the data gap investigation as outlined in Section 4;
- Completion of the HHRA for TRH/BTEX in groundwater, if required;
- Preparation of an amended RAP based on the data gap investigation and HHRA (if required);
- Remediation of ACM-impacted surficial areas;
- Decommissioning and removal of the USTs, backfill and associated infrastructure, followed by excavation and off-site disposal of soils associated with the tank pit and other impacted areas; and
- Remediation and/or management of contaminated groundwater.

Validation of the works would occur progressively throughout the remediation program.

Details in relation to the above are outlined in the following subsections:

6.3.1 Site Establishment and Demolition

The remediation contractor is to establish on site as required to facilitate the remediation. Consideration must be given to the work sequence and extent of remediation so that the site establishment (e.g. site sheds, fencing, access points etc) does not inhibit the remediation works.

Any hazardous building materials in the existing structures should be assessed prior to the commencement of demolition, demolished in accordance with the relevant codes and standards. A clearance certificate is to

be obtained by the demolition contractor following the removal of any hazardous materials. The concrete slabs should be inspected for potential ACM post-demolition by an Asbestos Assessor.

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.

6.3.2 Asbestos Management Plan (AMP)

An AMP should be prepared for the site by a licensed asbestos assessor and implemented for the site remediation and development works. The AMP should 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.

6.3.3 Remediation of ACM

The procedure for the remediation of ACM is outlined below:

Table 6-2: Remediation Details – ACM impacted areas

Step	Primary Role/ Responsibility	Procedure
1.	Remediation contractor	A surface clearance should be undertaken by a SafeWork NSW licensed asbestos assessor across the entirety of the site. The clearance should be undertaken following demolition but prior to removal of the slabs and commencement of earthworks. Any identified ACM should be identified, recovered, weighed and its source location noted. The ACM should then be disposed of to an appropriate NSW EPA licensed facility (i.e. licensed to accept asbestos waste).
2.	Remediation contractor	<u>Remediation of surficial ACM:</u> • Engage a Class A/B licensed asbestos removal contractor for the remediation works. Undertake raking of the top 100mm of fill soil via multi-directional raking. The raking should be undertaken with a manual or mechanical rake capable of probing to the remediation depth of 100mmBGL. Raking should turn over and disturb the soil identified by the asbestos assessor to be impacted by ACM; • Raking should occur in a north-south direction, then an east-west direction, on a 1m transect across the site. A minimum of three passes is required, with zero fragments of ACM encountered on the last pass;

Step	Primary Role/ Responsibility	Procedure
		• Raking in one direction (e.g. north-south) will be considered as one "pass" for the purpose of validation. Therefore, raking the impacted area along the north-south and east-west transects will be two passes; • During raking, any visible fragments of ACM should be picked and placed in a plastic bag. The bag should be sealed upon completion of remediation, "double-bagged" and placed in a nominated storage container; • The bagged ACM should be disposed of to an appropriate NSW EPA licensed waste facility (i.e. licensed to accept asbestos waste); • The removal of ACM should be completed in accordance with the Code of Practice; How to Manage and Control Asbestos in the Workplace (2019)[13]; and • All documents including landfill dockets should be retained and forwarded to the client and validation consultant for inclusion into the validation report.
3.	Validation consultant	• The raking and picking process will be documented and validated in accordance with Table 7-1; and • The impacted area treated by raking should be inspected and cleared by an asbestos assessor.

6.3.4 UST Remediation

The USTs and associated infrastructure (i.e. underground pipe work, vent pipes etc) are to be removed from the site in accordance with the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation (2019)[14], Guidelines for the Implementation of the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019 (2020)[15] and the Australian Standard for The Removal and Disposal of Underground Petroleum Storage Tanks (AS4976-2008)[16]. Reference is also to be made to the UPSS Technical Note: Decommissioning, Abandonment and Removal of UPSS (2010)[17] and the UPSS Technical Note: Site Validation Reporting (2010)[18].

It is noted that various guidelines are outdated and/or are currently being updated to reflect the UPSS Regulation 2019. The remediation is to occur in accordance with the current regulation and best practice guidelines available when the remediation commences.

[13] SafeWork NSW, (2019). *Code of Practice: How to Manage and Control Asbestos in the Workplace*

[14] *Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019* (NSW). (referred to as UPSS Regulation 2019)

[15] NSW EPA, (2020). *Guidelines for the Implementation of the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019.* (referred to as UPSS Guidelines 2020)

[16] Standards Australia, (2008). *The Removal and Disposal of Underground Petroleum Storage Tanks.* (referred to as AS4976-2008)

[17] NSW DECCW, (2010). *UPSS Technical Note: Decommissioning, Abandonment and Removal of UPSS*

[18] NSW DECCW, (2010). *UPSS Technical Note: Site Validation Reporting*

Table 6-3: Remediation – UST and Associated Infrastructure

Step	Primary Role/ Responsibility	Procedure
1.	Remediation contractor	Address Stability Issues and Underground Services: Geotechnical advice should be sought regarding the stability of the adjacent structures and/or adjacent areas prior to commencing remediation (as required). Stability issues should be addressed to the satisfaction of a suitably qualified geotechnical engineer. This may require the installation of temporary shoring. All underground services are to be appropriately disconnected or rerouted to facilitate the works.
2.	Remediation contractor (or their nominated sub-contractor) Validation consultant	Additional Groundwater Screening: A groundwater monitoring well should be installed as part of the data gap investigation in the vicinity of the UST to better assess the groundwater quality conditions. The groundwater should be sampled by the validation consultant and analysed for the contaminants of concern identified in the CSM in Section 3.2.
3.	Remediation contractor (or their nominated sub-contractor)	Initial Preparation: The pavement in the remediation area should be cut and removed with care using an excavator, or similar. An experienced contractor should be engaged for the removal of the UST. Liquid and/or sludge within the USTs and associated pipe work should be pumped out and disposed of lawfully by a licensed liquid waste operator.
4.	Remediation contractor (or their nominated sub-contractor) and validation consultant	Removal of the USTs/infrastructure, impacted soils, followed by validation: The UST and associated infrastructure is to be removed by an appropriately licensed contractor in accordance with AS4976-2008 and with regards to the Work Health and Safety Regulation (2017)[19]. Following removal, remediation of the area will be undertaken as follows: • The backfill soils (most likely to be sandy fill) surrounding the USTs should be excavated and stockpiled separately (all stockpiles should be placed on the adjacent hardstand with appropriate silt control). This material is to be validated by the validation consultant (for waste classification purposes) as outlined in Section 7.1; • Submit an application to dispose of the backfill soil (in accordance with the assigned waste classification) to a facility that is appropriately licensed to receive the waste, and obtain authorisation to dispose; • Load the backfill soil onto trucks and dispose in accordance with the assigned waste classification; • Depending on the contamination status of the backfill, excavation of additional material at the base and walls of the tank pits may be required. This should initially involve excavation of material to extend the pits (say 0.5m initially) in the direction of the suspected impact. The validation consultant should be present during the excavation to provide advice on the potential extent of contamination based on visual and olfactory indicators, and PID screening results; • Stockpile the excavated material separately (to the backfill that was initially excavated) and undertake a waste classification outlined above, then load the soil onto trucks and dispose in accordance with the assigned waste classification; • The validation consultant is to obtain validation samples from the walls and base of the excavation (see the Validation Plan in Section 7). Based on the findings of the ASI, groundwater may be encountered at the base of the remedial excavation;

[19] *Work Health and Safety Regulation 2017* (NSW). (Referred to as WHS regulation 2017)

Step	Primary Role/ Responsibility	Procedure
		• The groundwater seepage should be sampled and tested for contaminants (see Section 7). A liquid waste contractor should be engaged to pump out the seepage from the tank pit; and • Subject to successful validation, backfill or (preferably) isolate the remedial excavation. All documents including landfill disposal dockets, UST disposal/destruction dockets, liquid waste disposal etc. should be retained by the remediation 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.
5.	Validation consultant	Validation sampling of the tank pit, waste classification sampling of stockpiled backfill and any groundwater seepage as outlined in Section 7. Review of documentation issued by the remediation contractor and inclusion into validation report.

The detailed validation plan relevant to the above items is provided in Section 7.

6.4 Remediation of Contaminated Groundwater

The procedure for the remediation of contaminated groundwater is outlined below:

Table 6-4: Remediation – Contaminated Groundwater

Step	Primary Role/ Responsibility	Procedure
1.	Validation Consultant	<u>Identify the Extent of Contamination:</u> Additional testing of groundwater will be required in order to confirm the extent of groundwater contamination. The additional testing will be undertaken as part of the data gap investigation, as discussed in Section 4.
2.	Validation Consultant (and risk assessor, as required)	<u>Assessment of Remediation Options:</u> Based on the findings of the additional investigation, a HHRA may be prepared to better assess the risks posed by the contamination, and identify appropriate remediation options (if required). Potential remediation approaches are outlined in Section 5.2, however the data gap investigation and HHRA will refine the remediation approach. An amended RAP will be prepared to outline the remediation and/or management approach for contaminated groundwater.
3.	Remediation contractor (or their nominated sub-contractor)	<u>Implementation of the amended RAP:</u> The remediation contractor is responsible for completing the remediation in accordance with the conditions and requirements specified in the amended RAP.
4.	Validation consultant	Validation sampling of the groundwater, as outlined in the amended RAP. Review of documentation issued by the remediation contractor and inclusion into validation report. Preparation of a LTEMP for the management of groundwater if required.

6.5 Remediation Documentation

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

- Waste register (see below);
- Asbestos management documentation, including all relevant notifications and monitoring reports;
- Photographs of remediation works;
- Waste tracking documentation (where applicable);
- Survey information; and
- Imported materials documentation from suppliers, including any routine analysis reports, product specifications and dockets for imported materials.

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

6.5.1 Waste Register

All waste removed from the site is to be appropriately tracked and managed in accordance with the relevant regulations. The remediation contractor (and/or their nominated construction contractor) is to maintain adequate records and retain all documentation for waste disposal 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; and
- 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.

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

- The full name, address, Australian Company Number (ACN) or Australian Business Number (ABN) of the organisation and person(s) providing the waste classification;
- Location of the site where the waste was generated, including the source site address;
- History of the material and the processes and activities that have taken place to produce the waste;
- Potential contaminating activities that may have occurred at the site where the waste was generated;
- Description of the waste, including photographs, visible signs of contamination, such as discolouration, staining, odours, etc;
- Quantity of the waste;
- Number of samples collected and analysed;
- Sampling method including pattern, depth, locations, sampling devices, procedures, and photos of the sample locations and samples;
- Contaminants tested;
- Laboratory documentation – chain-of-custody (COC), sample receipt, laboratory report;

- All results regardless of whether they are not used in the classification process;
- Results of sample mean, sample standard deviation and the 95% upper confidence limit (UCL) where relevant;
- Brief summary of findings including discussion of results; and
- A clear statement of the classification of the waste as at the time of the report.

A soil volume analysis should be undertaken on completion of remediation and reconciled with the quantities shown on the soil disposal dockets. This information is to be reviewed by the validation consultant on completion of the works and an assessment of the quantities of soil disposed off-site (e.g. comparison with the estimated and actual volumes) is to be included in the validation report. A review of the disposal facility's licence issued under the Protection of the Environment Operations (POEO) Act (1997)[20] should also be undertaken to assess whether the facility is appropriately licensed to receive the waste.

6.5.2 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 (preferably 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). Legible dockets for imported materials are to be provided electronically so these can be reconciled with the register.

The above information is to be provided to the validation consultant for inclusion in the validation report. It is recommended that the register be set up at the beginning of the project and provided to the validation consultant regularly (say on a monthly or two-monthly basis) so the details can be checked and any rectification of the record keeping process can occur in a timely manner.

[20]NSW 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 or in the event of an unexpected find.

7.1 Validation Sampling and Documentation

The table below outlines the validation requirements for the site:

Table 7-1: Validation Requirements

Aspect	Sampling	Analysis	Observations and Documentation
Surficial ACM			
Surface ACM	Bulk sample (10L field screening) of one sample per 20m x 20m grid for ACM. Sampling will be confined to the ACM impacted areas identified by the asbestos assessor. The aim of the sampling is to demonstrate that the ACM has not impacted the underlying fill soil.	Bulk asbestos quantification in field i.e. sieving of 10L sample. Analysis of representative fill soil sample for asbestos quantification (500mL).	Field records to be maintained documenting the following: • Surface clearance inspection results showing impacted areas requiring raking; • The number of raked passes and the number of ACM fragments identified during each pass (clearly showing at least three passes were completed, and two consecutive passes, perpendicular to each other, occurred with no ACM encountered); • Presence/absence of ACM; and • Photographic log of remediation and clearances to be maintained. Disposal dockets to be retained and forwarded to validation consultant for inclusion in the validation report. Asbestos assessor surface clearance certificate/s (for ACM) to be provided following completion of raking.
UST, Associated Infrastructure and impacted Soils/Bedrock			
UST backfill	One sample per 25m^3, collected using hand equipment.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRHs, BTEX, PAHs and asbestos. TCLP testing may be required for waste classification.	Samples to be screened using photo-ionisation detection (PID) meter. Observations of staining and odour to be recorded. Photographs to be taken. Disposal dockets to be retained.

Aspect	Sampling	Analysis	Observations and Documentation
UST pit chase out spoil (if required)	One sample per 25m^3, collected using hand equipment.	As above. Other analytes to be considered based on remediation failures.	As above.
UST pit – excavation base UST pit – excavation walls	Minimum of two samples per UST to be collected using the excavator after removal of the tank. One sample per excavation wall and per vertical metre. Additional sampling is also to target obvious indicators of contamination and changes in soil profile.	Lead, TRH/BTEXN	Samples to be screened using PID. Observations of staining and odour to be recorded. Photographs to be taken.
Pipe trenches	One sample per 5m lineal, obtained from the base of the trench. Additional samples to target any areas of staining or odours.	As above.	As above.
UST Bowser	One sample from the base of the bowser. Additional samples to target any areas of staining or odours.	As above.	As above.
Groundwater			
Groundwater	To be determined based on the amended RAP.	To be determined based on the amended RAP.	To be determined based on the amended RAP.
Imported Materials – validation of imported materials is required for any materials imported onto the site during the remediation and to the point in time that the site validation report is prepared (e.g. general fill to raise the site levels or reinstate remedial excavations, imported materials to create piling platform, gravels for site preparation, material used for capping layers etc).			
Imported VENM backfill (if required)	Minimum of three samples per source	Heavy metals (as above), TRHs, BTEX, PAHs, OCPs, PCBs and asbestos (500ml). Additional analysis may be required depending on the site history	**Remediation contractor** to supply existing VENM documentation/report (report to be prepared in accordance with the NSW EPA waste classification reporting requirements).

Aspect	Sampling	Analysis	Observations and Documentation
Imported garden mix/topsoil and mulches	Minimum of three samples per source	of the source property. Analysis for CoPC outlined above.	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** and samples obtained for analysis. Material to be inspected during sampling 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 or Excavated Natural Material (ENM)	Minimum of three samples per source/material type. Additional testing may be required for ENM to meet the specification within the ENM Order.	Heavy metals (as above), TRHs, BTEX, PAHs, OCPs, PCBs and asbestos (500ml quantification). Additional testing may be required for ENM (e.g. foreign materials, pH and electrical conductivity) depending on available documentation.	**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 Environment Protection Licence (EPL). 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. 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

Aspect	Sampling	Analysis	Observations and Documentation
			- 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 VENM (i.e. natural quarried product). 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.

7.2 Validation Assessment Criteria and Data Assessment

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

Table 7-2: VAC

Validation Aspect	VAC
Soil validation	<u>Areas Impacted by ACM:</u> • Asbestos/ACM absent in the top 100mm of fill following at least three passes, with the final two passes (perpendicular to each other) demonstrating no ACM; • ACM visually absent in 10L screened soil validation sample; and • ACM not observed during surface clearance. <u>UST/infrastructure:</u> • TRH/BTEX = HSLs for commercial/industrial land use; • Lead = HIL for commercial/industrial land use; and • Free of staining and odours The presence of odours or exceedances of the VAC may compromise the VENM classification. However, from a risk perspective in the context of the proposed land use, such traces are unlikely to result in an unacceptable risk to future site users. In the event that persistent traces of TRH/BTEXN are reported above the VAC, these concentrations can be assessed in the context of human health risks, in accordance with Schedule B1 of NEPM (2013) and an alternative classification (other than VENM) would need to be pursued for this material if it is to be disposed off-site.
Waste classification (backfill/chase out soils associated with remediation of USTs, and supplementary waste classification of fill	In accordance with the procedures and criteria outlined in Part 1 of the Waste Classification Guidelines 2014 and any other exemptions/approvals as required.
Groundwater validation criteria	Groundwater data will be compared to relevant Tier 1 screening criteria in accordance with NEPM (2013), following an assessment of environmental values in accordance with the Guidelines for the Assessment and Management of Groundwater Contamination (2007). Environmental values include aquatic ecosystems, and human-health risks in non-use scenarios. The following validation criteria will be used: • HSLs for a 'commercial/industrial' exposure scenario (HSL-D). HSLs calculated based on the soil type and the observed depth to groundwater; • Site-specific assessment (SSA) for the Tier 1 screening of human health risks posed by volatile contaminants in groundwater; and • Groundwater Investigation Levels (GILs) for 95% protection of freshwater species were adopted based on the Default Guideline Values in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018).
Imported materials	Material imported as general fill must only be VENM or ENM. VENM is defined in the POEO Act 1997 as material: • That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities; • That does not contain sulfidic ores or other waste; and • Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette.

Validation Aspect	VAC
	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; and - Organic compounds are to be less than the laboratory PQLs and asbestos to be absent. All materials imported onto the site must also be adequately assessed as being appropriate for the final use of the site, including ecological considerations. A risk-based assessment approach is to be adopted with regards to the tier 1 screening criteria presented in Schedule B1 of NEPM 2013. Aesthetics: all imported materials are to be free of staining and odours.

Data should initially be assessed as above or below the VAC. Statistical analysis may be applied if deemed appropriate by the validation consultant and undertaken in accordance with the NEPM 2013.

7.3 Validation Sampling, Analysis and Quality Plan (SAQP)

Appropriate QA/QC samples should be obtained during the validation (where applicable) and analysed for the same suite of contaminants as the primary samples. As a minimum, QA/QC sampling should include duplicates (5% inter-laboratory and 5% intra-laboratory), trip spikes and trip blanks. Rinsate samples should be obtained if re-usable sampling equipment is utilised.

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.

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:

- Was the remediation undertaken in accordance with the RAP?
- 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?
- 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, survey information, as-built drawings, waste and imported materials registers;
- Validation sampling of imported materials; 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 and will be limited vertically to the surficial soils (approximately 100mm) for the remediation and validation of ACM impacts. The validation will guide the horizontal and vertical extent of the remediation associated with the UST, though it is anticipated to be approximately 2m to 3m deep.

The supplementary waste classification will be confined to the site boundaries as shown in Figure 2 in Appendix A and will be limited vertically to the base of the fill, anticipated to range from 0.2mBGL to 3.6mBGL.

The data gap investigation and HHRA, as discussed in Section 4, will guide the remediation extent of groundwater, if required.

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 7.2.

7.3.5.2 Field and Laboratory QA/QC

Field QA/QC is to include analysis of inter-laboratory duplicates (5% frequency), intra-laboratory duplicates (5% frequency), trip spike, trip blank and rinsate samples (one each for the assessment to demonstrate adequacy of standard sampling/handling procedures). Field QA/QC samples are to be analysed for the contaminants of concern, except asbestos. The trip spike will only be analysed for BTEX as BTEX will be considered a surrogate to assess potential loss of volatiles from TRH (F2).

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 for organic analytes. Metals will be considered on a case-by-case basis with regards to the reference material used as the blank medium.

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.

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.

7.3.8 Sampling Plan

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

7.4 Validation Report and LTEMP

As part of the site validation process, a 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.

Based on the preferred remediation strategy, a long-term environmental management plan (LTEMP) may be required for the management of groundwater impacted by TRH/BTEX. This will be assessed based on the results of the data gap investigation and HHRA.

8 CONTINGENCY PLAN

A review of the proposed remediation works has indicated that the greatest risks that may affect the success of the remediation include unexpected finds. A contingency plan for the remediation is provided below:

8.1 Unexpected Finds

Residual hazards that may exist at the site would generally be expected to be detectable through visual or olfactory means. 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 should contact the validation consultant and the project manager;
- Temporary barricades should be erected to isolate the area from access to workers;
- The validation consultant is to attend the site, adequately characterise the contamination and provide advice in relation to site management and remediation. In the event that remediation differs from the procedures outlined in this RAP, an addendum RAP or RWP must be prepared in consultation with the project stakeholders and submitted to the site auditor and consent authority; and
- Contamination should be remediated and validated in accordance with the advice provided, and the results should be included in the validation report.

8.2 Importation Failure for VENM or other Imported Materials

Where material to be imported onto the site does not meet the importation VAC detailed in Section 7.2, the material should not be imported. Alternative material must be sourced that meets the importation requirements.

8.3 Contingency for Failure of Remediation Strategy

8.3.1 Repeated ACM Remediation Failures

In the unexpected event that repeated failures of ACM remediation occur, or areas of considerable impact are identified, an amended remediation strategy, including excavation and off-site disposal, will be required. The process is outlined in the following table:

Table 8-1: Remediation – Repeated ACM Failures

Step	Primary Role/ Responsibility	Procedure
1.	Remediation contractor (or their nominated sub-contractor)	<u>Removal of contaminated fill:</u> Excavation of the remediation area will be undertaken as follows: • Submit an application to dispose the fill (in accordance with the assigned waste classification) to a landfill licensed by the NSW EPA to receive the waste and obtain authorisation to dispose; • A water system will need to be in place to spray the excavated soil during excavation/ remediation works and to decontaminate trucks entering the work area. The general site area should be kept damp during remediation works to minimise the generation of dust; • The remediation area should be excavated to the lateral extent of the grid (i.e. 20m x 20m) to a depth of 100mm below the surface;

Step	Primary Role/ Responsibility	Procedure
		• Load the contaminated fill onto trucks and dispose in accordance with the assigned waste classification, noting the inclusion of special waste (asbestos waste), to an appropriately licensed landfill facility; • A clearance certificate is to be issued by a licensed asbestos assessor; and • All documents including landfill dockets should be retained and forwarded to the client and validation consultant for inclusion into the validation report.
2.	Remediation contractor (or their nominated sub-contractor) and validation consultant	<u>Validation of Excavation Base:</u> • Once the contaminated fill is removed, the base of the excavation should be validated (by the validation consultant) in accordance with Section 7.1.; and • If the validation fails, the contaminated area should be chased out until the validation is successful. <u>Validation of Excavation walls:</u> Once the contaminated fill is removed, the walls of the resulting excavation should be validated (by the validation consultant), as follows: • One bulk (10L) sample per 10m lineal wall length, per wall, sieved in the field for asbestos quantification. This is to be done by the validation consultant; • One 500mL sample per 10m lineal wall length, per wall, for laboratory quantification of asbestos; and • If the validation fails, the contaminated area should be chased out in the direction of the validation failure until the validation is successful. If persistent ACM impacts are identified, these concentrations can be assessed in the context of human health risks, in accordance with Schedule B1 of NEPM (2013).

8.3.2 Hydrocarbon Impacted Soil Remaining On-site

In the unexpected event that 'pockets' of hydrocarbon impacted soil/bedrock cannot be excavated and disposed off-site, this material must be validated to assess its suitability to remain on-site and the potential risks posed by this soil in the context of the future land use.

In the event that the soils present a potentially unacceptable risk, there may be a need to implement a 'cap and contain' strategy or other mitigation measures. The strategy would need to be documented in an addendum RAP and submitted to the auditor and consent authority. It is noted that this would result in a long-term EMP for the site to manage the contamination.

Alternatively, a site-specific human health risk assessment could be considered to establish whether the risks warrant long-term management via an EMP.

8.3.3 Contaminated Groundwater Remaining Beneath the Site

In the unexpected event that contaminated groundwater remains beneath the site, additional mitigation and/or management measures may be required. The initial response should include undertaking a HHRA to account for the additional data and refine the risk-based scenarios. Additional investigation, such as soil vapour, may be necessary for the refinement of the HHRA, and should be discussed with the risk assessor at the outset.

A remediation works plan (RWP) will be prepared (if required) based on the findings of the additional HHRA. It is noted that the RWP would form part of the overall remedial strategy and must be approved by the site auditor/consent authority.

In the event the contamination does not pose an unacceptable risk, a LTEMP or Groundwater Management Plan (GMP) will be prepared for the site.

9 SITE MANAGEMENT PLAN FOR REMEDIATION WORKS

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

9.1 Asbestos Management Plan (AMP)

Prior to the commencement of any works in the remediation areas, an AMP is to be prepared by the validation consultant to document the asbestos-related management requirements for the remediation. The AMP is to be implemented by the remediation contractor (and their nominated subcontractors where relevant) throughout the remediation.

9.2 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 available contact details are summarised in the following table:

Table 9-1: Project Contacts

Role	Company	Contact Details
Client/developer	Woolworths Group Pty Limited	Thomas Stock **tstock@woolworths.com.au**
Project Manager	To be appointed	-
Remediation Contractor	To be appointed	-
Validation Consultant	JKE – subject to formal engagement	Vittal Boggaram **vboggaram@jkenvironments.com.au** 02 9888 5000
Certifier	To be appointed	-
NSW EPA	Pollution Line	131 555
NSW EPA Site Auditor	Louise Walkden (Ramboll Australia)	Louise Walkden **lwalkden@ramboll.com**
Emergency Services	Ambulance, Police, Fire	000

9.3 Security

Appropriate fencing should be installed as required to secure the site. Warning signs should be erected, which outline the personal protective equipment (PPE) required for remediation work.

9.4 Timing and Sequencing of Remediation Works

The anticipated sequence of remediation works is outlined in Section 6.3. Remediation will occur concurrently with the development works as the built form of the development and the landscaping forms part of the capping requirements.

9.5 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 should 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 consent conditions 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.

9.6 Noise and Vibration Control Plan

The guidelines for minimisation of noise on construction sites outlined in AS-2460 (2002)[21] 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 consent documents).

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

9.7 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:

[21] Australian Standard, (2002). *AS2460: Acoustics - Measurement of the Reverberation Time in Rooms.*

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

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.

9.8 Dewatering

Temporary dewatering may be required as part of the remediation works. The additional groundwater monitoring will provide additional information relating to the depth to groundwater in relation to bulk excavation levels. Based on the information presented in the ASI, minor treatment of seepage water may be required during the development. The seepage water should be managed appropriately on site in accordance with the remediation contractor's soil and water management plan, and the validation plan in Section 7. This water should not be pumped to stormwater or sewer unless a prior application is made and this is approved by the relevant authorities.

9.9 Air Monitoring

Reference is to be made to the AMP for details regarding asbestos air fibre monitoring. 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.

9.10 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:
  - 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.

9.11 Work Health and Safety (WHS) Plan

A site specific WHS plan should 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.

9.12 Waste Management

Prior to commencement of remedial works and excavation for the proposed development, the remediation contractor should develop a waste management or recycling plan to minimise the amount of waste produced by the site. Consideration should be given to re-use material wherever possible.

9.13 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, the validation consultant should be advised to assess potential impacts on contamination conditions and the remediation/validation timetable.

9.14 Hours of Operation

Hours of operation should be between those approved by the determining authority under the development approval process.

9.15 Community Consultation and Complaints

The remediation contractor should provide details for managing community consultation and complaints within their construction environment management plan (CEMP).

10 CONCLUSIONS

Previous investigations by JKE have identified surficial ACM. The source of the asbestos is considered likely to be associated with demolition of former structures, and to a lesser extent, impacted fill historically imported to the site. The previous investigations also identified at least one UST and associated infrastructure on-site. The investigations concluded the potential for extensive impacts from hydrocarbons associated with the UST/s and infrastructure was low. However, localised impacts may be encountered in the vicinity of the UST/s and associated infrastructure. The UST/s and infrastructure will be removed during the remediation process, and the residual risks assessed by the validation process.

The groundwater has been impacted by heavy metals, BTEX and TRH. The heavy metal impacts were considered likely a regional/background issue. Further investigation is required to assess the potential risks associated with BTEX and TRH in groundwater.

The remediation strategy for soil includes the on-site treatment of ACM and off-site disposal of the UST/s, UST backfill and associated infrastructure. The remediation strategy for groundwater will likely involve ongoing monitoring and management, though this will be determined based on the findings of the further investigation and HHRA.

The remediation methods outlined in the RAP are assessed to be sustainable, economically viable, commensurate with the level of risk posed by the contaminants and technically achievable to implement concurrently with the proposed development works. On this basis, JKE are of the opinion that the site can be made suitable for the proposed development provided this RAP (and any addendums or revisions) and any requirements under a RWP is implemented should a RWP be prepared.

A site 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 development. Any LTEMP or GMP prepared for the site will require appropriate public notification.

The RAP has met the objectives outlined in Section 1.2.

10.1 Regulatory Requirements

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

Table 10-1: Regulatory Requirement

Guideline / Legislation / Policy	Applicability
SEPP55	Prior notice of Category 2 remediation work is to be provided in accordance with Clause 16 of SEPP55. Under Clause 17 of SEPP55, a notice of completion of remediation work is to be given to council within 30 days of completion of the work. The notice of completion of remediation works must be in accordance with Clause 18 of SEPP55.
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.
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 (e.g. Class A) asbestos removal works or handling.

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 land use. 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 assessment. If the subject site is sold, ownership of the assessment report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the assessment was undertaken. No person should apply an assessment 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 assessment 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 assessments 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 assessment 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.

Assessment Limitations
Although information provided by a site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment 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 Assessments by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an assessment 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 Assessment 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 assessment. 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 assessment. 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 assessment 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 assessment 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 assessment, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.

Appendix A: Report Figures

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

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

Title: **SITE LOCATION PLAN**

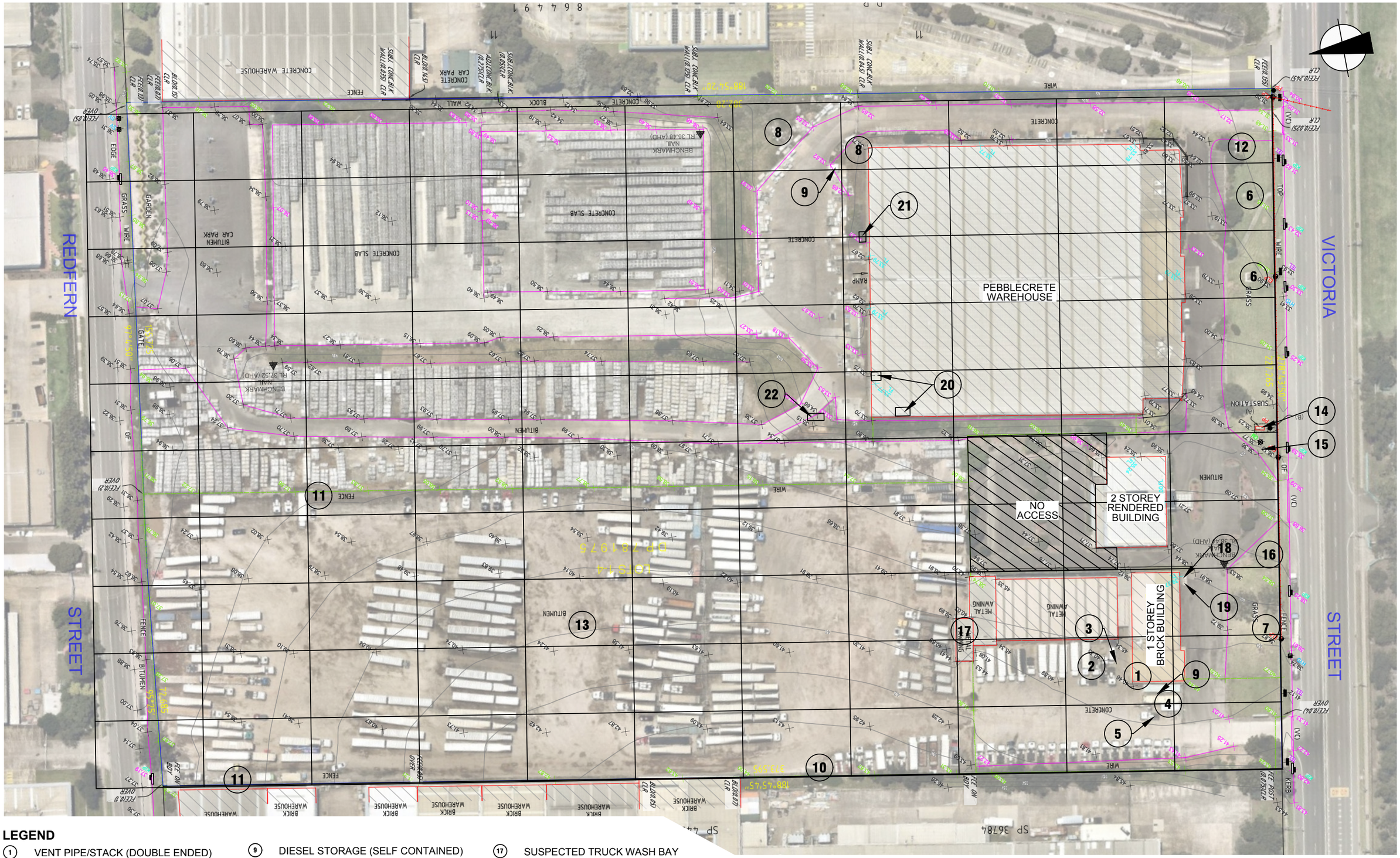
Location: 250 VICTORIA STREET
WETHERILL PARK, NSW

Project No: E31888BR

Figure No: 1

JKEnvironments

PLOT DATE: 26/02/2021 2:24:11 PM DWG FILE: Z:\5 EIS\5C- EIS \JOBS\31000\SIE31888KD WETHERILL PARK\CAD\E31888BRE31888BR.DWG



LEGEND

1. VENT PIPE/STACK (DOUBLE ENDED)
2. 10,000L UST (PETROL)
3. FEED LINES
4. SHIPPING CONTAINERS
5. FORMER BOWSER PLINTH
6. FORMER SIGNAGE/LIGHTING
7. SUSPECTED FCF
8. STOCKPILE OF DEBRIS
9. DIESEL STORAGE (SELF CONTAINED)
10. HYDRANT
11. IBC
12. SOIL STOCKPILE
13. CONCRETE SLAB SEGMENTS
14. SUBSTATION KIOSK
15. GAS MANIFOLD
16. WATER HYDRANT/MAINS
17. SUSPECTED TRUCK WASH BAY
18. 500L KEROSENE AST (FORMER)
19. 500L DIESEL AST (FORMER)
20. 250L EACH, PETROL CABINETS (FORMER)
21. LPG CYLINDER STORAGE (FORMER)
22. 2,200L LPG TANK AST (FORMER)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 12 24 36 48 60

SCALE 1:1200 @A3 METRES

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

Title: **SITE FEATURES PLAN**

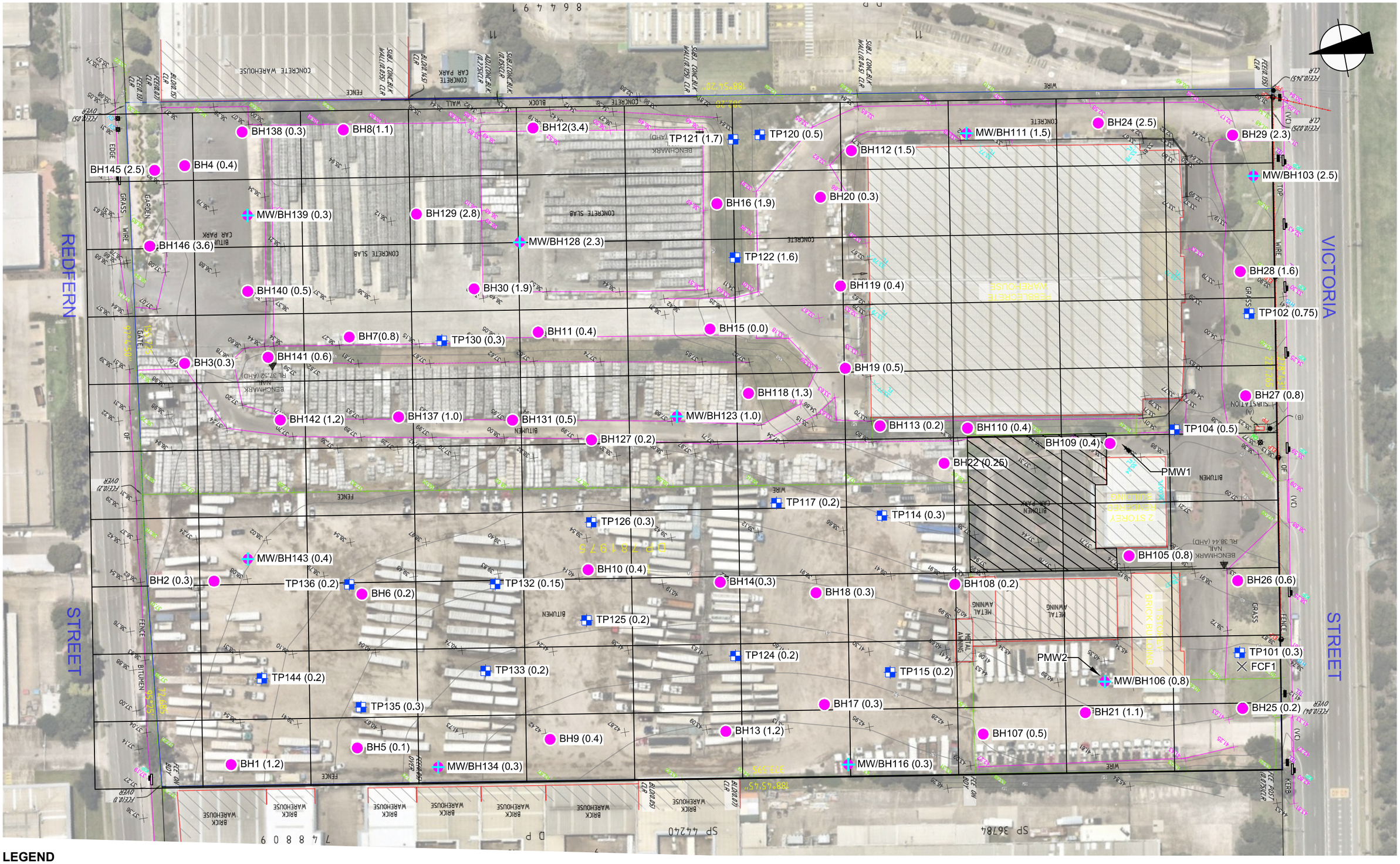
Location: 250 VICTORIA STREET WETHERILL PARK, NSW

Report No: E31888BR

Figure No: 2

JKEnvironments

PLOT DATE: 23/03/2021 2:21:11 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\31000\SIE31888KD WETHERILL PARK\CAD\E31888BR\E31888BR.DWG



LEGEND

— — — —	APPROXIMATE SITE BOUNDARY
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
TP(Fill Depth)	TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
PMW	PREVIOUS MONITORING WELL LOCATION
FCF(Surface)	FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 12 24 36 48 60

SCALE 1:1200 @A3 METRES

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

Title: **SAMPLE LOCATION PLAN**

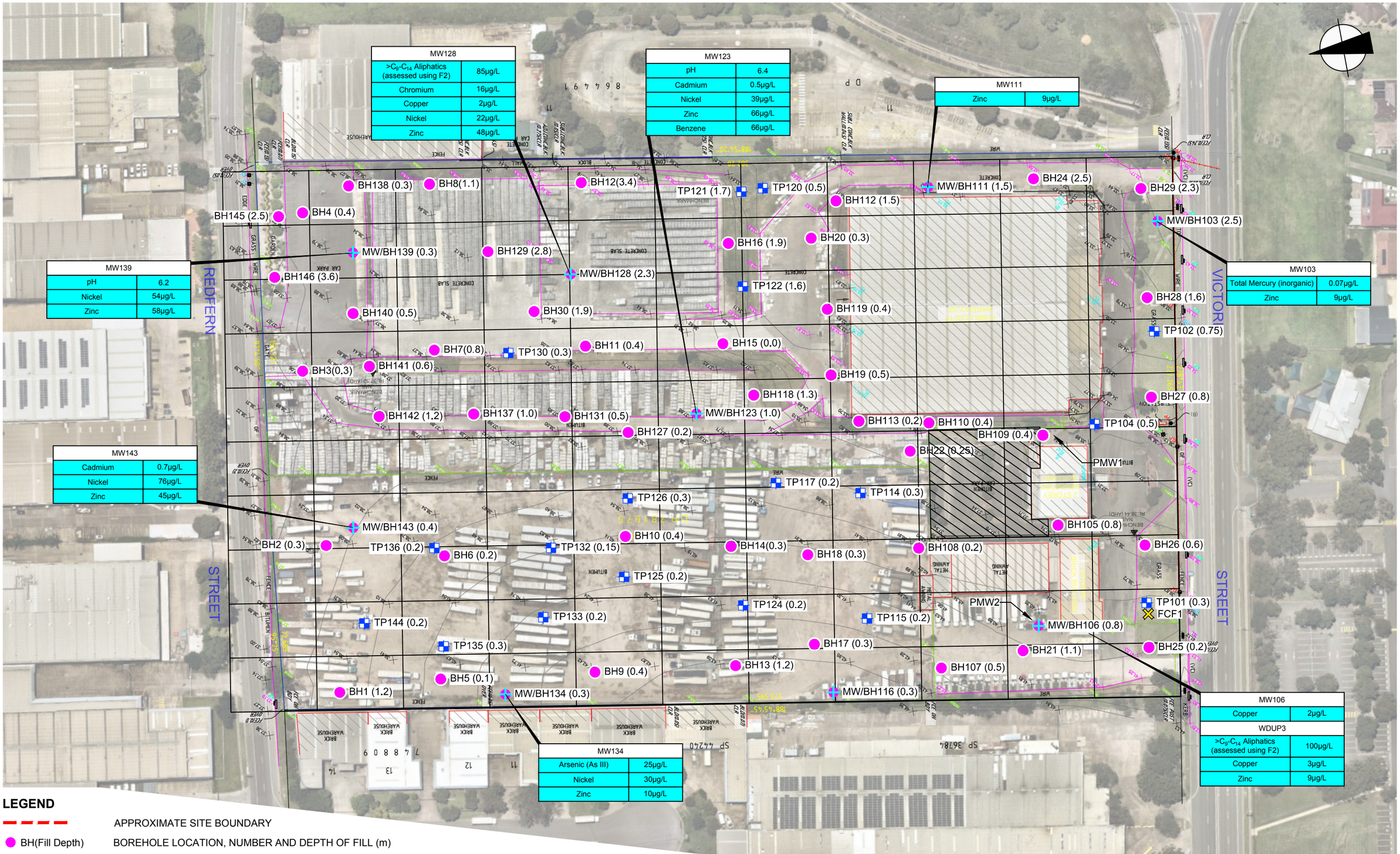
Location: 250 VICTORIA STREET WETHERILL PARK, NSW

Report No: E31888BR

Figure No: 3

JKEnvironments

PLOT DATE: 26/02/2021 1:44:07 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\31000'S\E31888KD WETHERILL PARK\CAD\E31888BR\E31888BR.DWG



LEGEND

APPROXIMATE SITE BOUNDARY	
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
TP(Fill Depth)	TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
PMW	PREVIOUS MONITORING WELL LOCATION
FCF(Surface)	SURFACE CEMENT FRAGMENT CONTAINING ASBESTOS

SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

GROUNDWATER SAMPLE EXCEEDANCE

GROUNDWATER CONTAMINATION ABOVE SAC

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 15 30 45 60 75

SCALE 1:1500 @A3 METRES

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

Title: **CONTAMINATION LOCATION PLAN**

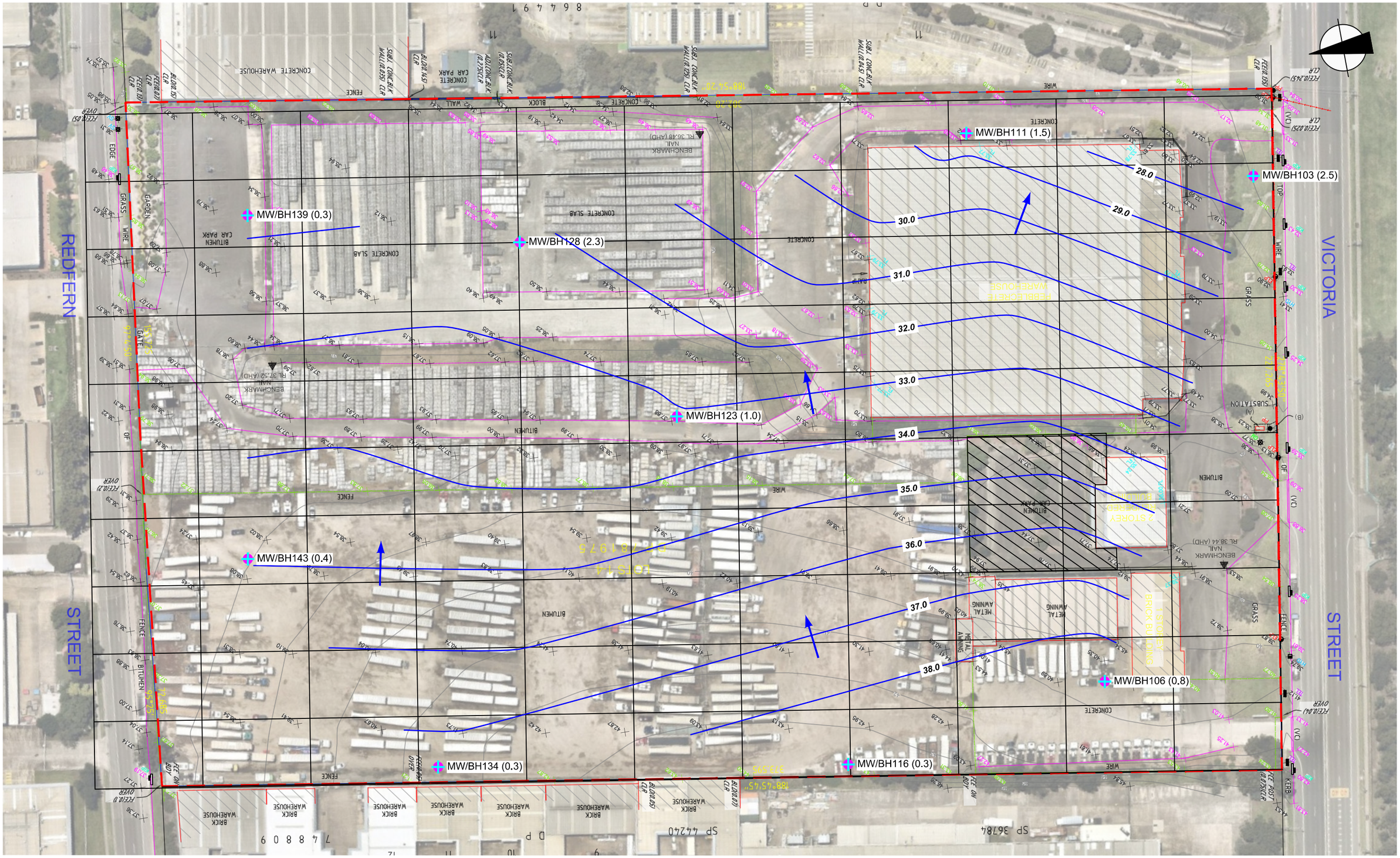
Location: 250 VICTORIA STREET WETHERILL PARK, NSW

Report No: E31888BR

Figure No: 4

JKEnvironments

PLOT DATE: 26/02/2021 2:38:34 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\31000\SIE31888KD WETHERILL PARK\CAD\E31888BR\E31888BR.DWG



LEGEND

- APPROXIMATE SITE BOUNDARY
- BH/MW(Fill Depth) BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
- 4.5 GROUNDWATER CONTOUR INTERVALS (mAHD)
- INFERRED GROUNDWATER FLOW DIRECTION

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 12 24 36 48 60

SCALE 1:1200 @A3 METRES

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

Title: **GROUNDWATER CONTOUR PLAN**

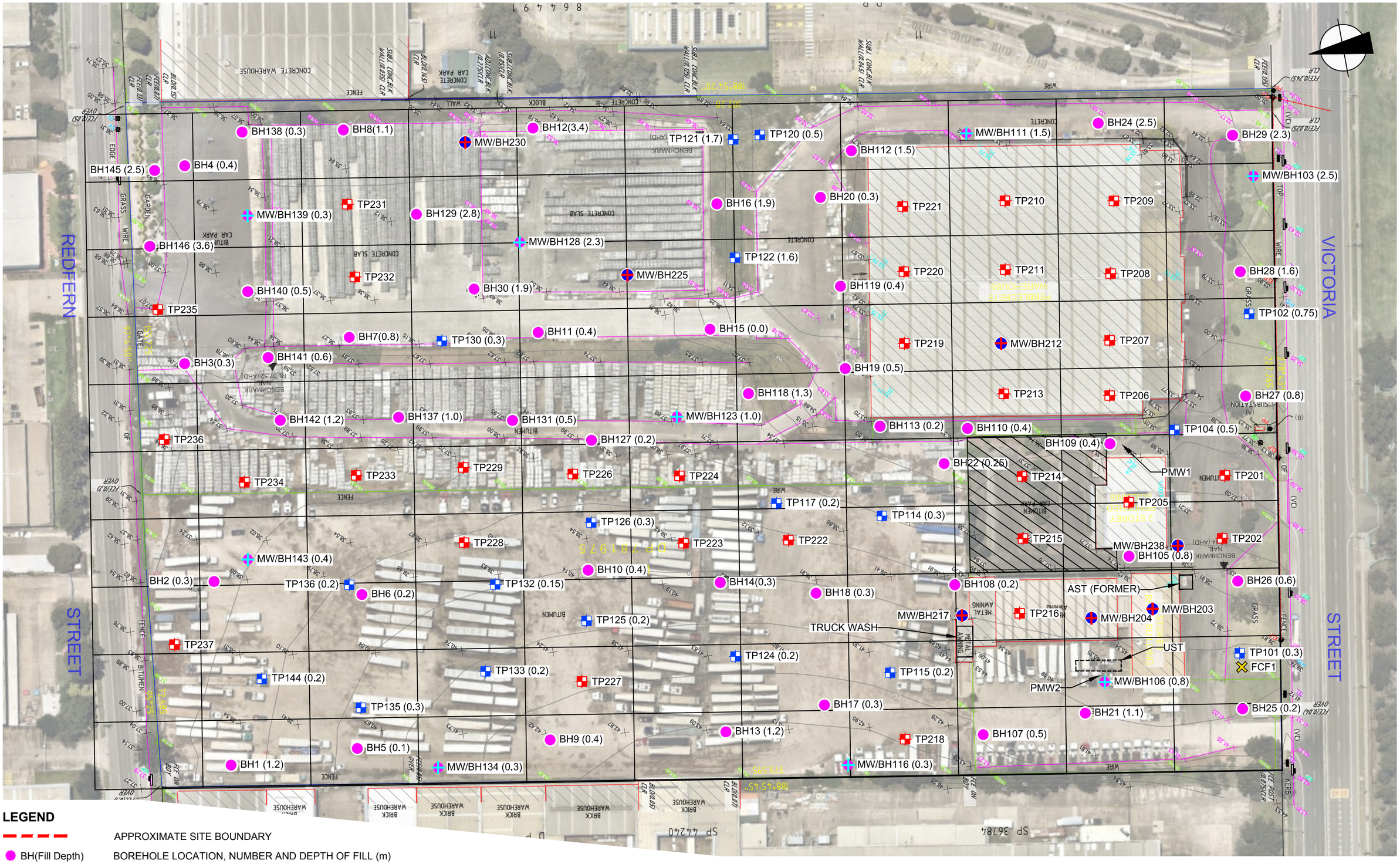
Location: 250 VICTORIA STREET WETHERILL PARK, NSW

Report No: E31888BR

Figure No: 5

JKEnvironments

PLOT DATE: 26/02/2021 2:38:51 PM DWG FILE: Z:\6 EIS\5C EIS JOBS\31000'S\E31888KD WETHERILL PARK\CAD\E31888BR\E31888BR.DWG



LEGEND

— — — —	APPROXIMATE SITE BOUNDARY
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
TP(Fill Depth)	TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
PMW	PREVIOUS MONITORING WELL LOCATION
FCF(Surface)	FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)
TP	PROPOSED TEST PIT LOCATION AND NUMBER
BH/MW212	PROPOSED BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION AND NUMBER

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 12 24 36 48 60

SCALE 1:1200 @A3 METRES

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

Title: **PROPOSED DATA GAP SAMPLE LOCATION PLAN**

Location: 250 VICTORIA STREET WETHERILL PARK, NSW

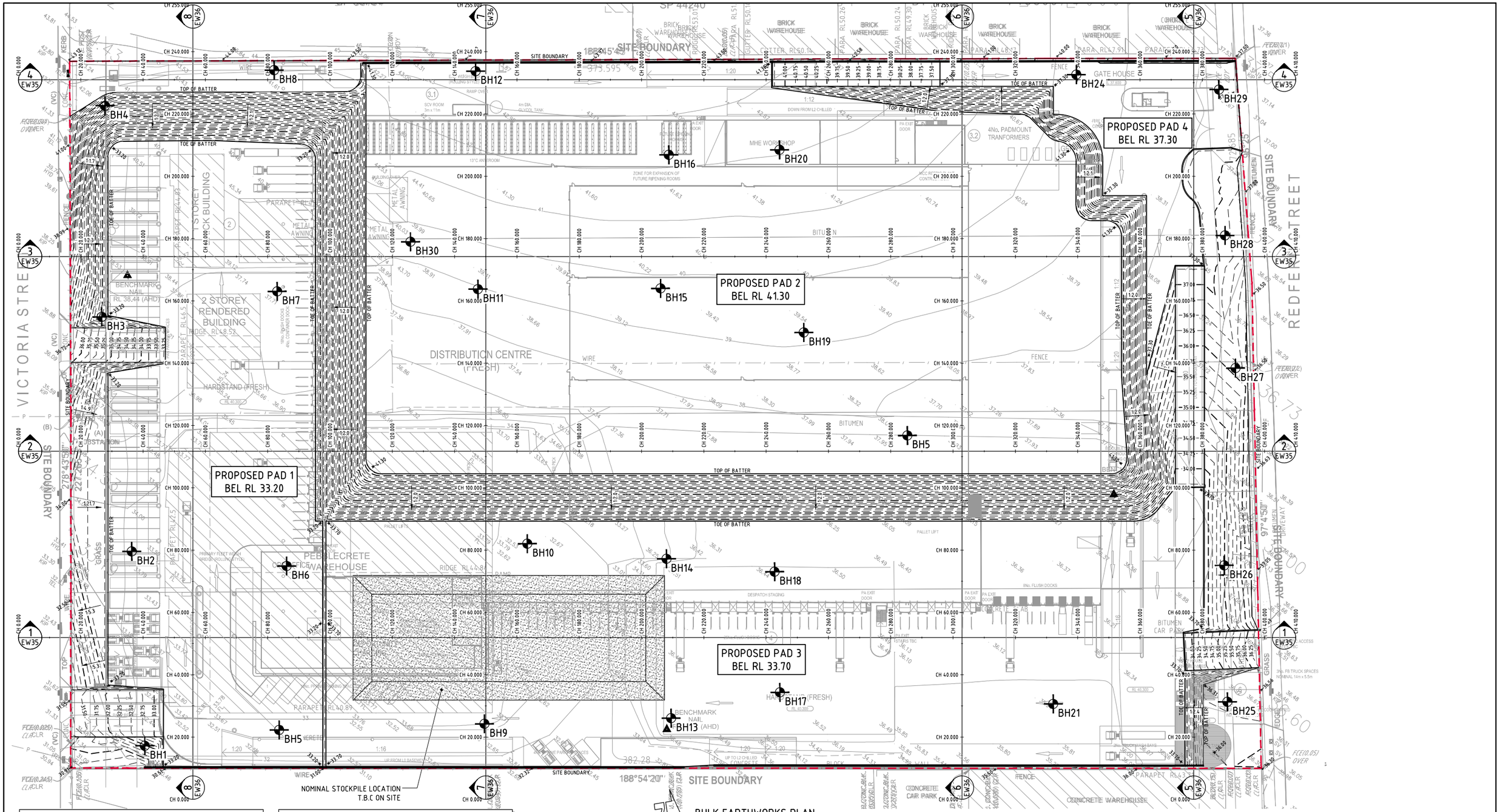
Report No: E31888BR

Figure No: 6

JKEnvironments

PLOT DATE: 30/03/2021 1:01:43 PM DWG FILE: Z:\5 EIS\5C EIS JOBS\31000'S\E31888KD WETHERILL PARK\CAD\E31888BR\E31888BR.DWG

Appendix B: Selected Development Plans



BULK EARTHWORKS PLAN
SCALE 1:500

SUMMARY NOTES

BULK EARTHWORKS VOLUMES:
SITE AREA = 8.6 Ha

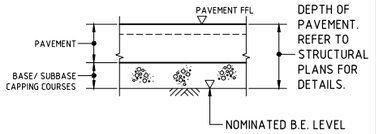
TOPSOIL STRIP (200mm OVER 8.6 Ha)	=	(-17,200m³)
CUT MATERIAL	= -	95,070m³
FILL MATERIAL	= +	83,340m³
BALANCE	= -	11,730m³ (STOCKPILED)

NOTE:
EARTHWORK VOLUMES ARE APPROXIMATE ONLY.
NO ALLOWANCE HAS BEEN MADE FOR DELETERIOUS MATERIAL, EROSION AND SEDIMENT CONTROL OR BULKING OR COMPACTION OF FILLED SOILS.
CONTRACTOR TO ALLOW FOR THESE ITEMS AS REQUIRED

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY TITLED 50469 002DT REV A DATED 21/05/20.



NOMINATED B.E.L. DETAIL
NTS

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY TITLED 50469 002DT REV A DATED 21/05/19.

- 50.00 – EXISTING CONTOUR (1.0m INTERVAL)
- 50.00 – B.E.L. CONTOUR (MAJOR 1.0m)
- 50.10 – B.E.L. CONTOUR (MINOR 0.25m)
- 50.00 – B.E.L. SPOT LEVEL
- BH1 – BOREHOLE LOCATION

BOREHOLE NOTE:

REFER TO GEOTECHNICAL REPORT PROVIDED BY JK GEOTECHNICS 31888AHrpt REV 0 DATED 18/10/2018 FOR TOP OF ROCK RL.

LEVELS NOTE:

LEVELS SHOWN TO BE ±500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO MINOR VARIATIONS TO SUIT DETAILED DESIGN.

NOTE:

1. TOPSOIL AND EXISTING PAVEMENT MAY BE REUSED ON SITE SUBJECT TO GEOTECHNICAL ADVICE DURING DETAILED DESIGN.
2. REFER TO DRAWING EW20 & EW21 FOR ESC MEASURE THROUGHOUT WORKS.

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR INFORMATION

ISSUED FOR INFORMATION	14.07.20	A			
AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE

ARCHITECT: watson young

CLIENT: Woolworths — the fresh food people

PROJECT: EARLY WORKS DA
250 - 266 VICTORIA STREET
WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	MdW	JULY '20	XC	B1	AS SHOWN	C013738.01-EW30

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3721
email: mail@costinroe.com.au

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: BULK EARTHWORKS PLAN
DRAWING No: C013738.01-EW30
ISSUE: A

PROPOSED PAD 1
BEL RL 33.20

PROPOSED PAD 2
BEL RL 41.30

PROPOSED PAD 3
BEL RL 33.70

PROPOSED PAD 4
BEL RL 37.30

NOMINAL STOCKPILE LOCATION
T.B.C ON SITE

DEPTH RANGE				
	No.	FROM DEPTH	TO DEPTH	COLOUR
CUT	1	-8.000	-7.000	
	2	-7.000	-6.000	
	3	-6.000	-5.000	
	4	-5.000	-4.000	
	5	-4.000	-3.000	
	6	-3.000	-2.000	
	7	-2.000	-1.000	
	8	-1.000	0.000	
FILL	9	0.000	1.000	
	10	1.000	2.000	
	11	2.000	3.000	
	12	3.000	4.000	
	13	4.000	5.000	
	14	5.000	6.000	
	15	6.000	7.000	
	16	7.000	8.000	
	17	8.000	9.000	

CUT/FILL PLAN
SCALE 1:500

LEVELS NOTE:
LEVELS SHOWN TO BE ±500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO MINOR VARIATIONS TO SUIT DETAILED DESIGN.

LEGEND:
LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY TITLED 50469 002DT REV A DATED 21/05/19.

- 50.00 – EXISTING CONTOUR (1.0m INTERVAL)
- 50.00 – B.E.L. CONTOUR (MAJOR 1.0m)
- 50.10 – B.E.L. CONTOUR (MINOR 0.25m)
- 50.00 – B.E.L. SPOT LEVEL

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR INFORMATION

ISSUED FOR INFORMATION	14.07.20	A
AMENDMENTS	DATE	ISSUE

AMENDMENTS	DATE	ISSUE

ARCHITECT watson young

CLIENT Woolworths the fresh food people

PROJECT
EARLY WORKS DA
250 - 266 VICTORIA STREET
WETHERILL PARK, NSW

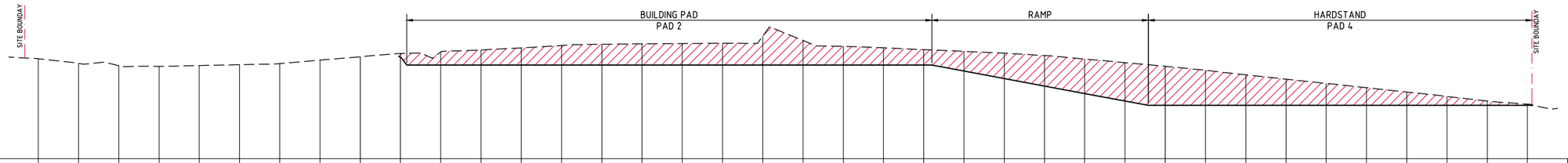
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	MdW	JULY '20	XC	B1	AS SHOWN	C013738.01-EW31

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 695 449
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3721
email: mail@costinroe.com.au

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
CUT/FILL PLAN

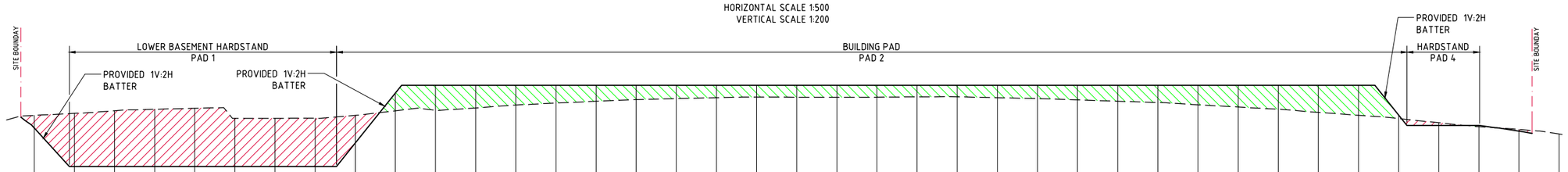
DRAWING No C013738.01-EW31 ISSUE A



DATUM 32.00

CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000	310.000	320.000	330.000	340.000	350.000	360.000	370.000	380.000	390.000	400.000	410.000
EXISTING SURFACE LEVEL			41.932	41.462	41.243	41.187	41.249	41.332	41.449	41.788	42.128	42.443	42.608	42.804	43.008	43.244	43.361	43.403	43.435	43.458	44.164	43.745	43.153	43.013	42.835	42.656	42.485	42.242	41.899	41.537	41.171	40.777	40.330	39.903	39.475	39.048	38.621	38.192	37.727	37.415	
BULK EARTHWORKS LEVEL												42.055	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	40.705	39.961	39.218	38.474	37.731	31.300	37.300	37.300	31.300	31.300	37.300	37.300	31.300	37.300	37.300	31.300	
CUT/FILL DEPTH												-0.388	-1.308	-1.504	-1.708	-1.944	-2.061	-2.103	-2.135	-2.158	-2.864	-2.445	-1.853	-1.713	-1.535	-1.951	-2.523	-3.024	-3.425	-3.807	-3.871	-3.477	-3.038	-2.603	-2.175	-1.748	-1.321	-0.892	-0.427	-0.115		

SECTION 4
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:200



DATUM 32.00

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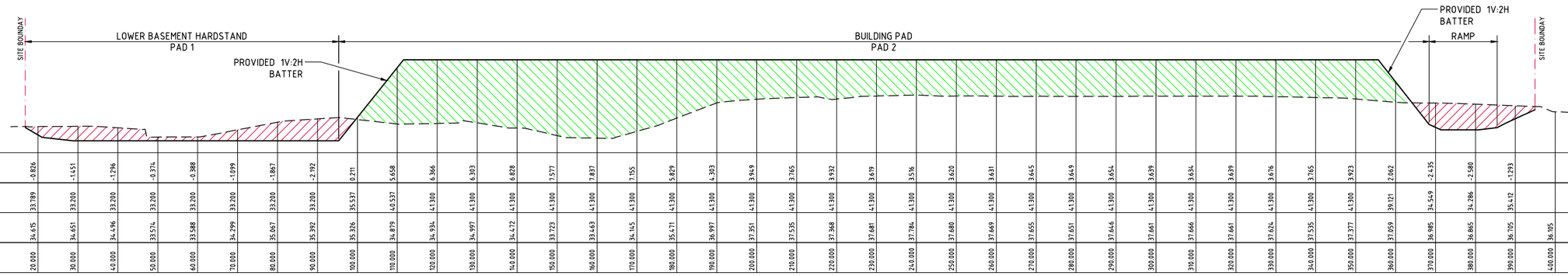
EXISTING SURFACE LEVEL			38.298	38.497	38.758	38.903	39.006	37.996	38.004	38.007	38.293	38.754	38.899	39.039	39.328	39.528	39.701	39.869	39.966	40.059	40.117	40.113	40.189	40.115	40.142	40.145	40.061	39.972	39.839	39.707	39.576	39.355	39.131	38.907	38.595	38.309	37.987	37.570	37.176	36.907	36.453	
BULK EARTHWORKS LEVEL			37.038	33.200	33.200	33.200	33.200	33.200	33.200	33.200	35.537	40.537	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	38.343	37.300	37.300	36.729		
CUT/FILL DEPTH			-1.260	-5.297	-5.558	-5.703	-5.806	-4.796	-4.804	-4.807	-2.756	1.783	2.491	2.261	1.972	1.772	1.599	1.431	1.334	1.241	1.183	1.187	1.191	1.185	1.158	1.155	1.239	1.328	1.461	1.593	1.724	1.945	2.169	2.393	2.705	2.991	0.356	-0.270	0.124	-0.177		

SECTION 3
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:200



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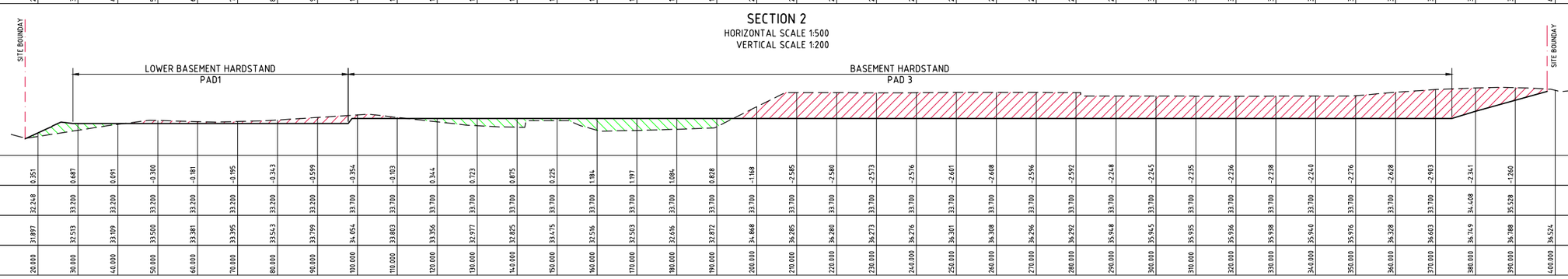
EXISTING SURFACE LEVEL			34.615	34.651	34.496	33.574	33.588	34.299	35.067	35.392	35.326	34.879	34.934	34.997	34.472	33.723	33.463	34.145	35.171	36.997	37.351	37.535	37.368	37.681	37.784	37.680	37.669	37.655	37.651	37.646	37.661	37.666	37.661	37.624	37.535	37.377	37.059	36.985	36.865	36.705	36.105	
BULK EARTHWORKS LEVEL			33.789	33.200	33.200	33.200	33.200	33.200	33.200	33.200	35.537	40.537	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	39.121	34.549	34.286	35.412		
CUT/FILL DEPTH			-0.826	-1.451	-1.296	-0.374	-0.388	-1.099	-1.867	-2.192	0.211	5.658	6.366	6.393	6.828	7.577	7.837	7.755	5.829	4.303	3.949	3.765	3.932	3.679	3.576	3.620	3.631	3.645	3.649	3.654	3.639	3.634	3.639	3.676	3.765	3.923	2.662	-2.435	-2.580	-1.293		

SECTION 2
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:200



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EXISTING SURFACE LEVEL			31.897	32.513	33.109	33.500	33.381	33.395	33.543	33.799	34.054	33.803	33.356	32.977	32.825	33.475	32.716	32.503	32.616	32.872	33.700	36.285	36.280	36.273	36.276	36.301	36.308	36.296	36.292	35.948	35.945	35.935	35.936	35.938	35.940	35.976	36.328	36.603	36.749	36.788	36.524	
BULK EARTHWORKS LEVEL			32.448	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	33.700	34.408	35.528		
CUT/FILL DEPTH			0.351	0.687	0.091	-0.300	-0.181	-0.195	-0.343	-0.599	-0.354	-0.103	0.344	0.723	0.875	0.225	1.184	1.397	1.084	0.828	-1.168	-2.585	-2.580	-2.573	-2.576	-2.601	-2.608	-2.596	-2.592	-2.248	-2.245	-2.235	-2.236	-2.238	-2.240	-2.276	-2.628	-2.903	-2.341	-1.260		

SECTION 1
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:200

LEGEND:

- DENOTES BULK EARTHWORKS SURFACE
- DENOTES EXISTING SURFACE LEVEL
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL

2m 0 5 10 15 20m
SCALE 1:200 AT B1 SIZE SHEET

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR INFORMATION

ISSUED FOR INFORMATION	14.07.20	A
AMENDMENTS	DATE	ISSUE

AMENDMENTS	DATE	ISSUE

ARCHITECT watson young

CLIENT Woolworths the fresh food people

PROJECT
EARLY WORKS DA
250 - 266 VICTORIA STREET
WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	MdW	JULY '20	XC	B1	AS SHOWN	C013738.01-EW35

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
Level 1, 6 Windmill Street
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Tel: (02) 9251-7699 Fax: (02) 9241-3721
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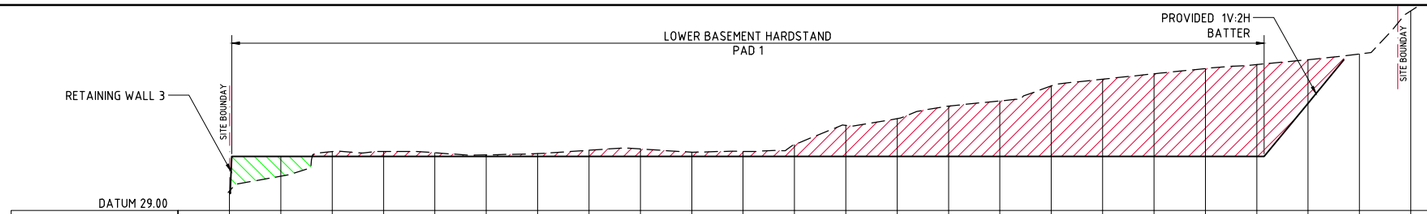
Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
BULK EARTHWORKS SECTIONS
SHEET 1

DRAWING No	ISSUE
C013738.01-EW35	A



DATUM 29.00

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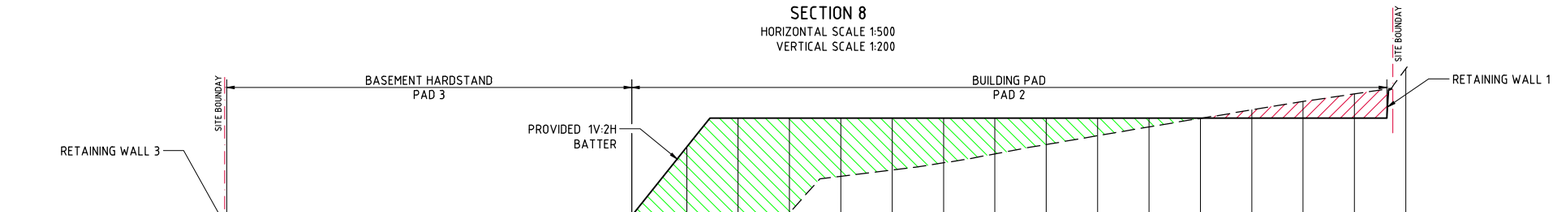
CUT/FILL DEPTH			1.538	-0.369	-0.389	-0.286	-0.118	-0.213	-0.478	-0.583	-0.326	-0.391	-0.919	-2.417	-2.941	-3.919	-4.321	-5.497	-6.007	-6.428	-6.833	-7.148	-3.398				
BULK EARTHWORKS LEVEL			33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	33.200	37.329				
EXISTING SURFACE LEVEL		39.593	31.662	33.569	33.589	33.486	33.318	33.413	33.678	33.783	33.526	33.591	34.119	35.617	36.141	37.119	37.521	38.697	39.207	39.628	40.033	40.348	40.727	41.172	44.533		
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	255.000

SECTION 8

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:200



DATUM 29.00

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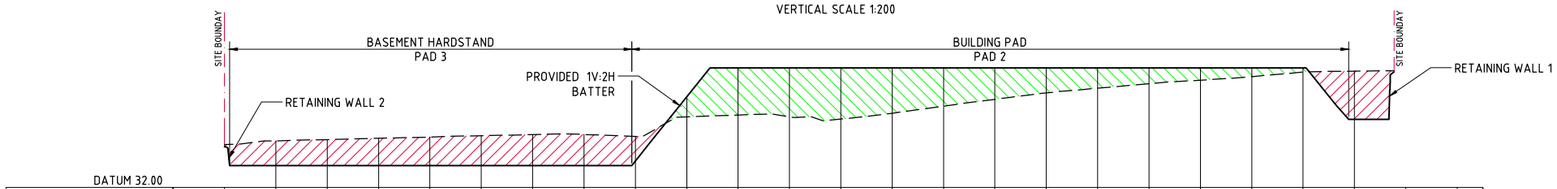
CUT/FILL DEPTH			1.290	0.192	0.207	0.222	0.230	1.195	1.179	0.326	5.340	7.568	7.378	4.531	4.045	3.485	2.786	2.065	1.370	0.687	0.021	-0.639	-1.295	-1.887			
BULK EARTHWORKS LEVEL			33.700	33.700	33.700	33.700	33.700	33.700	33.700	34.046	39.046	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300			
EXISTING SURFACE LEVEL		31.489	32.410	33.508	33.493	33.478	33.470	32.505	32.521	33.721	33.706	33.732	33.922	36.769	37.255	37.815	39.514	39.235	39.930	40.613	41.279	41.937	42.595	43.187	45.147		
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	255.000

SECTION 7

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:200



DATUM 32.00

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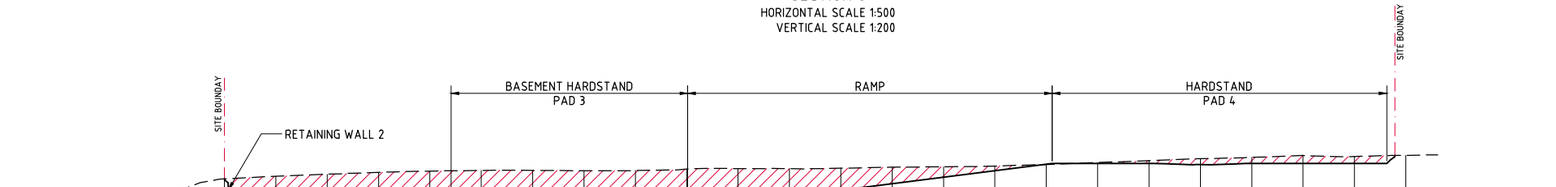
CUT/FILL DEPTH			-1.933	-2.029	-2.125	-2.219	-2.321	-2.416	-2.424	-1.926	1.549	3.662	3.803	3.980	3.521	2.967	2.437	1.942	1.570	1.219	0.944	0.674	0.317	-3.755			
BULK EARTHWORKS LEVEL			33.700	33.700	33.700	33.700	33.700	33.700	33.700	34.047	39.047	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	41.300	37.300			
EXISTING SURFACE LEVEL		35.633	35.729	35.825	35.919	36.021	36.116	36.124	35.973	37.498	37.638	37.497	37.320	37.779	38.333	38.863	39.358	39.730	40.081	40.356	40.626	40.983	41.055				
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	255.000

SECTION 6

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:200



DATUM 32.00

CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	255.000
CUT/FILL DEPTH			-1.420	-1.579	-2.020	-2.635	-3.056	-3.058	-3.040	-3.046	-3.157	-2.707	-2.186	-1.179	-1.288	-0.808	-0.370	0.022	-0.866	-0.223	-0.450	-0.469	-0.613	-0.542			
BULK EARTHWORKS LEVEL			34.875	34.875	34.586	34.065	33.700	33.700	33.700	33.700	33.700	34.197	34.705	35.212	35.719	36.227	36.734	37.241	37.300	37.300	37.211	37.300	37.300	37.300			
EXISTING SURFACE LEVEL		36.099	36.295	36.454	36.605	36.700	36.758	36.758	36.740	36.746	36.857	36.904	36.898	36.931	37.007	37.035	37.104	37.279	37.366	37.523	37.661	37.769	37.913	37.842	37.934		
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	255.000

SECTION 5

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:200

LEGEND:

- DENOTES BULK EARTHWORKS SURFACE
- DENOTES EXISTING SURFACE LEVEL
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL

2m 0 5 10 15 20m
SCALE 1:200 AT B1 SIZE SHEET

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR INFORMATION

ISSUED FOR INFORMATION	14.07.20	A	
AMENDMENTS	DATE	ISSUE	AMENDMENTS DATE ISSUE

ARCHITECT watsonyoung

CLIENT Woolworths the fresh food people

PROJECT
EARLY WORKS DA
250 - 266 VICTORIA STREET
WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	MdW	JULY '20	XC	B1	AS SHOWN	C013738.01-EW36

CONSULT AUSTRALIA

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Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
BULK EARTHWORKS SECTIONS
SHEET 2

DRAWING No C013738.01-EW36

ISSUE A

Appendix C: Data Summary Tables and Borehole Logs

ASI Data Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

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

Table Specific Explanations:

HIL Tables:

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

EIL/ESL Table:

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

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.

JKEnvironments

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

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	Phenol	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos			
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	5	100
Site Assessment Criteria (SAC)			3000	900	3600	240000	1500	730	6000	400000	4000	40	80	2000	2500	45	530	3600	50	2000	7	240000	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																					
TP101	0-0.3	Fill: Silty Clay	**18**	<0.4	**19**	**20**	**20**	<0.1	**11**	**45**	**0.2**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP102	0-0.25	Fill: Silty Clay	**14**	<0.4	**22**	**14**	**22**	<0.1	**7**	**39**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA
TP102 - [LAB_DUP]	0-0.25	Fill: Silty Clay	**13**	<0.4	**23**	**16**	**26**	<0.1	**7**	**47**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA
TP102	0.3-0.5	Fill: Silty Clay	**8**	<0.4	**15**	**14**	**12**	<0.1	**5**	**18**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH103	0-0.2	Fill: Silty Clay	**6**	<0.4	**14**	**17**	**24**	<0.1	**7**	**74**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH103	0.4-0.8	Fill: Silty Clay	**9**	<0.4	**12**	**20**	**14**	<0.1	**7**	**34**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP104	0-0.1	Fill: Silty Sand	**<4**	<0.4	**95**	**23**	**17**	<0.1	**11**	**74**	**0.2**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA
TP104	0.2-0.4	Fill: Silty Clayey Sand	**<4**	<0.4	**13**	**24**	**3**	<0.1	**56**	**26**	**0.1**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH105	0.03-0.3	Fill: Silty Sandy Gravel	**<4**	<0.4	**10**	**41**	**<1**	<0.1	**130**	**35**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH106	0.19-0.4	Fill: Silty Sand	**<4**	<0.4	**2**	**3**	**2**	<0.1	**3**	**10**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH106	0.8-0.95	Silty Clay	**6**	<0.4	**3**	**12**	**4**	<0.1	**1**	**15**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH107	0.22-0.5	Fill: Silty Clay	**4**	<0.4	**8**	**22**	**11**	<0.1	**12**	**46**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH108	0.03-0.2	Fill: Silty Gravelly Sand	**<4**	<0.4	**7**	**37**	**1**	<0.1	**84**	**26**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH108 - [LAB_DUP]	0.03-0.2	Fill: Silty Gravelly Sand	**<4**	<0.4	**10**	**45**	**2**	<0.1	**95**	**31**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA
BH109	0-0.2	Fill: Silty Sand	**<4**	<0.4	**7**	**14**	**10**	<0.1	**8**	**69**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH110	0-0.2	Fill: Silty Clay	**<4**	<0.4	**21**	**26**	**16**	<0.1	**38**	**79**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH111	0.2-0.5	Fill: Silty Clay	**<4**	<0.4	**29**	**33**	**3**	<0.1	**130**	**42**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH111	0.5-0.95	Fill: Silty Clay	**9**	<0.4	**19**	**18**	**16**	<0.1	**9**	**29**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH112	0-0.2	Fill: Silty Clay	**24**	<0.4	**20**	**19**	**27**	<0.1	**12**	**65**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH112	0.4-0.5	Fill: Silty Clay	**6**	<0.4	**14**	**13**	**11**	<0.1	**10**	**33**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH113	0-0.2	Fill: Silty Clay	**6**	<0.4	**12**	**15**	**14**	<0.1	**11**	**64**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP114	0-0.2	Fill: Silty Sand	**<4**	<0.4	**18**	**25**	**7**	<0.1	**23**	**150**	**0.57**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP115	0-0.2	Fill: Silty Sand	**<4**	<0.4	**21**	**15**	**2**	<0.1	**31**	**22**	**0.3**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH116	0.03-0.3	Fill: Silty Clay	**<4**	<0.4	**26**	**19**	**4**	<0.1	**38**	**33**	**0.58**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH116 - [LAB_DUP]	0.03-0.3	Fill: Silty Clay	**<4**	<0.4	**25**	**23**	**4**	<0.1	**39**	**34**	**1.2**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA
BH116	0.3-0.5	Silty Clay	**6**	<0.4	**15**	**12**	**11**	<0.1	**5**	**11**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP117	0-0.2	Fill: Silty Sand	**<4**	<0.4	**3**	**55**	**3**	<0.1	**5**	**15**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH118	0-0.2	Fill: Silty Gravelly Clay	**<4**	<0.4	**4**	**4**	**6**	<0.1	**3**	**11**	**0.94**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH118	0.2-0.4	Fill: Silty Clay	**NA**	NA	**NA**	**NA**	**NA**	NA	**NA**	**NA**	**NA**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH119	0.16-0.3	Fill: Silty Gravelly Clay	**<4**	<0.4	**6**	**19**	**2**	<0.1	**65**	**25**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
TP120	0-0.2	Fill: Sandy Clay	**<4**	<0.4	**5**	**13**	**12**	<0.1	**22**	**24**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP121	0-0.2	Fill: Silty Clay	**6**	<0.4	**6**	**10**	**7**	<0.1	**5**	**22**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP122	0-0.2	Fill: Silty Clay	**<4**	<0.4	**6**	**13**	**6**	<0.1	**12**	**31**	**0.54**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA
TP122- [LAB_DUP]	0-0.2	Fill: Silty Clay	**NA**	NA	**NA**	**NA**	**NA**	NA	**NA**	**NA**	**NA**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5	NA
TP122	0.6-0.8	Fill: Silty Clay	**<4**	<0.4	**6**	**19**	**6**	<0.1	**23**	**40**	**1.9**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH123	0-0.2	Fill: Silty Gravelly Sand	**<4**	<0.4	**20**	**5**	**2**	<0.1	**3**	**10**	**0.74**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
TP124	0-0.2	Fill: Silty Sand	**<4**	<0.4	**11**	**8**	**5**	<0.1	**10**	**16**	**0.1**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP125	0-0.2	Fill: Silty Sand	**<4**	<0.4	**22**	**20**	**5**	<0.1	**24**	**26**	**0.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
TP125 - [LAB_DUP]	0-0.2	Fill: Silty Sand	**<4**	<0.4	**20**	**19**	**4**	<0.1	**23**	**29**	**0.2**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA
TP126	0-0.2	Fill: Silty Sand	**<4**	<0.4	**17**	**12**	**5**	<0.1	**19**	**19**	**0.2**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH127	0-0.2	Fill: Silty Sandy Gravel	**<4**	<0.4	**5**	**7**	**6**	<0.1	**2**	**7**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH128	0-0.2	Fill: Silty Sandy Gravel	**<4**	<0.4	**5**	**7**	**7**	<0.1	**4**	**12**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH128	1.3-1.5	Fill: Silty Clay	**<4**	<0.4	**10**	**11**	**7**	<0.1	**15**	**22**	**0.4**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH129	0.5-0.7	Fill: Silty Sandy Gravel	**<4**	<0.4	**2**	**7**	**4**	<0.1	**3**	**14**	**0.4**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP130	0-0.2	Fill: Silty Clay	**4**	<0.4	**10**	**61**	**39**	<0.1	**21**	**130**	**2.9**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH131	0-0.2	Fill: Silty Gravelly Sand	**<4**	<0.4	**3**	**5**	**3**	<0.1	**2**	**10**	**0.4**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP132	0-0.15	Fill: Silty Sand	**<4**	<0.4	**10**	**11**	**7**	<0.1	**6**	**31**	**0.3**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA
TP132 - [LAB_DUP]	0-0.15	Fill: Silty Sand	**<4**	<0.4	**7**	**8**	**6**	<0.1	**3**	**16**	**0.1**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA
TP132 - [TRIPLICATE]	0-0.15	Fill: Silty Sand	**<4**	<0.4	**9**	**9**	**5**	<0.1	**7**	**27**	**NA**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP133	0-0.2	Fill: Silty Sand	**<4**	<0.4	**23**	**23**	**4**	<0.1	**27**	**38**	**0.2**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH134	0-0.2	Fill: Silty Sandy Gravel	**<4**	<0.4	**8**	**52**	**2**	<0.1	**130**	**37**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA
TP135	0-0.2	Fill: Silty Sand	**<4**	<0.4	**20**	**10**	**4**	<0.1	**19**	**27**	**0.3**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP136	0-0.2	Fill: Silty Sand	**<4**	<0.4	**21**	**11**	**5**	<0.1	**24**	**28**	**0.2**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH137	0-0.3	Fill: Silty Gravelly Sand	**<4**	<0.4	**2**	**2**	**1**	<0.1	**1**	**5**	**0.79**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH138	0.05-0.3	Fill: Silty Clay	**<4**	<0.4	**17**	**12**	**5**	<0.1	**17**	**19**	**0.1**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH139	0.05-0.3	Fill: Silty Sand	**<4**	<0.4	**22**	**15**	**6**	<0.1	**22**	**26**	**0.9**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH140	0.05-0.3	Fill: Silty Gravelly Sand	**<4**	<0.4	**4**	**4**	**2**	<0.1	**4**	**8**	**0.59**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH140 - [LAB_DUP]	0.05-0.3	Fill: Silty Gravelly Sand	**<4**	<0.4	**12**	**15**	**11**	<0.1	**11**	**24**	**0.52**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA
BH140 - [TRIPLICATE]	0.05-0.3	Fill: Silty Gravelly Sand	**<4**	<0.4	**10**	**12**	**7**	<0.1	**8**	**19**	**NA**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH140	0.3-0.5	Fill: Silty Gravelly Sand	**<4**	<0.4	**2**	**5**	**3**	<0.1	**<1**	**3**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH141	0-0.2	Fill: Silty Sand	**<4**	<0.4	**8**	**11**	**6**	<0.1	**11**	**23**	**0.52**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH142	0-0.2	Fill: Silty Gravelly Clay	**<4**	<0.4	**3**	**4**	**9**	<0.1	**2**	**12**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH142	0.5-0.95	Fill: Silty Clay	**NA**	NA	**NA**	**NA**	**NA**	NA	**NA**	**NA**	**NA**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH143	0-0.2	Fill: Silty Sandy Gravel	**<4**	<0.4	**12**	**27**	**4**	<0.1	**13**	**22**	**0.1**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
TP144	0-0.2	Fill: Silty Sand	**<4**	<0.4	**14**	**20**	**5**	<0.1	**30**	**29**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH145	0-0.2	Fill: Silty Clay	**6**	<0.4	**20**	**7**	**9**	<0.1	**6**	**8**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	Not Detected
BH145 - [LAB_DUP]	0-0.2	Fill: Silty Clay	**NA**	NA	**NA**	**NA**	**NA**	NA	**NA**	**NA**	**NA**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5	NA
BH145	0.5-0.95	Fill: Silty Clay	**<4**	<0.4	**9**	**6**	**6**	<0.1	**<1**	**3**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH146	0-0.2	Fill: Silty Sandy Clay	**<4**	<0.4	**6**	**15**	**30**	<0.1	**6**	**59**	**1.3**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH146	1.3-1.5	Fill: Silty Clay	**<4**	<0.4	**10**	**7**	**7**	<0.1	**1**	**5**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
SDUP1	-	Fill: Silty Sandy Clay	**<4**	<0.4	**8**	**22**	**43**	<0.1	**7**	**83**	**1.4**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP4	-	Fill: Silty Clay	**7**	<0.4	**12**	**13**	**19**	<0.1	**5**	**40**	**<0.05**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP7	-	Fill: Silty Clay	**6**	<0.4	**20**	**9**	**10**	<0.1	**6**	**10**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA
SDUP7 - [LAB_DUP]	-	Fill: Silty Clay	**6**	<0.4	**21**	**10**	**11**	<0.1	**6**	**11**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	NA	NA
SDUP10	-	Fill: Silty Sand	**<4**	<0.4	**2**	**2**	**2**	<0.1	**2**	**7**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<5	NA
SDUP101	-	Fill: Silty Clay	**16**	<0.4	**23**	**23**	**26**	<0.1	**9**	**50**	**0.06**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP101 - [LAB_DUP]	-	Fill: Silty Clay	**13**	<0.4	**20**	**22**	**20**	<0.1	**8**	**45**	**NA**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	NA
SDUP102	-	Fill: Silty Clay	**7**	<0.4	**11**	**20**	**9**	<0.1	**20**	**41**	**1.6**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	NA
SDUP102 - [LAB_DUP]	-	Fill: Silty Clay	**NA**	NA	**NA**	**NA**	**NA**	NA	**NA**	**NA**	**1.1**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA	NA	NA
SDUP103	-	Fill: Silty Clay	**10**	**0.4**	**31**	**76**	**64**	<0.1	**18**	**260**	**2**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP111	-	Fill: Silty Clay	**5**	<0.4	**26**	**30**	**16**	<0.1	**37**	**92**	**<0.05**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	NA
FCF1	Surface	Fragment	**NA**	NA	**NA**	**NA**	**NA**	NA	**NA**	**NA**	**NA**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
Total Number of Samples			76	76	76	76	76	76	76	76	74	74	33	33	33	33	33	3	33	0	33	25	40
Maximum Value			24	0.4	95	76	64	<PQL	130	260	2.9	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Detected

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
Standard deviation exceeds data assessment criteria — **VALUE**

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

					C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					HSL-D: COMMERCIAL/INDUSTRIAL							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
TP101	0-0.3	Fill: Silty Clay	0m to <1m	Sand	<25	**130**	<0.2	<0.5	<1	<3	<1	0
TP102	0-0.25	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP102 - [LAB_DUP]	0-0.25	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP102	0.3-0.5	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH103	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH103	0.4-0.8	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0.1
TP104	0-0.1	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP104	0.2-0.4	Fill: Silty Clayey Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH105	0.03-0.3	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH106	0.19-0.4	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH106	0.8-0.95	Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH107	0.22-0.5	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH108	0.03-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH108 - [LAB_DUP]	0.03-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH109	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH110	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH111	0.2-0.5	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH111	0.5-0.95	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH112	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH112	0.4-0.5	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH113	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP114	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP115	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH116	0.03-0.3	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH116 - [LAB_DUP]	0.03-0.3	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH116	0.3-0.5	Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP117	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH118	0-0.2	Fill: Silty Gravelly Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH119	0.16-0.3	Fill: Silty Gravelly Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP120	0-0.2	Fill: Sandy Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP121	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP122	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP122	0.6-0.8	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH123	0-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP124	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP125	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP125 - [LAB_DUP]	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP126	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH127	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH128	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH128	1.3-1.5	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH129	0.5-0.7	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP130	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH131	0-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP132	0-0.15	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP132 - [LAB_DUP]	0-0.15	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP133	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH134	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP135	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP136	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH137	0-0.3	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH138	0.05-0.3	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH139	0.05-0.3	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH140	0.05-0.3	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH140 - [LAB_DUP]	0.05-0.3	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH140	0.3-0.5	Fill: Silty Gravelly Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH141	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH142	0-0.2	Fill: Silty Gravelly Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH143	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
TP144	0-0.2	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH145	0-0.2	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH145	0.5-0.95	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH146	0-0.2	Fill: Silty Sandy Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
BH146	1.3-1.5	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
SDUP1	-	Fill: Silty Sandy Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	-
SDUP4	-	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
SDUP7	-	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
SDUP7 - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
SDUP10	-	Fill: Silty Sand	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
SDUP101	-	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
SDUP101 - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	<25	**NA**	<0.2	<0.5	<1	<3	<1	0
SDUP102	-	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
SDUP102 - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	NA	**<50**	NA	NA	NA	NA	NA	0
SDUP103	-	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
SDUP111	-	Fill: Silty Clay	0m to <1m	Sand	<25	**<50**	<0.2	<0.5	<1	<3	<1	0
Total Number of Samples					74	74	74	74	74	74	74	74
Maximum Value					<PQL	130	<PQL	<PQL	<PQL	<PQL	<PQL	0.1

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

HSL SOIL ASSESSMENT CRITERIA											
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
TP101	0-0.3	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP102	0-0.25	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP102 - [LAB_DUP]	0-0.25	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP102	0.3-0.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH103	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH103	0.4-0.8	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP104	0-0.1	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP104	0.2-0.4	Fill: Silty Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH105	0.03-0.3	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH106	0.19-0.4	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH106	0.8-0.95	Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH107	0.22-0.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH108	0.03-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH108 - [LAB_DUP]	0.03-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH109	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH110	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH111	0.2-0.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH111	0.5-0.95	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH112	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH112	0.4-0.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH113	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP114	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP115	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH116	0.03-0.3	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH116 - [LAB_DUP]	0.03-0.3	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH116	0.3-0.5	Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP117	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH118	0-0.2	Fill: Silty Gravelly Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH119	0.16-0.3	Fill: Silty Gravelly Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP120	0-0.2	Fill: Sandy Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP121	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP122	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP122	0.6-0.8	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH123	0-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP124	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP125	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP125 - [LAB_DUP]	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP126	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH127	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH128	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH128	1.3-1.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH129	0.5-0.7	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP130	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH131	0-0.2	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP132	0-0.15	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP132 - [LAB_DUP]	0-0.15	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP133	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH134	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP135	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP136	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH137	0-0.3	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH138	0.05-0.3	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH139	0.05-0.3	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH140	0.05-0.3	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH140 - [LAB_DUP]	0.05-0.3	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH140	0.3-0.5	Fill: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH141	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH142	0-0.2	Fill: Silty Gravelly Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH143	0-0.2	Fill: Silty Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP144	0-0.2	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH145	0-0.2	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH145	0.5-0.95	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH146	0-0.2	Fill: Silty Sandy Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
BH146	1.3-1.5	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP1	-	Fill: Silty Sandy Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP4	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP7	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP7 - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP10	-	Fill: Silty Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP101	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP101 - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	260	NA	3	NL	NL	230	NL
SDUP102	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP102 - [LAB_DUP]	-	Fill: Silty Clay	0m to <1m	Sand	NA	NL	NA	NA	NA	NA	NA
SDUP103	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP111	-	Fill: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL

JKEnvironments

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

			C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			COMMERCIAL/INDUSTRIAL			
Sample Reference	**Sample Depth**	**Soil Texture**				
TP101	0-0.3	Coarse	<25	**130**	**290**	<100
TP102	0-0.25	Coarse	<25	**<50**	**<100**	<100
TP102 - [LAB_DUP]	0-0.25	Coarse	<25	**<50**	**<100**	<100
TP102	0.3-0.5	Coarse	<25	**<50**	**<100**	<100
BH103	0-0.2	Coarse	<25	**<50**	**<100**	<100
BH103	0.4-0.8	Coarse	<25	**<50**	**<100**	<100
TP104	0-0.1	Coarse	<25	**<50**	**340**	**180**
TP104	0.2-0.4	Coarse	<25	**<50**	**<100**	<100
BH105	0.03-0.3	Coarse	<25	**<50**	**160**	**240**
BH106	0.19-0.4	Coarse	<25	**<50**	**<100**	<100
BH106	0.8-0.95	Fine	<25	**<50**	**<100**	<100
BH107	0.22-0.5	Coarse	<25	**<50**	**<100**	<100
BH108	0.03-0.2	Coarse	<25	**<50**	**210**	**330**
BH108 - [LAB_DUP]	0.03-0.2	Coarse	<25	**<50**	**120**	**190**
BH109	0-0.2	Coarse	<25	**<50**	**140**	<100
BH110	0-0.2	Coarse	<25	**<50**	**<100**	<100
BH111	0.2-0.5	Coarse	<25	**<50**	**<100**	<100
BH111	0.5-0.95	Coarse	<25	**<50**	**<100**	<100
BH112	0-0.2	Coarse	<25	**<50**	**<100**	<100
BH112	0.4-0.5	Coarse	<25	**<50**	**<100**	<100
BH113	0-0.2	Coarse	<25	**<50**	**140**	**110**
TP114	0-0.2	Coarse	<25	**<50**	**460**	**520**
TP115	0-0.2	Coarse	<25	**<50**	**<100**	<100
BH116	0.03-0.3	Coarse	<25	**<50**	**<100**	<100
BH116 - [LAB_DUP]	0.03-0.3	Coarse	<25	**<50**	**<100**	<100
BH116	0.3-0.5	Fine	<25	**<50**	**<100**	<100
TP117	0-0.2	Coarse	<25	**<50**	**290**	**540**
BH118	0-0.2	Coarse	<25	**<50**	**<100**	<100
BH119	0.16-0.3	Coarse	<25	**<50**	**<100**	<100
TP120	0-0.2	Coarse	<25	**<50**	**<100**	<100
TP121	0-0.2	Coarse	<25	**<50**	**<100**	<100
TP122	0-0.2	Coarse	<25	**<50**	**<100**	<100
TP122	0.6-0.8	Coarse	<25	**<50**	**160**	**220**
BH123	0-0.2	Coarse	<25	**<50**	**<100**	<100
TP124	0-0.2	Coarse	<25	**<50**	**200**	<100
TP125	0-0.2	Coarse	<25	**<50**	**340**	**320**
TP125 - [LAB_DUP]	0-0.2	Coarse	<25	**<50**	**330**	**360**
TP126	0-0.2	Coarse	<25	**<50**	**200**	**300**
BH127	0-0.2	Coarse	<25	**<50**	**<100**	<100
BH128	0-0.2	Coarse	<25	**<50**	**<100**	<100
BH128	1.3-1.5	Coarse	<25	**<50**	**<100**	<100
BH129	0.5-0.7	Coarse	<25	**<50**	**<100**	<100
TP130	0-0.2	Coarse	<25	**<50**	**270**	**280**
BH131	0-0.2	Coarse	<25	**<50**	**<100**	<100
TP132	0-0.15	Coarse	<25	**<50**	**320**	**300**
TP132 - [LAB_DUP]	0-0.15	Coarse	<25	**<50**	**330**	**330**
TP133	0-0.2	Coarse	<25	**<50**	**400**	**360**
BH134	0-0.2	Coarse	<25	**<50**	**<100**	<100
TP135	0-0.2	Coarse	<25	**<50**	**<100**	<100
TP136	0-0.2	Coarse	<25	**<50**	**220**	**270**
BH137	0-0.3	Coarse	<25	**<50**	**180**	**220**
BH138	0.05-0.3	Coarse	<25	**<50**	**<100**	<100
BH139	0.05-0.3	Coarse	<25	**<50**	**<100**	<100
BH140	0.05-0.3	Coarse	<25	**<50**	**190**	**270**
BH140 - [LAB_DUP]	0.05-0.3	Coarse	<25	**<50**	**190**	**290**
BH140	0.3-0.5	Coarse	<25	**<50**	**<100**	<100
BH141	0-0.2	Coarse	<25	**<50**	**<100**	<100
BH142	0-0.2	Coarse	<25	**<50**	**<100**	<100
BH143	0-0.2	Coarse	<25	**<50**	**<100**	<100
TP144	0-0.2	Coarse	<25	**<50**	**420**	**390**
BH145	0-0.2	Coarse	<25	**<50**	**<100**	<100
BH145	0.5-0.95	Coarse	<25	**<50**	**<100**	<100
BH146	0-0.2	Coarse	<25	**<50**	**<100**	<100
BH146	1.3-1.5	Coarse	<25	**<50**	**<100**	<100
SDUP1	-	Coarse	<25	**<50**	**<100**	<100
SDUP4	-	Coarse	<25	**<50**	**<100**	<100
SDUP7	-	Coarse	<25	**<50**	**<100**	<100
SDUP7 - [LAB_DUP]	-	Coarse	<25	**<50**	**<100**	<100
SDUP10	-	Coarse	<25	**<50**	**<100**	<100
SDUP101	-	Coarse	<25	**<50**	**<100**	<100
SDUP101 - [LAB_DUP]	-	Coarse	<25	**NA**	**NA**	NA
SDUP102	-	Coarse	<25	**<50**	**<100**	<100
SDUP102 - [LAB_DUP]	-	Coarse	NA	**<50**	**<100**	<100
SDUP103	-	Coarse	<25	**<50**	**<100**	<100
SDUP111	-	Coarse	<25	**<50**	**<100**	<100
Total Number of Samples			74	74	74	74
Maximum Value			<PQL	130	460	540

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

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Soil Texture**	C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
TP101	0-0.3	Coarse	700	1000	3500	10000
TP102	0-0.25	Coarse	700	1000	3500	10000
TP102 - [LAB_DUP]	0-0.25	Coarse	700	1000	3500	10000
TP102	0.3-0.5	Coarse	700	1000	3500	10000
BH103	0-0.2	Coarse	700	1000	3500	10000
BH103	0.4-0.8	Coarse	700	1000	3500	10000
TP104	0-0.1	Coarse	700	1000	3500	10000
TP104	0.2-0.4	Coarse	700	1000	3500	10000
BH105	0.03-0.3	Coarse	700	1000	3500	10000
BH106	0.19-0.4	Coarse	700	1000	3500	10000
BH106	0.8-0.95	Fine	800	1000	5000	10000
BH107	0.22-0.5	Coarse	700	1000	3500	10000
BH108	0.03-0.2	Coarse	700	1000	3500	10000
BH108 - [LAB_DUP]	0.03-0.2	Coarse	700	1000	3500	10000
BH109	0-0.2	Coarse	700	1000	3500	10000
BH110	0-0.2	Coarse	700	1000	3500	10000
BH111	0.2-0.5	Coarse	700	1000	3500	10000
BH111	0.5-0.95	Coarse	700	1000	3500	10000
BH112	0-0.2	Coarse	700	1000	3500	10000
BH112	0.4-0.5	Coarse	700	1000	3500	10000
BH113	0-0.2	Coarse	700	1000	3500	10000
TP114	0-0.2	Coarse	700	1000	3500	10000
TP115	0-0.2	Coarse	700	1000	3500	10000
BH116	0.03-0.3	Coarse	700	1000	3500	10000
BH116 - [LAB_DUP]	0.03-0.3	Coarse	700	1000	3500	10000
BH116	0.3-0.5	Fine	800	1000	5000	10000
TP117	0-0.2	Coarse	700	1000	3500	10000
BH118	0-0.2	Coarse	700	1000	3500	10000
BH119	0.16-0.3	Coarse	700	1000	3500	10000
TP120	0-0.2	Coarse	700	1000	3500	10000
TP121	0-0.2	Coarse	700	1000	3500	10000
TP122	0-0.2	Coarse	700	1000	3500	10000
TP122	0.6-0.8	Coarse	700	1000	3500	10000
BH123	0-0.2	Coarse	700	1000	3500	10000
TP124	0-0.2	Coarse	700	1000	3500	10000
TP125	0-0.2	Coarse	700	1000	3500	10000
TP125 - [LAB_DUP]	0-0.2	Coarse	700	1000	3500	10000
TP126	0-0.2	Coarse	700	1000	3500	10000
BH127	0-0.2	Coarse	700	1000	3500	10000
BH128	0-0.2	Coarse	700	1000	3500	10000
BH128	1.3-1.5	Coarse	700	1000	3500	10000
BH129	0.5-0.7	Coarse	700	1000	3500	10000
TP130	0-0.2	Coarse	700	1000	3500	10000
BH131	0-0.2	Coarse	700	1000	3500	10000
TP132	0-0.15	Coarse	700	1000	3500	10000
TP132 - [LAB_DUP]	0-0.15	Coarse	700	1000	3500	10000
TP133	0-0.2	Coarse	700	1000	3500	10000
BH134	0-0.2	Coarse	700	1000	3500	10000
TP135	0-0.2	Coarse	700	1000	3500	10000
TP136	0-0.2	Coarse	700	1000	3500	10000
BH137	0-0.3	Coarse	700	1000	3500	10000
BH138	0.05-0.3	Coarse	700	1000	3500	10000
BH139	0.05-0.3	Coarse	700	1000	3500	10000
BH140	0.05-0.3	Coarse	700	1000	3500	10000
BH140 - [LAB_DUP]	0.05-0.3	Coarse	700	1000	3500	10000
BH140	0.3-0.5	Coarse	700	1000	3500	10000
BH141	0-0.2	Coarse	700	1000	3500	10000
BH142	0-0.2	Coarse	700	1000	3500	10000
BH143	0-0.2	Coarse	700	1000	3500	10000
TP144	0-0.2	Coarse	700	1000	3500	10000
BH145	0-0.2	Coarse	700	1000	3500	10000
BH145	0.5-0.95	Coarse	700	1000	3500	10000
BH146	0-0.2	Coarse	700	1000	3500	10000
BH146	1.3-1.5	Coarse	700	1000	3500	10000
SDUP1	-	Coarse	700	1000	3500	10000
SDUP4	-	Coarse	700	1000	3500	10000
SDUP7	-	Coarse	700	1000	3500	10000
SDUP7 - [LAB_DUP]	-	Coarse	700	1000	3500	10000
SDUP10	-	Coarse	700	1000	3500	10000
SDUP101	-	Coarse	700	1000	3500	10000
SDUP101 - [LAB_DUP]	-	Coarse	700	NA	NA	NA
SDUP102	-	Coarse	700	1000	3500	10000
SDUP102 - [LAB_DUP]	-	Coarse	NA	1000	3500	10000
SDUP103	-	Coarse	700	1000	3500	10000
SDUP111	-	Coarse	700	1000	3500	10000

JKEnvironments

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

Analyte		C_6-C_{10}	>C_{10}-C_{16}	>C_{16}-C_{34}	>C_{34}-C_{40}	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		26,000	20,000	27,000	38,000	430	99,000	27,000	81,000	11,000	
Site Use		COMMERCIAL/INDUSTRIAL - DIRECT SOIL CONTACT									
Sample Reference	**Sample Depth**										
TP101	0-0.3	<25	**130**	**290**	<100	<0.2	<0.5	<1	<3	<1	0
TP102	0-0.25	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP102 - [LAB_DUP]	0-0.25	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP102	0.3-0.5	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH103	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH103	0.4-0.8	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	**0.1**
TP104	0-0.1	<25	**<50**	**340**	**180**	<0.2	<0.5	<1	<3	<1	0
TP104	0.2-0.4	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH105	0.03-0.3	<25	**<50**	**160**	**240**	<0.2	<0.5	<1	<3	<1	0
BH106	0.19-0.4	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH106	0.8-0.95	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH107	0.22-0.5	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH108	0.03-0.2	<25	**<50**	**210**	**330**	<0.2	<0.5	<1	<3	<1	0
BH108 - [LAB_DUP]	0.03-0.2	<25	**<50**	**120**	**190**	<0.2	<0.5	<1	<3	<1	0
BH109	0-0.2	<25	**<50**	**140**	<100	<0.2	<0.5	<1	<3	<1	0
BH110	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH111	0.2-0.5	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH111	0.5-0.95	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH112	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH112	0.4-0.5	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH113	0-0.2	<25	**<50**	**140**	**110**	<0.2	<0.5	<1	<3	<1	0
TP114	0-0.2	<25	**<50**	**460**	**520**	<0.2	<0.5	<1	<3	<1	0
TP115	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH116	0.03-0.3	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH116 - [LAB_DUP]	0.03-0.3	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH116	0.3-0.5	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP117	0-0.2	<25	**<50**	**290**	**540**	<0.2	<0.5	<1	<3	<1	0
BH118	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH119	0.16-0.3	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP120	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP121	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP122	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP122	0.6-0.8	<25	**<50**	**160**	**220**	<0.2	<0.5	<1	<3	<1	0
BH123	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP124	0-0.2	<25	**<50**	**200**	<100	<0.2	<0.5	<1	<3	<1	0
TP125	0-0.2	<25	**<50**	**340**	**320**	<0.2	<0.5	<1	<3	<1	0
TP125 - [LAB_DUP]	0-0.2	<25	**<50**	**330**	**360**	<0.2	<0.5	<1	<3	<1	0
TP126	0-0.2	<25	**<50**	**200**	**300**	<0.2	<0.5	<1	<3	<1	0
BH127	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH128	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH128	1.3-1.5	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH129	0.5-0.7	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP130	0-0.2	<25	**<50**	**270**	**280**	<0.2	<0.5	<1	<3	<1	0
BH131	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP132	0-0.15	<25	**<50**	**320**	**300**	<0.2	<0.5	<1	<3	<1	0
TP132 - [LAB_DUP]	0-0.15	<25	**<50**	**330**	**330**	<0.2	<0.5	<1	<3	<1	0
TP133	0-0.2	<25	**<50**	**400**	**360**	<0.2	<0.5	<1	<3	<1	0
BH134	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP135	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP136	0-0.2	<25	**<50**	**220**	**270**	<0.2	<0.5	<1	<3	<1	0
BH137	0-0.3	<25	**<50**	**180**	**220**	<0.2	<0.5	<1	<3	<1	0
BH138	0.05-0.3	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH139	0.05-0.3	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH140	0.05-0.3	<25	**<50**	**190**	**270**	<0.2	<0.5	<1	<3	<1	0
BH140 - [LAB_DUP]	0.05-0.3	<25	**<50**	**190**	**290**	<0.2	<0.5	<1	<3	<1	0
BH140	0.3-0.5	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH141	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH142	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH143	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
TP144	0-0.2	<25	**<50**	**420**	**390**	<0.2	<0.5	<1	<3	<1	0
BH145	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH145	0.5-0.95	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH146	0-0.2	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
BH146	1.3-1.5	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
SDUP1	-	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	-
SDUP4	-	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
SDUP7	-	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
SDUP7 - [LAB_DUP]	-	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
SDUP10	-	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
SDUP101	-	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
SDUP101 - [LAB_DUP]	-	<25	**NA**	**NA**	NA	<0.2	<0.5	<1	<3	<1	0
SDUP102	-	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
SDUP102 - [LAB_DUP]	-	NA	**<50**	**<100**	<100	NA	NA	NA	NA	NA	0
SDUP103	-	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
SDUP111	-	<25	**<50**	**<100**	<100	<0.2	<0.5	<1	<3	<1	0
Total Number of Samples		74	74	74	74	74	74	74	74	74	74
Maximum Value		<PQL	130	460	540	<PQL	<PQL	<PQL	<PQL	<PQL	0.1

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

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

FIELD DATA														LABORATORY DATA										
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	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**				**0.05**			**0.001**			**0.001**											**0.05**	**0.001**
3.2.21	TP101	0-0.3	No	10,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP101	0-0.3	538.32	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
3.2.21	TP102	0-0.25	No	15,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP102	0.25-0.75	NA	12,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP102	0.3-0.5	545.62	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
2.2.21	BH103	0-0.4	No	1,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2.2.21	BH103	0.4-1.4	NA	9,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH103	0.4-0.8	720.98	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
2.2.21	BH103	1.8-2.5	NA	4,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	BH104	0-0.1	No	8,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	BH104	0.1-0.5	NA	16,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5.2.21	BH105	0.03-0.8	No	12,500	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.2.21	BH106	0.19-0.8	NA	8,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH106	0.19-0.4	710.64	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
--	--	--	--	--	--	--	--	--	--	--	--	--	--	261320	BH107	0.22-0.5	482.11	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
4.2.21	BH108	0.03-0.2	No	3,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH108	0.03-0.2	751.21	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
2.2.21	BH109	0-0.4	No	7,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH109	0-0.2	303.44	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
5.2.21	BH110	0-0.4	No	10,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH110	0-0.2	392.04	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
2.2.21	BH111	0.5-1.5	NA	9,500	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH111	0.5-0.95	531.35	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
2.2.21	BH112	0-0.4	No	9,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH112	0-0.2	556.22	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
2.2.21	BH112	0.4-1.4	NA	8,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5.2.21	BH113	0-0.2	No	11,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.2.21	TP114	0-0.3	No	16,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP114	0-0.2	889.05	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected: Synthetic mineral fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
4.2.21	TP115	0-0.2	No	13,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.2.21	BH116	0.03-0.3	No	4,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH116	0.03-0.3	876.24	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
4.2.21	TP117	0-0.2	No	15,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	BH118	0-0.3	No	3,500	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH118	0-0.2	868.87	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
3.2.21	BH118	0.3-1.3	NA	11,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH118	0.2-0.4	643.21	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
2.2.21	BH119	0.16-0.4	No	3,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH119	0.16-0.3	935.55	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
3.2.21	TP120	0-0.2	No	13,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP120	0-0.2	671.59	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
3.2.21	TP120	0.2-0.5	NA	12,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP121	0-0.5	No	14,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP121	0-0.2	459.34	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
3.2.21	TP121	0.5-1.1	NA	13,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP121	1.1-1.7	NA	12,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP122	0-0.6	No	14,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP122	0.6-1.4	NA	13,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP122	0.6-0.8	613.32	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
3.2.21	TP122	1.4-1.9	NA	1,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	BH123	0-0.3	No	5,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH123	0-0.2	745.88	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
3.2.21	BH123	0.3-1.0	NA	10,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.2.21	TP124	0-0.2	No	15,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP124	0-0.2	955.5	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
4.2.21	TP125	0-0.2	No	14,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP125	0-0.2	917.15	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
4.2.21	TP126	0-0.3	No	14,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP126	0-0.2	973.16	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
3.2.21	BH127	0-0.2	No	10,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--	--	--	261320	BH128	0-0.2	638.2	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
1.2.21	BH128	0.2-0.4	No	4,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1.2.21	BH128	0.4-1.3	NA	10,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1.2.21	BH128	1.3-2.1	NA	4,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH128	1.3-1.5	691.5	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
1.2.21	BH129	0.5-1.0	No	2,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH129	0.5-0.7	714.71	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
1.2.21	BH129	1.0-2.0	NA	12,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1.2.21	BH129	2.0-2.8	NA	11,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	TP130	0-0.3	No	12,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	BH131	0-0.3	No	5,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH131	0-0.2	766.3	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
3.2.21	BH131	0.3-0.5	NA	2,500	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.2.21	TP132	0-0.15	No	12,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5.2.21	TP133	0-0.2	No	13,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP133	0-0.2	689.43	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
5.2.21	BH134	0-0.3	No	5,500	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4.2.21	TP135	0-0.3	No	15,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP135	0-0.2	867.61	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
5.2.21	TP136	0-0.2	No	13,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP136	0-0.2	954.8	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
3.2.21	BH137	0-0.3	No	4,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH137	0-0.3	816.67	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
3.2.21	BH137	0.3-1.0	NA	8,600	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1.2.21	BH138	0.05-0.3	No	4,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH138	0.05-0.3	712.52	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
1.2.21	BH139	0.05-0.3	No	1,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH139	0.05-0.3	661.6	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
1.2.21	BH140	0.05-0.3	No	2,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH140	0.05-0.3	838.67	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
1.2.21	BH140	0.3-0.5	NA	3,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5.2.21	BH141	0-0.3	No	9,800	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH141	0-0.2	916.01	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
2.2.21	BH142	0-0.5	No	5,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2.2.21	BH142	0.5-1.2	NA	8,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH142	0.5-0.95	529.75	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
5.2.21	BH143	0-0.2	No	4,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH143	0-0.2	841.94	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
5.2.21	BH143	0.2-0.4	NA	2,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5.2.21	TP144	0-0.2	No	17,900	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	TP144	0-0.2	1110.99	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
3.2.21	BH145	0-0.5	No	8,500	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH145	0-0.2	506.59	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
3.2.21	BH145	0.5-1.5	NA	7,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3.2.21	BH145	1.5-2.5	NA	7,500	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1.2.21	BH146	0-0.3	No	9,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1.2.21	BH146	0.3-1.3	NA	10,400	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1.2.21	BH146	1.3-2.3	NA	9,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	261320	BH146	1.3-1.5	479.83	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
1.2.21	BH146	2.3-3.3	NA	10,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Concentration above the SAC **VALUE**

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

Land Use Category				COMMERCIAL/INDUSTRIAL																			
							AGED HEAVY METALS-EILs						EILs		ESLs								
				pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																				
TP101	0-0.3	Fill: Silty Clay	Coarse	NA	NA	NA	**18**	**19**	**20**	**20**	**11**	**45**	<1	NA	<25	**130**	**290**	<100	<0.2	<0.5	<1	<3	**0.08**
TP102	0-0.25	Fill: Silty Clay	Coarse	NA	NA	NA	**14**	**22**	**14**	**22**	**7**	**39**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP102 - [LAB_DUP]	0-0.25	Fill: Silty Clay	Coarse	NA	NA	NA	**13**	**23**	**16**	**26**	**7**	**47**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP102	0.3-0.5	Fill: Silty Clay	Coarse	NA	NA	NA	**8**	**15**	**14**	**12**	**5**	**18**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH103	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	**6**	**14**	**17**	**24**	**7**	**74**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH103	0.4-0.8	Fill: Silty Clay	Coarse	NA	NA	NA	**9**	**12**	**20**	**14**	**7**	**34**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP104	0-0.1	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**95**	**23**	**17**	**11**	**74**	<1	<0.1	<25	<50	**340**	**180**	<0.2	<0.5	<1	<3	<0.05
TP104	0.2-0.4	Fill: Silty Clayey Sand	Coarse	NA	NA	NA	<4	**13**	**24**	**3**	**56**	**26**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH105	0.03-0.3	Fill: Silty Sandy Gravel	Coarse	NA	**20**	NA	<4	**10**	**41**	<1	**130**	**35**	<1	NA	<25	<50	**160**	**240**	<0.2	<0.5	<1	<3	<0.05
BH106	0.19-0.4	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**2**	**3**	**2**	**3**	**10**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH106	0.8-0.95	Silty Clay	Fine	NA	NA	NA	**6**	**3**	**12**	**4**	**1**	**15**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH107	0.22-0.5	Fill: Silty Clay	Coarse	NA	NA	NA	**4**	**8**	**22**	**11**	**12**	**46**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH108	0.03-0.2	Fill: Silty Gravelly Sand	Coarse	NA	**28**	NA	<4	**7**	**37**	**1**	**84**	**26**	<1	<0.1	<25	<50	**210**	**330**	<0.2	<0.5	<1	<3	<0.05
BH108 - [LAB_DUP]	0.03-0.2	Fill: Silty Gravelly Sand	Coarse	NA	**28**	NA	<4	**10**	**45**	**2**	**95**	**31**	<1	<0.1	<25	<50	**120**	**190**	<0.2	<0.5	<1	<3	<0.05
BH109	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**7**	**14**	**10**	**8**	**69**	<1	NA	<25	<50	**140**	<100	<0.2	<0.5	<1	<3	<0.05
BH110	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	<4	**21**	**26**	**16**	**38**	**79**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH111	0.2-0.5	Fill: Silty Clay	Coarse	NA	**16**	NA	<4	**29**	**33**	**3**	**130**	**42**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH111	0.5-0.95	Fill: Silty Clay	Coarse	NA	NA	NA	**9**	**19**	**18**	**16**	**9**	**29**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH112	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	**24**	**20**	**19**	**27**	**12**	**65**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH112	0.4-0.5	Fill: Silty Clay	Coarse	NA	NA	NA	**6**	**14**	**13**	**11**	**10**	**33**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH113	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	**6**	**12**	**15**	**14**	**11**	**64**	<1	NA	<25	<50	**140**	**110**	<0.2	<0.5	<1	<3	<0.05
TP114	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**18**	**25**	**7**	**23**	**150**	<1	NA	<25	<50	**460**	**520**	<0.2	<0.5	<1	<3	<0.05
TP115	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**21**	**15**	**2**	**31**	**22**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH116	0.03-0.3	Fill: Silty Clay	Coarse	NA	NA	NA	<4	**26**	**19**	**4**	**38**	**33**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH116 - [LAB_DUP]	0.03-0.3	Fill: Silty Clay	Coarse	NA	NA	NA	<4	**25**	**23**	**4**	**39**	**34**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH116	0.3-0.5	Silty Clay	Fine	NA	NA	NA	**6**	**15**	**12**	**11**	**5**	**11**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP117	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**3**	**55**	**3**	**5**	**15**	<1	NA	<25	<50	**290**	**540**	<0.2	<0.5	<1	<3	<0.05
BH118	0-0.2	Fill: Silty Gravelly Clay	Coarse	NA	NA	NA	<4	**4**	**4**	**6**	**3**	**11**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.1**
BH119	0.16-0.3	Fill: Silty Gravelly Clay	Coarse	NA	**35**	NA	<4	**6**	**19**	**2**	**65**	**25**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP120	0-0.2	Fill: Sandy Clay	Coarse	NA	NA	NA	<4	**5**	**13**	**12**	**22**	**24**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP121	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	**6**	**6**	**10**	**7**	**5**	**22**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP122	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	<4	**6**	**13**	**6**	**12**	**31**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.1**
TP122	0.6-0.8	Fill: Silty Clay	Coarse	NA	NA	NA	<4	**6**	**19**	**6**	**23**	**40**	<1	NA	<25	<50	**160**	**220**	<0.2	<0.5	<1	<3	**0.2**
BH123	0-0.2	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	**20**	**5**	**2**	**3**	**10**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.08**
TP124	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**11**	**8**	**5**	**10**	**16**	<1	NA	<25	<50	**200**	<100	<0.2	<0.5	<1	<3	<0.05
TP125	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**22**	**20**	**5**	**24**	**26**	<1	<0.1	<25	<50	**340**	**320**	<0.2	<0.5	<1	<3	**0.07**
TP125 - [LAB_DUP]	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**20**	**19**	**4**	**23**	**29**	<1	<0.1	<25	<50	**330**	**360**	<0.2	<0.5	<1	<3	<0.05
TP126	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**17**	**12**	**5**	**19**	**19**	<1	NA	<25	<50	**200**	**300**	<0.2	<0.5	<1	<3	<0.05
BH127	0-0.2	Fill: Silty Sandy Gravel	Coarse	NA	NA	NA	<4	**5**	**7**	**6**	**2**	**7**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH128	0-0.2	Fill: Silty Sandy Gravel	Coarse	NA	NA	NA	<4	**5**	**7**	**7**	**4**	**12**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH128	1.3-1.5	Fill: Silty Clay	Coarse	NA	NA	NA	<4	**10**	**11**	**7**	**15**	**22**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.07**
BH129	0.5-0.7	Fill: Silty Sandy Gravel	Coarse	NA	NA	NA	<4	**2**	**7**	**4**	**3**	**14**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.05**
TP130	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	**4**	**10**	**61**	**39**	**21**	**130**	<1	NA	<25	<50	**270**	**280**	<0.2	<0.5	<1	<3	**0.2**
BH131	0-0.2	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	**3**	**5**	**3**	**2**	**10**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.09**
TP132	0-0.15	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**10**	**11**	**7**	**6**	**31**	<1	<0.1	<25	<50	**320**	**300**	<0.2	<0.5	<1	<3	<0.05
TP132 - [LAB_DUP]	0-0.15	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**7**	**8**	**6**	**3**	**16**	<1	<0.1	<25	<50	**330**	**330**	<0.2	<0.5	<1	<3	<0.05
TP132 - [TRIPLICATE]	0-0.15	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**9**	**9**	**5**	**7**	**27**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP133	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**23**	**23**	**4**	**27**	**38**	<1	NA	<25	<50	**400**	**360**	<0.2	<0.5	<1	<3	<0.05
BH134	0-0.2	Fill: Silty Sandy Gravel	Coarse	NA	**34**	NA	<4	**8**	**52**	**2**	**130**	**37**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP135	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**20**	**10**	**4**	**19**	**27**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP136	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**21**	**11**	**5**	**24**	**28**	<1	NA	<25	<50	**220**	**270**	<0.2	<0.5	<1	<3	<0.05
BH137	0-0.3	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	**2**	**2**	**1**	**1**	**5**	<1	NA	<25	<50	**180**	**220**	<0.2	<0.5	<1	<3	**0.09**
BH138	0.05-0.3	Fill: Silty Clay	Coarse	NA	NA	NA	<4	**17**	**12**	**5**	**17**	**19**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH139	0.05-0.3	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**22**	**15**	**6**	**22**	**26**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.07**
BH140	0.05-0.3	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	**4**	**4**	**2**	**4**	**8**	<1	<0.1	<25	<50	**190**	**270**	<0.2	<0.5	<1	<3	**0.08**
BH140 - [LAB_DUP]	0.05-0.3	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	**12**	**15**	**11**	**11**	**24**	<1	<0.1	<25	<50	**190**	**290**	<0.2	<0.5	<1	<3	**0.09**
BH140 - [TRIPLICATE]	0.05-0.3	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	**10**	**12**	**7**	**8**	**19**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH140	0.3-0.5	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	**2**	**5**	**3**	<1	**3**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH141	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**8**	**11**	**6**	**11**	**23**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.09**
BH142	0-0.2	Fill: Silty Gravelly Clay	Coarse	NA	NA	NA	<4	**3**	**4**	**9**	**2**	**12**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH143	0-0.2	Fill: Silty Sandy Gravel	Coarse	NA	NA	NA	<4	**12**	**27**	**4**	**13**	**22**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
TP144	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**14**	**20**	**5**	**30**	**29**	<1	<0.1	<25	<50	**420**	**390**	<0.2	<0.5	<1	<3	<0.05
BH145	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	**6**	**20**	**7**	**9**	**6**	**8**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH145	0.5-0.95	Fill: Silty Clay	Coarse	NA	NA	NA	<4	**9**	**6**	**6**	<1	**3**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
BH146	0-0.2	Fill: Silty Sandy Clay	Coarse	NA	NA	NA	<4	**6**	**15**	**30**	**6**	**59**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.1**
BH146	1.3-1.5	Fill: Silty Clay	Coarse	NA	NA	NA	<4	**10**	**7**	**7**	**1**	**5**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SDUP1	-	Fill: Silty Sandy Clay	Coarse	NA	NA	NA	<4	**8**	**22**	**43**	**7**	**83**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.1**
SDUP4	-	Fill: Silty Clay	Coarse	NA	NA	NA	**7**	**12**	**13**	**19**	**5**	**40**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SDUP7	-	Fill: Silty Clay	Coarse	NA	NA	NA	**6**	**20**	**9**	**10**	**6**	**10**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SDUP7 - [LAB_DUP]	-	Fill: Silty Clay	Coarse	NA	NA	NA	**6**	**21**	**10**	**11**	**6**	**11**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SDUP10	-	Fill: Silty Sand	Coarse	NA	NA	NA	<4	**2**	**2**	**2**	**2**	**7**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
SDUP101	-	Fill: Silty Clay	Coarse	NA	NA	NA	**16**	**23**	**23**	**26**	**9**	**50**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.06**
SDUP101 - [LAB_DUP]	-	Fill: Silty Clay	Coarse	NA	NA	NA	**13**	**20**	**22**	**20**	**8**	**45**	<1	NA	<25	NA	NA	NA	<0.2	<0.5	<1	<3	NA
SDUP102	-	Fill: Silty Clay	Coarse	NA	NA	NA	**7**	**11**	**20**	**9**	**20**	**41**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.15**
SDUP102 - [LAB_DUP]	-	Fill: Silty Clay	Coarse	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	NA	<50	<100	<100	NA	NA	NA	NA	**0.17**
SDUP103	-	Fill: Silty Clay	Coarse	**8.4**	**4.65**	NA	**10**	**31**	**76**	**64**	**18**	**260**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<3	**0.19**
SDUP111	-	Fill: Silty Clay	Coarse	NA	NA	NA	**5**	**26**	**30**	**16**	**37**	**92**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.05
Total Number of Samples				1	7	0	76	76	76	76	76	76	74	33	74	74	74	74	74	74	74	74	74
Maximum Value				8.4	35	NA	24	95	76	64	130	260	<PQL	<PQL	<PQL	130	460	540	<PQL	<PQL	<PQL	<PQL	0.2

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

EIL AND ESL ASSESSMENT CRITERIA

Sample Reference	Sample Depth	Sample Description	Soil Texture	pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
TP101	0-0.3	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP102	0-0.25	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP102 - [LAB_DUP]	0-0.25	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP102	0.3-0.5	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH103	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH103	0.4-0.8	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP104	0-0.1	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP104	0.2-0.4	Fill: Silty Clayey Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH105	0.03-0.3	Fill: Silty Sandy Gravel	Coarse	NA	20	NA	160	320	110	2000	460	230	370	--	215	170	1700	3300	75	135	165	180	72
BH106	0.19-0.4	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH106	0.8-0.95	Silty Clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	2500	6600	95	135	185	95	72
BH107	0.22-0.5	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH108	0.03-0.2	Fill: Silty Gravelly Sand	Coarse	NA	28	NA	160	320	110	2000	600	230	370	640	215	170	1700	3300	75	135	165	180	72
BH108 - [LAB_DUP]	0.03-0.2	Fill: Silty Gravelly Sand	Coarse	NA	28	NA	160	320	110	2000	600	230	370	640	215	170	1700	3300	75	135	165	180	72
BH109	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH110	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH111	0.2-0.5	Fill: Silty Clay	Coarse	NA	16	NA	160	320	110	2000	460	230	370	--	215	170	1700	3300	75	135	165	180	72
BH111	0.5-0.95	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH112	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH112	0.4-0.5	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH113	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP114	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP115	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH116	0.03-0.3	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH116 - [LAB_DUP]	0.03-0.3	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH116	0.3-0.5	Silty Clay	Fine	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	2500	6600	95	135	185	95	72
TP117	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH118	0-0.2	Fill: Silty Gravelly Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH119	0.16-0.3	Fill: Silty Gravelly Clay	Coarse	NA	35	NA	160	320	110	2000	740	230	370	640	215	170	1700	3300	75	135	165	180	72
TP120	0-0.2	Fill: Sandy Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP121	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP122	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP122	0.6-0.8	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH123	0-0.2	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP124	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP125	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP125 - [LAB_DUP]	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP126	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH127	0-0.2	Fill: Silty Sandy Gravel	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH128	0-0.2	Fill: Silty Sandy Gravel	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH128	1.3-1.5	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH129	0.5-0.7	Fill: Silty Sandy Gravel	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP130	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH131	0-0.2	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP132	0-0.15	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP132 - [LAB_DUP]	0-0.15	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP132 - [TRIPLICATE]	0-0.15	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	--	--	--	--	--	--	--	--	--	--	--
TP133	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH134	0-0.2	Fill: Silty Sandy Gravel	Coarse	NA	34	NA	160	320	110	2000	740	230	370	640	215	170	1700	3300	75	135	165	180	72
TP135	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP136	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH137	0-0.3	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH138	0.05-0.3	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH139	0.05-0.3	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH140	0.05-0.3	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH140 - [LAB_DUP]	0.05-0.3	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH140 - [TRIPLICATE]	0.05-0.3	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	--	--	--	--	--	--	--	--	--	--	--
BH140	0.3-0.5	Fill: Silty Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH141	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH142	0-0.2	Fill: Silty Gravelly Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH143	0-0.2	Fill: Silty Sandy Gravel	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP144	0-0.2	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH145	0-0.2	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
BH145	0.5-0.95	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH146	0-0.2	Fill: Silty Sandy Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
BH146	1.3-1.5	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
SDUP1	-	Fill: Silty Sandy Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
SDUP4	-	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
SDUP7	-	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
SDUP7 - [LAB_DUP]	-	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
SDUP10	-	Fill: Silty Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
SDUP101	-	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
SDUP101 - [LAB_DUP]	-	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	--	--	--	75	135	165	180	--
SDUP102	-	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
SDUP102 - [LAB_DUP]	-	Fill: Silty Clay	Coarse	NA	NA	NA	--	--	--	--	--	--	--	640	--	170	1700	3300	--	--	--	--	72
SDUP103	-	Fill: Silty Clay	Coarse	8.4	4.65	NA	160	320	170	2000	60	480	370	--	215	170	1700	3300	75	135	165	180	72
SDUP111	-	Fill: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72

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

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total	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**																										
TP101	0-0.3	Fill: Silty Clay	**18**	<0.4	**19**	**20**	**20**	<0.1	**11**	**45**	**0.2**	**0.08**	NA	NA	NA	NA	NA	<25	**120**	**200**	**150**	**470**	<0.2	<0.5	<1	<3	Not Detected
TP102	0-0.25	Fill: Silty Clay	**14**	<0.4	**22**	**14**	**22**	<0.1	**7**	**39**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
TP102 - [LAB_DUP]	0-0.25	Fill: Silty Clay	**13**	<0.4	**23**	**16**	**26**	<0.1	**7**	**47**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
TP102	0.3-0.5	Fill: Silty Clay	**8**	<0.4	**15**	**14**	**12**	<0.1	**5**	**18**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH103	0-0.2	Fill: Silty Clay	**6**	<0.4	**14**	**17**	**24**	<0.1	**7**	**74**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH103	0.4-0.8	Fill: Silty Clay	**9**	<0.4	**12**	**20**	**14**	<0.1	**7**	**34**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
TP104	0-0.1	Fill: Silty Sand	**<4**	<0.4	**95**	**23**	**17**	<0.1	**11**	**74**	**0.2**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**180**	**230**	**410**	<0.2	<0.5	<1	<3	NA
TP104	0.2-0.4	Fill: Silty Clayey Sand	**<4**	<0.4	**13**	**24**	**3**	<0.1	**56**	**26**	**0.1**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH105	0.03-0.3	Fill: Silty Sandy Gravel	**<4**	<0.4	**10**	**41**	**<1**	<0.1	**130**	**35**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**180**	**180**	<0.2	<0.5	<1	<3	NA
BH106	0.19-0.4	Fill: Silty Sand	**<4**	<0.4	**2**	**3**	**2**	<0.1	**3**	**10**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH106	0.8-0.95	Silty Clay	**6**	<0.4	**3**	**12**	**4**	<0.1	**1**	**15**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH107	0.22-0.5	Fill: Silty Clay	**4**	<0.4	**8**	**22**	**11**	<0.1	**12**	**46**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH108	0.03-0.2	Fill: Silty Gravelly Sand	**<4**	<0.4	**7**	**37**	**1**	<0.1	**84**	**26**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**240**	**240**	<0.2	<0.5	<1	<3	Not Detected
BH108 - [LAB_DUP]	0.03-0.2	Fill: Silty Gravelly Sand	**<4**	<0.4	**10**	**45**	**2**	<0.1	**95**	**31**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**140**	**140**	<0.2	<0.5	<1	<3	NA
BH109	0-0.2	Fill: Silty Sand	**<4**	<0.4	**7**	**14**	**10**	<0.1	**8**	**69**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**140**	**140**	<0.2	<0.5	<1	<3	Not Detected
BH110	0-0.2	Fill: Silty Clay	**<4**	<0.4	**21**	**26**	**16**	<0.1	**38**	**79**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH111	0.2-0.5	Fill: Silty Clay	**<4**	<0.4	**29**	**33**	**3**	<0.1	**130**	**42**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH111	0.5-0.95	Fill: Silty Clay	**9**	<0.4	**19**	**18**	**16**	<0.1	**9**	**29**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH112	0-0.2	Fill: Silty Clay	**24**	<0.4	**20**	**19**	**27**	<0.1	**12**	**65**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH112	0.4-0.5	Fill: Silty Clay	**6**	<0.4	**14**	**13**	**11**	<0.1	**10**	**33**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH113	0-0.2	Fill: Silty Clay	**6**	<0.4	**12**	**15**	**14**	<0.1	**11**	**64**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**170**	**170**	<0.2	<0.5	<1	<3	NA
TP114	0-0.2	Fill: Silty Sand	**<4**	<0.4	**18**	**25**	**7**	<0.1	**23**	**150**	**0.57**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**210**	**410**	**620**	<0.2	<0.5	<1	<3	Not Detected
TP115	0-0.2	Fill: Silty Sand	**<4**	<0.4	**21**	**15**	**2**	<0.1	**31**	**22**	**0.3**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH116	0.03-0.3	Fill: Silty Clay	**<4**	<0.4	**26**	**19**	**4**	<0.1	**38**	**33**	**0.58**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH116 - [LAB_DUP]	0.03-0.3	Fill: Silty Clay	**<4**	<0.4	**25**	**23**	**4**	<0.1	**39**	**34**	**1.2**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH116	0.3-0.5	Silty Clay	**6**	<0.4	**15**	**12**	**11**	<0.1	**5**	**11**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
TP117	0-0.2	Fill: Silty Sand	**<4**	<0.4	**3**	**55**	**3**	<0.1	**5**	**15**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**110**	**350**	**460**	<0.2	<0.5	<1	<3	NA
BH118	0-0.2	Fill: Silty Gravelly Clay	**<4**	<0.4	**4**	**4**	**6**	<0.1	**3**	**11**	**0.94**	**0.1**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH118	0.2-0.4	Fill: Silty Clay	**NA**	NA	**NA**	**NA**	**NA**	NA	**NA**	**NA**	**NA**	**NA**	NA	NA	NA	NA	NA	NA	**NA**	**NA**	**NA**	**NA**	NA	NA	NA	NA	Not Detected
BH119	0.16-0.3	Fill: Silty Gravelly Clay	**<4**	<0.4	**6**	**19**	**2**	<0.1	**65**	**25**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
TP120	0-0.2	Fill: Sandy Clay	**<4**	<0.4	**5**	**13**	**12**	<0.1	**22**	**24**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
TP121	0-0.2	Fill: Silty Clay	**6**	<0.4	**6**	**10**	**7**	<0.1	**5**	**22**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
TP122	0-0.2	Fill: Silty Clay	**<4**	<0.4	**6**	**13**	**6**	<0.1	**12**	**31**	**0.54**	**0.1**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
TP122	0.6-0.8	Fill: Silty Clay	**<4**	<0.4	**6**	**19**	**6**	<0.1	**23**	**40**	**1.9**	**0.2**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**180**	**180**	<0.2	<0.5	<1	<3	Not Detected
BH123	0-0.2	Fill: Silty Gravelly Sand	**<4**	<0.4	**20**	**5**	**2**	<0.1	**3**	**10**	**0.74**	**0.08**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
TP124	0-0.2	Fill: Silty Sand	**<4**	<0.4	**11**	**8**	**5**	<0.1	**10**	**16**	**0.1**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**150**	**150**	<0.2	<0.5	<1	<3	Not Detected
TP125	0-0.2	Fill: Silty Sand	**<4**	<0.4	**22**	**20**	**5**	<0.1	**24**	**26**	**0.4**	**0.07**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**160**	**280**	**440**	<0.2	<0.5	<1	<3	Not Detected
TP125 - [LAB_DUP]	0-0.2	Fill: Silty Sand	**<4**	<0.4	**20**	**19**	**4**	<0.1	**23**	**29**	**0.2**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**140**	**310**	**450**	<0.2	<0.5	<1	<3	NA
TP126	0-0.2	Fill: Silty Sand	**<4**	<0.4	**17**	**12**	**5**	<0.1	**19**	**19**	**0.2**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**210**	**210**	<0.2	<0.5	<1	<3	Not Detected
BH127	0-0.2	Fill: Silty Sandy Gravel	**<4**	<0.4	**5**	**7**	**6**	<0.1	**2**	**7**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH128	0-0.2	Fill: Silty Sandy Gravel	**<4**	<0.4	**5**	**7**	**7**	<0.1	**4**	**12**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH128	1.3-1.5	Fill: Silty Clay	**<4**	<0.4	**10**	**11**	**7**	<0.1	**15**	**22**	**0.4**	**0.07**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH129	0.5-0.7	Fill: Silty Sandy Gravel	**<4**	<0.4	**2**	**7**	**4**	<0.1	**3**	**14**	**0.4**	**0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
TP130	0-0.2	Fill: Silty Clay	**4**	<0.4	**10**	**61**	**39**	<0.1	**21**	**130**	**2.9**	**0.2**	NA	NA	NA	NA	NA	<25	**<50**	**120**	**240**	**360**	<0.2	<0.5	<1	<3	NA
BH131	0-0.2	Fill: Silty Gravelly Sand	**<4**	<0.4	**3**	**5**	**3**	<0.1	**2**	**10**	**0.4**	**0.09**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
TP132	0-0.15	Fill: Silty Sand	**<4**	<0.4	**10**	**11**	**7**	<0.1	**6**	**31**	**0.3**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**170**	**270**	**440**	<0.2	<0.5	<1	<3	NA
TP132 - [LAB_DUP]	0-0.15	Fill: Silty Sand	**<4**	<0.4	**7**	**8**	**6**	<0.1	**3**	**16**	**0.1**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**150**	**290**	**440**	<0.2	<0.5	<1	<3	NA
TP132 - [TRIPLICATE]	0-0.15	Fill: Silty Sand	**<4**	<0.4	**9**	**9**	**5**	<0.1	**7**	**27**	**NA**	**NA**	NA	NA	NA	NA	NA	NA	**NA**	**NA**	**NA**	**NA**	NA	NA	NA	NA	NA
TP133	0-0.2	Fill: Silty Sand	**<4**	<0.4	**23**	**23**	**4**	<0.1	**27**	**38**	**0.2**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**210**	**300**	**510**	<0.2	<0.5	<1	<3	Not Detected
BH134	0-0.2	Fill: Silty Sandy Gravel	**<4**	<0.4	**8**	**52**	**2**	<0.1	**130**	**37**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
TP135	0-0.2	Fill: Silty Sand	**<4**	<0.4	**20**	**10**	**4**	<0.1	**19**	**27**	**0.3**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
TP136	0-0.2	Fill: Silty Sand	**<4**	<0.4	**21**	**11**	**5**	<0.1	**24**	**28**	**0.2**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**130**	**180**	**310**	<0.2	<0.5	<1	<3	Not Detected
BH137	0-0.3	Fill: Silty Gravelly Sand	**<4**	<0.4	**2**	**2**	**1**	<0.1	**1**	**5**	**0.79**	**0.09**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**180**	**180**	<0.2	<0.5	<1	<3	Not Detected
BH138	0.05-0.3	Fill: Silty Clay	**<4**	<0.4	**17**	**12**	**5**	<0.1	**17**	**19**	**0.1**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH139	0.05-0.3	Fill: Silty Sand	**<4**	<0.4	**22**	**15**	**6**	<0.1	**22**	**26**	**0.9**	**0.07**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH140	0.05-0.3	Fill: Silty Gravelly Sand	**<4**	<0.4	**4**	**4**	**2**	<0.1	**4**	**8**	**0.59**	**0.08**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**210**	**210**	<0.2	<0.5	<1	<3	Not Detected
BH140 - [LAB_DUP]	0.05-0.3	Fill: Silty Gravelly Sand	**<4**	<0.4	**12**	**15**	**11**	<0.1	**11**	**24**	**0.52**	**0.09**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**220**	**220**	<0.2	<0.5	<1	<3	NA
BH140 - [TRIPLICATE]	0.05-0.3	Fill: Silty Gravelly Sand	**<4**	<0.4	**10**	**12**	**7**	<0.1	**8**	**19**	**NA**	**NA**	NA	NA	NA	NA	NA	NA	**NA**	**NA**	**NA**	**NA**	NA	NA	NA	NA	NA
BH140	0.3-0.5	Fill: Silty Gravelly Sand	**<4**	<0.4	**2**	**5**	**3**	<0.1	**<1**	**3**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH141	0-0.2	Fill: Silty Sand	**<4**	<0.4	**8**	**11**	**6**	<0.1	**11**	**23**	**0.52**	**0.09**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH142	0-0.2	Fill: Silty Gravelly Clay	**<4**	<0.4	**3**	**4**	**9**	<0.1	**2**	**12**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH142	0.5-0.95	Fill: Silty Clay	**NA**	NA	**NA**	**NA**	**NA**	NA	**NA**	**NA**	**NA**	**NA**	NA	NA	NA	NA	NA	NA	**NA**	**NA**	**NA**	**NA**	NA	NA	NA	NA	Not Detected
BH143	0-0.2	Fill: Silty Sandy Gravel	**<4**	<0.4	**12**	**27**	**4**	<0.1	**13**	**22**	**0.1**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
TP144	0-0.2	Fill: Silty Sand	**<4**	<0.4	**14**	**20**	**5**	<0.1	**30**	**29**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**230**	**290**	**520**	<0.2	<0.5	<1	<3	Not Detected
BH145	0-0.2	Fill: Silty Clay	**6**	<0.4	**20**	**7**	**9**	<0.1	**6**	**8**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
BH145	0.5-0.95	Fill: Silty Clay	**<4**	<0.4	**9**	**6**	**6**	<0.1	**<1**	**3**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH146	0-0.2	Fill: Silty Sandy Clay	**<4**	<0.4	**6**	**15**	**30**	<0.1	**6**	**59**	**1.3**	**0.1**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
BH146	1.3-1.5	Fill: Silty Clay	**<4**	<0.4	**10**	**7**	**7**	<0.1	**1**	**5**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	Not Detected
SDUP1	-	Fill: Silty Sandy Clay	**<4**	<0.4	**8**	**22**	**43**	<0.1	**7**	**83**	**1.4**	**0.1**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
SDUP4	-	Fill: Silty Clay	**7**	<0.4	**12**	**13**	**19**	<0.1	**5**	**40**	**<0.05**	**<0.05**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
SDUP7	-	Fill: Silty Clay	**6**	<0.4	**20**	**9**	**10**	<0.1	**6**	**10**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
SDUP7 - [LAB_DUP]	-	Fill: Silty Clay	**6**	<0.4	**21**	**10**	**11**	<0.1	**6**	**11**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
SDUP10	-	Fill: Silty Sand	**<4**	<0.4	**2**	**2**	**2**	<0.1	**2**	**7**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
SDUP101	-	Fill: Silty Clay	**16**	<0.4	**23**	**23**	**26**	<0.1	**9**	**50**	**0.06**	**0.06**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
SDUP101 - [LAB_DUP]	-	Fill: Silty Clay	**13**	<0.4	**20**	**22**	**20**	<0.1	**8**	**45**	**NA**	**NA**	NA	NA	NA	NA	<0.1	<25	**NA**	**NA**	**NA**	**NA**	<0.2	<0.5	<1	<3	NA
SDUP102	-	Fill: Silty Clay	**7**	<0.4	**11**	**20**	**9**	<0.1	**20**	**41**	**1.6**	**0.15**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
SDUP102 - [LAB_DUP]	-	Fill: Silty Clay	**NA**	NA	**NA**	**NA**	**NA**	NA	**NA**	**NA**	**1.1**	**0.17**	<0.1	NA	NA	NA	NA	NA	**<50**	**<100**	**<100**	**<50**	NA	NA	NA	NA	NA
SDUP103	-	Fill: Silty Clay	**10**	**0.4**	**31**	**76**	**64**	<0.1	**18**	**260**	**2**	**0.19**	NA	NA	NA	NA	NA	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
SDUP111	-	Fill: Silty Clay	**5**	<0.4	**26**	**30**	**16**	<0.1	**37**	**92**	**<0.05**	**<0.05**	<0.1	NA	NA	NA	<0.1	<25	**<50**	**<100**	**<100**	**<50**	<0.2	<0.5	<1	<3	NA
FCF1	Surface	Fragment	**NA**	NA	**NA**	**NA**	**NA**	NA	**NA**	**NA**	**NA**	**NA**	NA	NA	NA	NA	NA	NA	**NA**	**NA**	**NA**	**NA**	NA	NA	NA	NA	Detected
Total Number of Samples			76	76	76	76	76	76	76	76	74	74	33	0	0	0	33	74	74	74	74	74	74	74	74	74	40
Maximum Value			24	0.4	95	76	64	<PQL	130	260	2.9	0.2	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	120	230	410	620	<PQL	<PQL	<PQL	<PQL	Detected

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

Standard deviation exceeds data assessment criteria — **VALUE**

TABLE S8
SOIL LABORATORY TCLP RESULTS
All data in mg/L unless stated otherwise

			Nickel
PQL - Envirolab Services			0.02
TCLP1 - General Solid Waste			2
TCLP2 - Restricted Solid Waste			8
TCLP3 - Hazardous Waste			>8
Sample Reference	**Sample Depth**	**Sample Description**	
TP104	0.2-0.4	Fill: Silty Clayey Sand	**0.03**
BH105	0.03-0.3	Fill: Silty Sandy Gravel	**0.3**
BH108	0.03-0.2	Fill: Silty Gravelly Sand	**0.2**
BH111	0.2-0.5	Fill: Silty Clay	**0.2**
BH119	0.16-0.3	Fill: Silty Gravelly Clay	**0.03**
BH134	0-0.2	Fill: Silty Sandy Gravel	**0.1**
Total Number of samples			6
Maximum Value			0.3

General Solid Waste	**VALUE**
Restricted Solid Waste	**VALUE**
Hazardous Waste	**VALUE**
Concentration above PQL	**Bold**

TABLE S9
SOIL QA/QC SUMMARY

			TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene
	PQL Envirolab SYD		25	50	100	100	0.2	0.5	1	2	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.05	0.1	0.1	0.1
	PQL Envirolab VIC		25	50	100	100	0.2	0.5	1.0	2.0	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
Intra	BH146	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.2	0.2	0.1	0.1	0.2	0.1	<0.1	<0.1	0.1
laboratory	SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.3	0.2	0.1	0.1	0.2	0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.2	nc	0.25	0.2	0.1	0.1	0.2	0.1	nc	nc	0.075
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	nc	40%	0%	0%	0%	0%	0%	nc	nc	67%
Intra	BH103	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP4	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH145	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP7	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH106	0.19-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP10	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	TP122	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.2	0.1	<0.1	<0.1	0.1
laboratory	SDUP102	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.3	0.3	0.1	0.1	0.2	0.15	0.1	<0.1	0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.075	nc	0.25	0.25	0.075	0.075	0.15	0.125	0.075	nc	0.1
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	nc	40%	40%	67%	67%	67%	40%	67%	nc	0%
Inter	TP101	0-0.3	<25	130	290	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.2	0.08	<0.1	<0.1	<0.1
laboratory	SDUP101	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.06	<0.1	<0.1	<0.1
duplicate	MEAN		nc	77.5	170	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.075	nc	nc	nc	0.07	nc	nc	nc
	RPD %		nc	135%	141%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	nc	nc	nc	29%	nc	nc	nc
Inter	TP130	0-0.2	<25	<50	270	280	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.4	0.1	0.5	0.5	0.2	0.2	0.4	0.2	0.1	<0.1	0.2
laboratory	SDUP103	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.3	0.3	0.2	0.1	0.3	0.19	0.1	<0.1	0.2
duplicate	MEAN		nc	nc	160	165	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.3	0.075	0.4	0.4	0.2	0.15	0.35	0.195	0.1	nc	0.2
	RPD %		nc	nc	138%	139%	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	67%	50%	50%	0%	67%	29%	5%	0%	nc	0%
Inter	BH110	0-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP111	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field	TB-S1	-	<25	NA	NA	NA	<0.2	<0.5	<1	<2	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	1/02/21																									
Field	TB-S2	-	<25	NA	NA	NA	<0.2	<0.5	<1	<2	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	3/02/21																									
Field	FR1-SPT	µg/L	NA	NA	NA	NA	<1	<1	<1	<2	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	3/02/21																									
Field	FR2-SPT	µg/L	NA	NA	NA	NA	<1	<1	<1	<2	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	5/02/21																									
Trip	TS-S1		-	-	-	-	100%	98%	104%	105%	104%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	1/02/21																									
Trip	TS-S2		-	-	-	-	96%	95%	97%	95%	97%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	1/02/21																									

			HCB	alpha- BHC	gamma- BHC	beta- BHC	Heptachlor	delta- BHC	Aldrin	Heptachlor Epoxide	Gamma- Chlordane	alpha- chlordane	Endosulfan I	pp- DDE	Dieldrin	Endrin	pp- DDD	Endosulfan II	pp- DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor
	PQL Envirolab SYD		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	PQL Envirolab VIC		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Intra	BH146	0-0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
laboratory	SDUP1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH103	0-0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
laboratory	SDUP4	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH145	0-0.2	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP7	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH106	0.19-0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP10	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	TP122	0-0.2	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP102	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	TP101	0-0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
laboratory	SDUP101	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	TP130	0-0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
laboratory	SDUP103	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	BH110	0-0.2	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP111	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field	TB-S1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	1/02/21																					
Field	TB-S2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	3/02/21																					
Field	FR1-SPT	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	3/02/21																					
Field	FR2-SPT	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	5/02/21																					
Trip	TS-S1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	1/02/21																					
Trip	TS-S2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	1/02/21																					

			Azinphos-methyl (Guthion)	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	4	0.4	1	1	1	0.1	1	1
	PQL Envirolab VIC		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	4.0	0.4	1.0	1.0	1.0	0.1	1.0	1.0
Intra	BH146	0-0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<4	<0.4	6	15	30	<0.1	6	59
laboratory	SDUP1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<4	<0.4	8	22	43	<0.1	7	83
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	7	18.5	36.5	nc	6.5	71
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	29%	38%	36%	nc	15%	34%
Intra	BH103	0-0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6	<0.4	14	17	24	<0.1	7	74
laboratory	SDUP4	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7	<0.4	12	13	19	<0.1	5	40
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	6.5	nc	13	15	21.5	nc	6	57
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	15%	nc	15%	27%	23%	nc	33%	60%
Intra	BH145	0-0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	6	<0.4	20	7	9	<0.1	6	8
laboratory	SDUP7	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	6	<0.4	20	9	10	<0.1	6	10
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	6	nc	20	8	9.5	nc	6	9
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	nc	0%	25%	11%	nc	0%	22%
Intra	BH106	0.19-0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<4	<0.4	2	3	2	<0.1	3	10
laboratory	SDUP10	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<4	<0.4	2	2	2	<0.1	2	7
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	2	2.5	2	nc	2.5	8.5
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	40%	0%	nc	40%	35%
Intra	TP122	0-0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<4	<0.4	6	13	6	<0.1	12	31
laboratory	SDUP102	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	7	<0.4	11	20	9	<0.1	20	41
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	4.5	nc	8.5	16.5	7.5	nc	16	36
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	111%	nc	59%	42%	40%	nc	50%	28%
Inter	TP101	0-0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	18	<0.4	19	20	20	<0.1	11	45
laboratory	SDUP101	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	16	<0.4	23	23	26	<0.1	9	50
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	17	nc	21	21.5	23	nc	10	47.5
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	12%	nc	19%	14%	26%	nc	20%	11%
Inter	TP130	0-0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4	<0.4	10	61	39	<0.1	21	130
laboratory	SDUP103	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10	0.4	31	76	64	<0.1	18	260
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	7	0.3	20.5	68.5	51.5	nc	19.5	195
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	86%	67%	102%	22%	49%	nc	15%	67%
Inter	BH110	0-0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<4	<0.4	21	26	16	<0.1	38	79
laboratory	SDUP111	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	5	<0.4	26	30	16	<0.1	37	92
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	3.5	nc	23.5	28	16	nc	37.5	85.5
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	86%	nc	21%	14%	0%	nc	3%	15%
Field	TB-S1	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	1/02/21																						
Field	TB-S2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	3/02/21																						
Field	FR1-SPT	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	3/02/21																						
Field	FR2-SPT	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	5/02/21																						
Trip	TS-S1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	1/02/21																						
Trip	TS-S2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	1/02/21																						

Result outside of QA/QC acceptance criteria (highlighted)

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

CT: Contaminant Threshold
FTS: Fluorotelomer sulfonic acid
NA: Not Analysed
NC: Not Calculated
NEMP National Environmental Management Plan
NSL: No Set Limit
PFAS Per- and polyfluoroalkyl substances
PFHxS Perfluorohexanesulfonic acid
PFOA Perfluorooctanoic acid
PFOS Perfluorooctanesulfonic acid
PQL: Practical Quantitation Limit
RS: Rinsate Sample
SAC: Site Assessment Criteria
SCC: Specific Contaminant Concentration
TB: Trip Blank
TCLP: Toxicity Characteristics Leaching Procedure
TS: Trip Spike
UCL: Upper Level Confidence Limit on Mean Value

Table Specific Explanations:

Groundwater Ecology Tables:

- 95% refers to a concentration that has been derived to protect 95% of aquatic species
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

Waste Classification and TCLP Table:

- Data assessed using the Addendum to the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014) -October 201

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

	PQL Envirolab Services	ANZG 2018 Fresh Waters	SAMPLES													
			MW103	MW103 - [LAB_DUP]	MW106	MW111	MW123	MW123 - [LAB_DUP]	MW128	MW134	MW139	MW143	PMW1	PMW2	WDUP3	WDUP3 - [LAB_DUP]
Inorganic Compounds and Parameters																
pH		6.5 - 8.5	6.7	6.8	8.3	6.6	6.4	NA	6.9	6.8	6.2	7	NA	NA	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	**13000**	**13000**	**1500**	**19000**	**18000**	NA	**5500**	**17000**	**22000**	**25000**	NA	NA	NA	NA
Turbidity (NTU)		NSL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals and Metalloids																
Arsenic (As III)	1	24	**4**	**4**	**1**	<1	**5**	NA	**2**	**25**	**1**	**9**	NA	NA	**1**	NA
Cadmium	0.1	0.2	**0.1**	**0.1**	<0.1	<0.1	**0.5**	NA	**0.2**	<0.1	<0.1	**0.7**	NA	NA	<0.1	NA
Chromium (SAC for Cr III adopted)	1	3.3	<1	<1	**1**	**1**	<1	NA	**16**	<1	<1	**2**	NA	NA	**1**	NA
Copper	1	1.4	<1	<1	**2**	<1	**1**	NA	**2**	<1	<1	<1	NA	NA	**3**	NA
Lead	1	3.4	<1	<1	<1	<1	<1	NA	<1	<1	<1	<1	NA	NA	<1	NA
Total Mercury (inorganic)	0.05	0.06	**0.07**	**0.07**	<0.05	<0.05	<0.05	NA	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	NA
Nickel	1	11	**11**	**10**	**1**	**3**	**39**	NA	**22**	**30**	**54**	**76**	NA	NA	**1**	NA
Zinc	1	8	**9**	**8**	**7**	**9**	**66**	NA	**48**	**10**	**58**	**45**	NA	NA	**9**	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)																
Benzene	1	950	<1	NA	<1	<1	**66**	**61**	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	1	180	<1	NA	<1	<1	**4**	**3**	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	80	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-xylene	2	75	<2	NA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-xylene	1	350	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total xylenes	2	NSL	<2	NA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Volatile Organic Compounds (VOCs), including chlorinated VOCs																
Dichlorodifluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Chloromethane	10	NSL	<10	NA	<10	<10	**11**	**17**	<10	<10	<10	<10	NA	NA	<10	<10
Vinyl Chloride	10	100	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Bromomethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Chloroethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Trichlorofluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
1,1-Dichloroethene	1	700	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Trans-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1-dichloroethane	1	90	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Cis-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Chloroform	1	370	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
2,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dichloroethane	1	1900	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,1-trichloroethane	1	270	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Cyclohexane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Carbon tetrachloride	1	240	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Benzene	1	950	<1	NA	<1	<1	**66**	**61**	<1	<1	<1	<1	NA	NA	<1	<1
Dibromomethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dichloropropane	1	900	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Trichloroethene	1	330	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromodichloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
trans-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
cis-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,2-trichloroethane	1	6500	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Toluene	1	180	<1	NA	<1	<1	**4**	**3**	<1	<1	<1	<1	NA	NA	<1	<1
1,3-dichloropropane	1	1100	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Dibromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dibromoethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Tetrachloroethene	1	70	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Chlorobenzene	1	55	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Ethylbenzene	1	80	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromoform	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
m+p-xylene	2	75	<2	NA	<2	<2	<2	<2	<2	<2	<2	<2	NA	NA	<2	<2
Styrene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,2,2-tetrachloroethane	1	400	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
o-xylene	1	350	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2,3-trichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Isopropylbenzene	1	30	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromobenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
n-propyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
2-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
4-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Tert-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,3-dichlorobenzene	1	260	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Sec-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,4-dichlorobenzene	1	60	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
4-isopropyl toluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dichlorobenzene	1	160	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
n-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dibromo-3-chloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2,4-trichlorobenzene	1	85	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Hexachlorobutadiene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2,3-trichlorobenzene	1	3	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Polycyclic Aromatic Hydrocarbons (PAHs)																
Naphthalene	0.2	16	<0.2	<0.2	<0.2	<0.2	<0.2	NA	<0.2	<0.2	<0.2	<0.2	NA	NA	<0.2	<0.2
Acenaphthylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Phenanthrene	0.1	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Anthracene	0.1	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Fluoranthene	0.1	1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	NA	<0.2	<0.2	<0.2	<0.2	NA	NA	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1

Concentration above the SAC	**VALUE**
Concentration above the PQL	**Bold**
GIL >PQL	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													
			MW103	MW103 - [LAB_DUP]	MW106	MW111	MW123	MW123 - [LAB_DUP]	MW128	MW134	MW139	MW143	PMW1	PMW2	WDUP3	WDUP3 - [LAB_DUP]
Inorganic Compounds and Parameters																
pH		6.5 - 8.5	6.7	6.8	8.3	6.6	6.4	NA	6.9	6.8	6.2	7	NA	NA	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	**13000**	**13000**	**1500**	**19000**	**18000**	NA	**5500**	**17000**	**22000**	**25000**	NA	NA	NA	NA
Turbidity (NTU)		NSL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals and Metalloids																
Arsenic (As III)	1	100	**4**	**4**	**1**	<1	**5**	NA	**2**	**25**	**1**	**9**	NA	NA	**1**	NA
Cadmium	0.1	20	**0.1**	**0.1**	<0.1	<0.1	**0.5**	NA	**0.2**	<0.1	<0.1	**0.7**	NA	NA	<0.1	NA
Chromium (total)	1	500	<1	<1	**1**	**1**	<1	NA	**16**	<1	<1	**2**	NA	NA	**1**	NA
Copper	1	20000	<1	<1	**2**	<1	**1**	NA	**2**	<1	<1	<1	NA	NA	**3**	NA
Lead	1	100	<1	<1	<1	<1	<1	NA	<1	<1	<1	<1	NA	NA	<1	NA
Total Mercury (inorganic)	0.05	10	**0.07**	**0.07**	<0.05	<0.05	<0.05	NA	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05	NA
Nickel	1	200	**11**	**10**	**1**	**3**	**39**	NA	**22**	**30**	**54**	**76**	NA	NA	**1**	NA
Zinc	1	30000	**9**	**8**	**7**	**9**	**66**	NA	**48**	**10**	**58**	**45**	NA	NA	**9**	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)																
Benzene	1	10	<1	NA	<1	<1	**66**	**61**	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	1	8000	<1	NA	<1	<1	**4**	**3**	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-xylene	2	NSL	<2	NA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-xylene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total xylenes	2	6000	<2	NA												
Volatile Organic Compounds (VOCs), including chlorinated VOCs																
Dichlorodifluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Chloromethane	10	NSL	<10	NA	<10	<10	**11**	**17**	<10	<10	<10	<10	NA	NA	<10	<10
Vinyl Chloride	10	3	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Bromomethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Chloroethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
Trichlorofluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10
1,1-Dichloroethene	1	300	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Trans-1,2-dichloroethene	1	600	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1-dichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Cis-1,2-dichloroethene	1	600	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromochloromethane	1	2500	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Chloroform	1		<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
2,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dichloroethane	1	30	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,1-trichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Cyclohexane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Carbon tetrachloride	1	30	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Benzene	1	10	<1	NA	<1	<1	**66**	**61**	<1	<1	<1	<1	NA	NA	<1	<1
Dibromomethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Trichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromodichloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
trans-1,3-dichloropropene	1	1000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
cis-1,3-dichloropropene	1	1000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,2-trichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Toluene	1	8000	<1	NA	<1	<1	**4**	**3**	<1	<1	<1	<1	NA	NA	<1	<1
1,3-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Dibromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dibromoethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Tetrachloroethene	1	500	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Chlorobenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Ethylbenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromoform	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
m+p-xylene	2	NSL	<2	NA	<2	<2	<2	<2	<2	<2	<2	<2	NA	NA	<2	<2
Styrene	1	300	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,1,2,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
o-xylene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2,3-trichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Isopropylbenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Bromobenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
n-propyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
2-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
4-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Tert-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,3-dichlorobenzene	1	200	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Sec-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,4-dichlorobenzene	1	400	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
4-isopropyl toluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dichlorobenzene	1	15000	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
n-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2-dibromo-3-chloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2,4-trichlorobenzene	1	300	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
1,2,3-trichlorobenzene	1		<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Hexachlorobutadiene	1	7	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	NA	NA	<1	<1
Polycyclic Aromatic Hydrocarbons (PAHs)																
Naphthalene	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	NA	<0.2	<0.2	<0.2	<0.2	NA	NA	<0.2	<0.2
Acenaphthylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Phenanthrene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Fluoranthene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	NA	<0.2	<0.2	<0.2	<0.2	NA	NA	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1	<0.1

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
GIL >PQL — 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	
PQL - Envirolab Services				10	50	1	1	1	2	1	PID
NEPM 2013 - Land Use Category				HSL-D: COMMERCIAL/INDUSTRIAL							
Sample Reference	**Water Depth**	**Depth Category**	**Soil Category**								
MW103	4.78	4m to <8m	Sand	<10	<50	<1	<1	<1	<2	<1	0.5
MW106	1.5	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	0.2
MW111	5.13	4m to <8m	Sand	<10	<50	<1	<1	<1	<2	<1	3.2
MW123	4.77	4m to <8m	Sand	**41**	**60**	**66**	**4**	<1	<2	<1	1.3
MW123 - [LAB_DUP]	4.77	4m to <8m	Sand	**56**	NA	**61**	**3**	<1	<2	<1	1.3
MW128	4.2	0m to <2m	Sand	<10	**85**	<1	<1	<1	<2	<1	4.2
MW134	4.25	4m to <8m	Sand	<10	<50	<1	<1	<1	<2	<1	0.3
MW139	4.71	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	0
MW143	3.08	2m to <4m	Sand	<10	<50	<1	<1	<1	<2	<1	0.3
PMW1	3.2	2m to <4m	Sand	<10	<50	<1	<1	<1	<2	<1	0.1
PMW2	0.32	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	0
WDUP3	1.5	0m to <2m	Sand	<10	<50	<1	<1	<1	<2	<1	NA
WDUP3 - [LAB_DUP]	1.5	0m to <2m	Sand	<10	**100**	<1	<1	<1	<2	<1	NA
Total Number of Samples				13	12	13	13	13	13	13	11
Maximum Value				56	85	66	4	<PQL	<PQL	<PQL	4.2

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
MW103	4.78	4m to <8m	Sand	6000	NL	5000	NL	NL	NL	NL
MW106	1.5	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW111	5.13	4m to <8m	Sand	6000	NL	5000	NL	NL	NL	NL
MW123	4.77	4m to <8m	Sand	6000	NL	5000	NL	NL	NL	NL
MW123 - [LAB_DUP]	4.77	4m to <8m	Sand	6000	NL	5000	NL	NL	NL	NL
MW128	4.2	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW134	4.25	4m to <8m	Sand	6000	NL	5000	NL	NL	NL	NL
MW139	4.71	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
MW143	3.08	2m to <4m	Sand	6000	NL	5000	NL	NL	NL	NL
PMW1	3.2	2m to <4m	Sand	6000	NL	5000	NL	NL	NL	NL
PMW2	0.32	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
WDUP3	1.5	0m to <2m	Sand	SSA	SSA	SSA	SSA	SSA	SSA	SSA
WDUP3 - [LAB_DUP]	1.5	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 Envirolab Services	NHMRC ADWG 2011 (v3.5 2018)	WHO 2008	USEPA RSL Tapwater 2017	MW106	MW128	MW139	PMW1	PMW2	WDUP3	WDUP3 - [LAB_DUP]
Total Recoverable Hydrocarbons (TRH)											
C_6-C_9 Aliphatics (assessed using F1)	10	-	15000	-	<10	<10	<10	<10	<10	<10	<10
>C_9-C_{14} Aliphatics (assessed using F2)	50	-	100	-	<50	**85**	<50	<50	<50	<50	**100**
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)											
Benzene	1	1	-	-	<1	<1	<1	<1	<1	<1	<1
Toluene	1	800	-	-	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	<1	<1	<1	<1	<1	<1
Total xylenes	2	600	-	-	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**
Polycyclic Aromatic Hydrocarbons (PAHs)											
Naphthalene	1	-	-	6.1	<1	<1	<1	<1	<1	<1	<1
Volatile Organic Compounds (VOCs), including chlorinated VOCs											
Dichlorodifluoromethane	10	-	-	-	<10	<10	<10	NA	NA	<10	<10
Chloromethane	10	-	-	-	<10	<10	<10	NA	NA	<10	<10
Vinyl Chloride	10	0.3	-	-	<10	<10	<10	NA	NA	<10	<10
Bromomethane	10	-	-	-	<10	<10	<10	NA	NA	<10	<10
Chloroethane	10	-	-	-	<10	<10	<10	NA	NA	<10	<10
Trichlorofluoromethane	10	-	-	-	<10	<10	<10	NA	NA	<10	<10
1,1-Dichloroethene	1	30	-	-	<1	<1	<1	NA	NA	<1	<1
Trans-1,2-dichloroethene	1	60	-	-	<1	<1	<1	NA	NA	<1	<1
1,1-dichloroethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Cis-1,2-dichloroethene	1	60	-	-	<1	<1	<1	NA	NA	<1	<1
Bromochloromethane	1	250	-	-	<1	<1	<1	NA	NA	<1	<1
Chloroform	1		-	-	<1	<1	<1	NA	NA	<1	<1
2,2-dichloropropane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2-dichloroethane	1	3	-	-	<1	<1	<1	NA	NA	<1	<1
1,1,1-trichloroethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,1-dichloropropene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Cyclohexane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Carbon tetrachloride	1	3	-	-	<1	<1	<1	NA	NA	<1	<1
Benzene	1	1	-	-	<1	<1	<1	NA	NA	<1	<1
Dibromomethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2-dichloropropane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Trichloroethene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Bromodichloromethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
trans-1,3-dichloropropene	1	100	-	-	<1	<1	<1	NA	NA	<1	<1
cis-1,3-dichloropropene	1	100	-	-	<1	<1	<1	NA	NA	<1	<1
1,1,2-trichloroethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Toluene	1	800	-	-	<1	<1	<1	NA	NA	<1	<1
1,3-dichloropropane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Dibromochloromethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2-dibromoethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Tetrachloroethene	1	50	-	-	<1	<1	<1	NA	NA	<1	<1
1,1,1,2-tetrachloroethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Chlorobenzene	1	300	-	-	<1	<1	<1	NA	NA	<1	<1
Ethylbenzene	1	300	-	-	<1	<1	<1	NA	NA	<1	<1
Bromoform	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
m+p-xylene	2	-	-	-	<2	<2	<2	NA	NA	<2	<2
Styrene	1	30	-	-	<1	<1	<1	NA	NA	<1	<1
1,1,2,2-tetrachloroethane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
o-xylene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2,3-trichloropropane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Isopropylbenzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Bromobenzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
n-propyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
2-chlorotoluene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
4-chlorotoluene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,3,5-trimethyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
Tert-butyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2,4-trimethyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,3-dichlorobenzene	1	20	-	-	<1	<1	<1	NA	NA	<1	<1
Sec-butyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,4-dichlorobenzene	1	40	-	-	<1	<1	<1	NA	NA	<1	<1
4-isopropyl toluene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2-dichlorobenzene	1	1500	-	-	<1	<1	<1	NA	NA	<1	<1
n-butyl benzene	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2-dibromo-3-chloropropane	1	-	-	-	<1	<1	<1	NA	NA	<1	<1
1,2,4-trichlorobenzene	1	30	-	-	<1	<1	<1	NA	NA	<1	<1
1,2,3-trichlorobenzene	1		-	-	<1	<1	<1	NA	NA	<1	<1
Hexachlorobutadiene	1	0.7	-	-	<1	<1	<1	NA	NA	<1	<1

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

Additional Site Investigation
250 Victoria Street Wetherill Park
E31888BR

TABLE G5
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - ECOLOGY
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NEMP 2018 95% Freshwater	SAMPLES										
			MW103	MW103 - [LAB_DUP]	MW106	MW111	MW123	MW128	MW134	MW139	MW143	WDUP3	WDUP3 - [LAB_DUP]
PFAS Compound													
Perfluorobutanesulfonic acid	0.0004	NSL	**0.001**	**0.001**	**0.046**	**0.0006**	**0.0004**	**0.005**	**0.001**	**0.001**	**0.0047**	**0.049**	**0.055**
Perfluoropentanesulfonic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid - PFHxS	0.0002	NSL	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanesulfonic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonic acid PFOS	0.0002	0.13	**0.0004**	**0.0004**	**0.002**	**0.0003**	**0.0003**	**0.0005**	<0.0002	<0.0002	<0.0002	**0.002**	**0.002**
Perfluorodecanesulfonic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	0.002	NSL	<0.01	<0.01	**0.02**	<0.01	<0.01	**0.01**	<0.01	<0.01	<0.01	**0.02**	**0.02**
Perfluoropentanoic acid	0.002	NSL	<0.01	<0.01	**0.047**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.046**	**0.046**
Perfluorohexanoic acid	0.0004	NSL	<0.0004	<0.0004	**0.027**	<0.0004	**0.004**	**0.0053**	<0.0004	**0.002**	**0.0006**	**0.022**	**0.023**
Perfluoroheptanoic acid	0.0004	NSL	<0.0004	<0.0004	**0.0084**	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	**0.008**	**0.007**
Perfluorooctanoic acid PFOA	0.0002	220	**0.0003**	**0.0003**	**0.002**	**0.0003**	**0.0002**	**0.001**	<0.0002	**0.0003**	**0.0004**	**0.002**	**0.002**
Perfluorononanoic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	0.05	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	0.0004	NSL	<0.0004	<0.0004	**0.084**	<0.0004	**0.003**	**0.003**	**0.0006**	**0.008**	**0.001**	**0.041**	**0.042**
8:2 FTS	0.0004	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfon amide	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid oethanol	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid oethanol	0.05	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MePer uorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EtPer uorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Positive PFHxS & PFOS	0.0002	NSL	**0.0004**	**0.0004**	**0.002**	**0.0003**	**0.0003**	**0.0006**	<0.0002	<0.0002	<0.0002	**0.002**	**0.002**
Total Positive PFOS & PFOA	0.0002	NSL	**0.0006**	**0.0007**	**0.0034**	**0.0006**	**0.0005**	**0.002**	<0.0002	**0.0003**	**0.0004**	**0.0037**	**0.0034**
Total Positive PFAS	0.0002	NSL	**0.002**	**0.002**	**0.23**	**0.001**	**0.0074**	**0.028**	**0.002**	**0.012**	**0.0068**	**0.19**	**0.19**

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

Additional Site Investigation
250 Victoria Street Wetherill Park
E31888BR

JKEnvironments

TABLE G6
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - HUMAN HEALTH
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NEMP 2020 Recreational	SAMPLES										
			MW103	MW103 - [LAB_DUP]	MW106	MW111	MW123	MW128	MW134	MW139	MW143	WDUP3	WDUP3 - [LAB_DUP]
PFAS Compound													
Perfluorobutanesulfonic acid	0.0004	NSL	**0.001**	**0.001**	**0.046**	**0.0006**	**0.0004**	**0.005**	**0.001**	**0.001**	**0.0047**	**0.049**	**0.055**
Perfluoropentanesulfonic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid - PFHxS	0.0002	NSL	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanesulfonic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonic acid PFOS	0.0002	NSL	**0.0004**	**0.0004**	**0.002**	**0.0003**	**0.0003**	**0.0005**	<0.0002	<0.0002	<0.0002	**0.002**	**0.002**
Perfluorodecanesulfonic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	0.002	NSL	<0.01	<0.01	**0.02**	<0.01	<0.01	**0.01**	<0.01	<0.01	<0.01	**0.02**	**0.02**
Perfluoropentanoic acid	0.002	NSL	<0.01	<0.01	**0.047**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.046**	**0.046**
Perfluorohexanoic acid	0.0004	NSL	<0.0004	<0.0004	**0.027**	<0.0004	**0.004**	**0.0053**	<0.0004	**0.002**	**0.0006**	**0.022**	**0.023**
Perfluoroheptanoic acid	0.0004	NSL	<0.0004	<0.0004	**0.0084**	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	**0.008**	**0.007**
Perfluorooctanoic acid PFOA	0.0002	10	**0.0003**	**0.0003**	**0.002**	**0.0003**	**0.0002**	**0.001**	<0.0002	**0.0003**	**0.0004**	**0.002**	**0.002**
Perfluorononanoic acid	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	0.05	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	0.001	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	0.0004	NSL	<0.0004	<0.0004	**0.084**	<0.0004	**0.003**	**0.003**	**0.0006**	**0.008**	**0.001**	**0.041**	**0.042**
8:2 FTS	0.0004	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfon amide	0.01	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid oethanol	0.005	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid oethanol	0.05	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MePer uorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EtPer uorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Positive PFHxS & PFOS	0.0002	2	**0.0004**	**0.0004**	**0.002**	**0.0003**	**0.0003**	**0.0006**	<0.0002	<0.0002	<0.0002	**0.002**	**0.002**
Total Positive PFOS & PFOA	0.0002	NSL	**0.0006**	**0.0007**	**0.0034**	**0.0006**	**0.0005**	**0.002**	<0.0002	**0.0003**	**0.0004**	**0.0037**	**0.0034**
Total Positive PFAS	0.0002	NSL	**0.002**	**0.002**	**0.23**	**0.001**	**0.0074**	**0.028**	**0.002**	**0.012**	**0.0068**	**0.19**	**0.19**

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

Preliminary Stage 2 ESA Data Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

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

Table Specific Explanations:

HIL Tables:

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

EIL/ESL Table:

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

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.

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

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100
Site Assessment Criteria (SAC)			3000	900	3600	240000	1500	730	6000	400000	4000	40	80	2000	2500	45	530	3600	50	2000	7	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
BH1	0-0.1	Fill - Gravelly Sand	5	<0.4	22	19	10	<0.1	14	22	2.3	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH2	0-0.2	Fill - Gravelly Silty Sand	<4	<0.4	6	5	9	<0.1	4	37	<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	0.1-0.2	Fill - Silty Gravelly Sand	<4	<0.4	13	46	31	<0.1	14	52	6	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH4	0.3-0.4	Fill - Silty Sandy Gravel	4	<0.4	30	28	11	<0.1	30	37	1.2	<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	Fill - Silty Sand	6	<0.4	24	35	11	<0.1	16	25	0.3	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH6	0-0.1	Fill - Gravelly Silty Sand	<4	<0.4	34	21	7	<0.1	38	37	0.4	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH7	0.3-0.4	Fill - Silty Gravelly Sand	<4	<0.4	21	45	21	<0.1	9	170	2.8	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH7	0.5-0.8	Fill - Silty Clay	7	<0.4	24	19	12	<0.1	19	25	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH8	0.5-0.6	Fill - Silty Gravelly Sand	<4	<0.4	15	170	16	<0.1	19	75	1.8	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	Not Detected
BH9	0-0.1	Fill - Silty Gravelly Sand	<4	<0.4	6	8	7	<0.1	7	25	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH10	0-0.2	Fill - Gravelly Sand	6	<0.4	15	13	9	<0.1	4	10	<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	0.3-0.4	Fill - Silty Gravelly Sand	<4	<0.4	14	49	14	<0.1	20	38	4.4	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH12	0-0.1	Fill - Silty Sandy Gravel	<4	<0.4	15	21	17	<0.1	13	39	<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	0-0.1	Fill - Silty Gravelly Sand	<4	<0.4	13	25	9	<0.1	29	30	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH14	0-0.1	Fill - Gravelly Sand	7	<0.4	20	13	13	<0.1	10	23	<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	0.3-0.4	Silty Sandy Clay	5	<0.4	3	12	9	<0.1	2	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
BH16	0-0.1	Fill - Silty Gravelly Sand	4	<0.4	8	26	9	<0.1	26	39	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH16	0.8-0.95	Fill - Silty Clay	6	<0.4	24	33	12	<0.1	32	37	1.3	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH17	0-0.1	Fill - Silty Gravelly Sand	<4	<0.4	27	47	8	<0.1	38	34	0.2	<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	Fill - Gravelly Sand	7	<0.4	32	18	12	<0.1	22	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
BH19	0.3-0.4	Fill - Silty Gravelly Sand	6	<0.4	12	27	11	<0.1	49	83	<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	0.5-0.76	Silty Clay	6	<0.4	5	8	6	<0.1	<1	4	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH21	0.1-0.2	Fill - Silty Clay	4	<0.4	8	27	10	<0.1	3	13	<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	0.1-0.2	Fill - Silty Gravelly Sand	<4	<0.4	6	57	2	<0.1	82	27	<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	0.2-0.3	Fill - Silty Gravelly Sand	<4	<0.4	11	55	2	<0.1	100	25	<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	0.5-0.95	Fill - Silty Clay	8	<0.4	18	14	14	<0.1	4	13	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH25	0-0.1	Fill - Silty Sand	11	0.4	20	16	21	<0.1	10	43	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH26	0.1-0.2	Fill - Silty Sand	10	<0.4	19	21	30	<0.1	8	69	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH27	0.1-0.2	Fill - Silty Sand	6	<0.4	16	19	24	<0.1	8	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
BH28	0.1-0.2	Fill - Silty Sand	7	<0.4	19	17	22	<0.1	7	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
BH28	1.6-1.95	Silty Clay	10	<0.4	31	14	19	<0.1	6	17	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH29	0.1-0.2	Fill - Silty Sand	14	<0.4	14	15	16	<0.1	10	32	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH29	1.8-1.95	Fill - Silty Sand	<4	<0.4	10	12	12	<0.1	6	38	0.2	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH29	3-3.2	Silty Clay	8	<0.4	22	9	15	<0.1	5	13	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH30	0.6-0.7	Fill - Silty Gravelly Sand	5	<0.4	14	64	13	<0.1	12	51	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH30	1.5-1.9	Fill - Silty Clay	6	<0.4	28	26	12	<0.1	30	32	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUPMP1	0-0.2	BH10 (0-0.2)	6	<0.4	14	18	10	<0.1	3	10	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
DUPMP2	0.1-0.2	BH27 (0.1-0.2)	<4	<0.4	33	30	8	<0.1	32	39	1.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SP1	-	Fill Stockpile Sample	72	<0.4	18	26	14	<0.1	27	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
SP2	-	Fill Stockpile Sample	7	<0.4	20	14	17	<0.1	8	35	<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 - T	0-0.1	Laboratory Triplicate	6	<0.4	22	16	11	<0.1	13	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH5 - T	0-0.1	Laboratory Triplicate	<4	<0.4	26	52	9	<0.1	24	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUPMP2 - T	-	Laboratory Triplicate	<4	<0.4	31	31	9	<0.1	30	38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of Samples			43	43	43	43	43	43	43	43	40	40	33	33	33	33	33	33	33	33	33	31
Maximum Value			72	0.4	34	170	31	<PQL	100	170	6	0.6	<PQL	<PQL	<PQL	<PQL	<PQL	0.1	<PQL	<PQL	0.2	NC

Concentration above the SAC **VALUE**

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

					C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					**HSL-D: COMMERCIAL/INDUSTRIAL**							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH1	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH2	0-0.2	Fill - Gravelly Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.2
BH3	0.1-0.2	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH4	0.3-0.4	Fill - Silty Sandy Gravel	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH5	0-0.1	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH6	0-0.1	Fill - Gravelly Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH7	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH7	0.5-0.8	Fill - Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	0.4
BH8	0.5-0.6	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.8
BH9	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH10	0-0.2	Fill - Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH11	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH12	0-0.1	Fill - Silty Sandy Gravel	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH13	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH14	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH15	0.3-0.4	Silty Sandy Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH16	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH16	0.8-0.95	Fill - Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH17	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH18	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH19	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH20	0.5-0.76	Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH21	0.1-0.2	Fill - Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH22	0.1-0.2	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH24	0.2-0.3	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH24	0.5-0.95	Fill - Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH25	0-0.1	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH26	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH27	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH28	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH28	1.6-1.95	Silty Clay	1m to <2m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH29	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH29	1.8-1.95	Fill - Silty Sand	1m to <2m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH29	3-3.2	Silty Clay	0m to < 1m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH30	0.6-0.7	Fill - Silty Gravelly Sand	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.4
BH30	1.5-1.9	Fill - Silty Clay	1m to <2m	Clay	<25	<50	<0.2	<0.5	<1	<1	<1	0
DUPMP1	0-0.2	BH10 (0-0.2)	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
DUPMP2	0.1-0.2	BH27 (0.1-0.2)	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SP1	-	Fill Stockpile Sample	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
SP2	-	Fill Stockpile Sample	0m to < 1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
Total Number of Samples					40	40	40	40	40	40	40	38
Maximum Value					<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.8

Concentration above the SAC **VALUE**

The guideline corresponding to the elevated value is highlighted in grey in the Site Assessment Criteria Table below

SITE ASSESSMENT CRITERIA

					C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1
NEPM 2013 HSL Land Use Category					**HSL-D: COMMERCIAL/INDUSTRIAL**						
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**							
BH1	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH2	0-0.2	Fill - Gravelly Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH3	0.1-0.2	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH4	0.3-0.4	Fill - Silty Sandy Gravel	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH5	0-0.1	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH6	0-0.1	Fill - Gravelly Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH7	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH7	0.5-0.8	Fill - Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL
BH8	0.5-0.6	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH9	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH10	0-0.2	Fill - Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH11	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH12	0-0.1	Fill - Silty Sandy Gravel	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH13	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH14	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH15	0.3-0.4	Silty Sandy Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL
BH16	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH16	0.8-0.95	Fill - Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL
BH17	0-0.1	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH18	0-0.1	Fill - Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH19	0.3-0.4	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH20	0.5-0.76	Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL
BH21	0.1-0.2	Fill - Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL
BH22	0.1-0.2	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH24	0.2-0.3	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH24	0.5-0.95	Fill - Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL
BH25	0-0.1	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH26	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH27	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH28	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH28	1.6-1.95	Silty Clay	1m to <2m	Clay	480	NL	6	NL	NL	NL	NL
BH29	0.1-0.2	Fill - Silty Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH29	1.8-1.95	Fill - Silty Sand	1m to <2m	Sand	370	NL	3	NL	NL	NL	NL
BH29	3-3.2	Silty Clay	0m to < 1m	Clay	310	NL	4	NL	NL	NL	NL
BH30	0.6-0.7	Fill - Silty Gravelly Sand	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
BH30	1.5-1.9	Fill - Silty Clay	1m to <2m	Clay	480	NL	6	NL	NL	NL	NL
DUPMP1	0-0.2	BH10 (0-0.2)	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
DUPMP2	0.1-0.2	BH27 (0.1-0.2)	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
SP1	-	Fill Stockpile Sample	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL
SP2	-	Fill Stockpile Sample	0m to < 1m	Sand	260	NL	3	NL	NL	230	NL

TABLE C-1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				COMMERCIAL/INDUSTRIAL																	
							AGED HEAVY METALS-EILs						EILs		ESLs						
				pH	CEC ($cmol_c/kg$)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	$>C_{16}$-C_{34} (F3)	$>C_{34}$-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	0.1	0.1	25	50	100	100	0.2	0.5	1	3	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																				
BH1	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	5	22	19	10	14	22	<1	<0.1	<25	<50	1200	420	<0.2	<0.5	<1	<1	0.1
BH2	0-0.2	Fill - Gravelly Silty Sand	Coarse	NA	NA	NA	<4	6	5	9	4	37	<1	<0.1	<25	<50	740	<100	<0.2	<0.5	<1	<1	<0.05
BH3	0.1-0.2	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	13	46	31	14	52	<1	<0.1	<25	<50	<100	140	<0.2	<0.5	<1	<1	0.4
BH4	0.3-0.4	Fill - Silty Sandy Gravel	Coarse	NA	NA	NA	4	30	28	11	30	37	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.08
BH5	0-0.1	Fill - Silty Sand	Coarse	NA	NA	NA	6	24	35	11	16	25	<1	<0.1	<25	<50	280	300	<0.2	<0.5	<1	<1	<0.05
BH6	0-0.1	Fill - Gravelly Silty Sand	Coarse	NA	NA	NA	<4	34	21	7	38	37	<1	<0.1	<25	<50	530	290	<0.2	<0.5	<1	<1	<0.05
BH7	0.3-0.4	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	21	45	21	9	170	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.2
BH7	0.5-0.8	Fill - Silty Clay	Fine	NA	NA	NA	7	24	19	12	19	25	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH8	0.5-0.6	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	15	170	16	19	75	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.1
BH9	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	6	8	7	7	25	<1	<0.1	<25	<50	660	100	<0.2	<0.5	<1	<1	<0.05
BH10	0-0.2	Fill - Gravelly Sand	Coarse	NA	NA	NA	6	15	13	9	4	10	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH11	0.3-0.4	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	14	49	14	20	38	<1	<0.1	<25	<50	260	290	<0.2	<0.5	<1	<1	0.4
BH12	0-0.1	Fill - Silty Sandy Gravel	Coarse	NA	NA	NA	<4	15	21	17	13	39	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH13	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	13	25	9	29	30	<1	<0.1	<25	<50	710	320	<0.2	<0.5	<1	<1	<0.05
BH14	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	7	20	13	13	10	23	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH15	0.3-0.4	Silty Sandy Clay	Fine	NA	NA	NA	5	3	12	9	2	11	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH16	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	4	8	26	9	26	39	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH16	0.8-0.95	Fill - Silty Clay	Fine	NA	NA	NA	6	24	33	12	32	37	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.1
BH17	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	27	47	8	38	34	<1	<0.1	<25	<50	1600	400	<0.2	<0.5	<1	<1	<0.05
BH18	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	7	32	18	12	22	26	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
Total Number of Samples				0	0	0	20	20	20	20	20	20	20	18	20	20	20	20	20	20	20	20	20
Maximum Value				<PQL	<PQL	<PQL	7	34	170	31	38	170	<PQL	<PQL	<PQL	<PQL	1600	420	<PQL	<PQL	<PQL	<PQL	0.4

Concentration above the SAC VALUE

The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

EIL AND ESL ASSESSMENT CRITERIA

Land Use Category				COMMERCIAL/INDUSTRIAL																	
							AGED HEAVY METALS-EILs						EILs		ESLs						
				pH	CEC ($cmol_c/kg$)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	$>C_{16}$-C_{34} (F3)	$>C_{34}$-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	0.1	0.1	25	50	100	100	0.2	0.5	1	3	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																				
BH1	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH2	0-0.2	Fill - Gravelly Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH3	0.1-0.2	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH4	0.3-0.4	Fill - Silty Sandy Gravel	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH5	0-0.1	Fill - Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH6	0-0.1	Fill - Gravelly Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH7	0.3-0.4	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH7	0.5-0.8	Fill - Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	172
BH8	0.5-0.6	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH9	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH10	0-0.2	Fill - Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH11	0.3-0.4	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH12	0-0.1	Fill - Silty Sandy Gravel	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH13	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH14	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH15	0.3-0.4	Silty Sandy Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	172
BH16	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH16	0.8-0.95	Fill - Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	172
BH17	0-0.1	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH18	0-0.1	Fill - Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172

TABLE C-2
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				COMMERCIAL/INDUSTRIAL																	
							AGED HEAVY METALS-EILs						EILs		ESLs							
				pH	CEC ($cmol_c/kg$)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	0.1	0.1	25	50	100	100	0.2	0.5	1	3	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																				
BH19	0.3-0.4	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	6	12	27	11	49	83	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH20	0.5-0.76	Silty Clay	Fine	NA	NA	NA	6	5	8	6	<1	4	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH21	0.1-0.2	Fill - Silty Clay	Fine	NA	NA	NA	4	8	27	10	3	13	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH22	0.1-0.2	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	6	57	2	82	27	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH24	0.2-0.3	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	<4	11	55	2	100	25	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH24	0.5-0.95	Fill - Silty Clay	Fine	NA	NA	NA	8	18	14	14	4	13	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH25	0-0.1	Fill - Silty Sand	Coarse	NA	NA	NA	11	20	16	21	10	43	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH26	0.1-0.2	Fill - Silty Sand	Coarse	NA	NA	NA	10	19	21	30	8	69	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH27	0.1-0.2	Fill - Silty Sand	Coarse	NA	NA	NA	6	16	19	24	8	59	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH28	0.1-0.2	Fill - Silty Sand	Coarse	NA	NA	NA	7	19	17	22	7	47	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH28	1.6-1.95	Silty Clay	Fine	NA	NA	NA	10	31	14	19	6	17	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH29	0.1-0.2	Fill - Silty Sand	Coarse	NA	NA	NA	14	14	15	16	10	32	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH29	1.8-1.95	Fill - Silty Sand	Coarse	NA	NA	NA	<4	10	12	12	6	38	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH29	3-3.2	Silty Clay	Fine	NA	NA	NA	8	22	9	15	5	13	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH30	0.6-0.7	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	5	14	64	13	12	51	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH30	1.5-1.9	Fill - Silty Clay	Fine	NA	NA	NA	6	28	26	12	30	32	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
DUPMP1	0-0.2	BH10 (0-0.2)	Coarse	NA	NA	NA	6	14	18	10	3	10	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
DUPMP2	0.1-0.2	BH27 (0.1-0.2)	Coarse	NA	NA	NA	<4	33	30	8	32	39	<1	<0.1	<25	<50	240	<100	<0.2	<0.5	<1	<1	0.1
SP1	-	Fill Stockpile Sample	Coarse	NA	NA	NA	72	18	26	14	27	47	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SP2	-	Fill Stockpile Sample	Coarse	NA	NA	NA	7	20	14	17	8	35	<1	0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1 - T	0-0.1	Laboratory Triplicate	Coarse	NA	NA	NA	6	22	16	11	13	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH5 - T	0-0.1	Laboratory Triplicate	Coarse	NA	NA	NA	<4	26	52	9	24	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUPMP2 - T	-	Laboratory Triplicate	Coarse	NA	NA	NA	<4	31	31	9	30	38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of Samples				0	0	0	23	23	23	23	23	23	20	15	20	20	20	20	20	20	20	20	20
Raw Max				0	0	0	72	33	64	30	100	83	0	0.1	0	0	240	0	0	0	0	0	0.1
Maximum Value				<PQL	<PQL	<PQL	72	33	64	30	100	83	<PQL	0.1	<PQL	<PQL	240	<PQL	<PQL	<PQL	<PQL	<PQL	0.1

Concentration above the SAC — VALUE

The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

EIL AND ESL ASSESSMENT CRITERIA

Land Use Category				COMMERCIAL/INDUSTRIAL																	
							AGED HEAVY METALS-EILs						EILs		ESLs							
				pH	CEC ($cmol_c/kg$)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	0.1	0.1	25	50	100	100	0.2	0.5	1	3	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																				
BH19	0.3-0.4	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH20	0.5-0.76	Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	172
BH21	0.1-0.2	Fill - Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	2500	6600	95	135	185	95	172
BH22	0.1-0.2	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH24	0.2-0.3	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH24	0.5-0.95	Fill - Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	172
BH25	0-0.1	Fill - Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH26	0.1-0.2	Fill - Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH27	0.1-0.2	Fill - Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH28	0.1-0.2	Fill - Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH28	1.6-1.95	Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	172
BH29	0.1-0.2	Fill - Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH29	1.8-1.95	Fill - Silty Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	1700	3300	75	135	165	180	172
BH29	3-3.2	Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	172
BH30	0.6-0.7	Fill - Silty Gravelly Sand	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH30	1.5-1.9	Fill - Silty Clay	Fine	NA	NA	NA	160	323	113	1963	60	232	370	--	215	170	2500	6600	95	135	185	95	172
DUPMP1	0-0.2	BH10 (0-0.2)	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
DUPMP2	0.1-0.2	BH27 (0.1-0.2)	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
SP1	-	Fill Stockpile Sample	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
SP2	-	Fill Stockpile Sample	Coarse	NA	NA	NA	160	323	113	1963	60	232	370	640	215	170	1700	3300	75	135	165	180	172
BH1 - T	0-0.1	Laboratory Triplicate	Coarse	NA	NA	NA	160	323	113	1963	60	232	--	--	--	--	--	--	--	--	--	--	--
BH5 - T	0-0.1	Laboratory Triplicate	Coarse	NA	NA	NA	160	323	113	1963	60	232	--	--	--	--	--	--	--	--	--	--	--
DUPMP2 - T	-	Laboratory Triplicate	Coarse	NA	NA	NA	160	323	113	1963	60	232	--	--	--	--	--	--	--	--	--	--	--

TABLE D-1
SOIL INTRA-LABORATORY DUPLICATE RESULTS & RPD CALCULATIONS
All results in mg/kg unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	INITIAL	REPEAT	MEAN	RPD %
Sample Ref = BH10 (0-0.2)	Arsenic	4	6	6	6.0	0
Dup Ref = DUPMP1	Cadmium	0.4	<0.4	<0.4	NC	NC
	Chromium	1	15	14	14.5	7
Envirolab Report: 202302	Copper	1	13	18	15.5	32
	Lead	1	9	10	9.5	11
	Mercury	0.1	<0.1	<0.1	NC	NC
	Nickel	1	4	3	3.5	29
	Zinc	1	10	10	10.0	0
	Naphthalene	0.1	<0.1	<0.1	NC	NC
	Acenaphthylene	0.1	<0.1	<0.1	NC	NC
	Acenaphthene	0.1	<0.1	<0.1	NC	NC
	Fluorene	0.1	<0.1	<0.1	NC	NC
	Phenanthrene	0.1	<0.1	<0.1	NC	NC
	Anthracene	0.1	<0.1	<0.1	NC	NC
	Fluoranthene	0.1	<0.1	<0.1	NC	NC
	Pyrene	0.1	<0.1	<0.1	NC	NC
	Benzo(a)anthracene	0.1	<0.1	<0.1	NC	NC
	Chrysene	0.1	<0.1	<0.1	NC	NC
	Benzo(b,j+k)fluoranthene	0.2	<0.2	<0.2	NC	NC
	Benzo(a)pyrene	0.05	<0.05	<0.05	NC	NC
	Indeno(123-cd)pyrene	0.1	<0.1	<0.1	NC	NC
	Dibenzo(ah)anthracene	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	0.1	<0.1	<0.1	NC	NC
	Total OCPs	0.1	<0.1	<0.1	NC	NC
	Total OPPs	0.1	<0.1	<0.1	NC	NC
	Total PCBs	0.1	<0.1	<0.1	NC	NC
	TRH C_6-C_{10} (F1)	25	<25	<25	NC	NC
	TRH >C_{10}-C_{16} (F2)	50	<50	<50	NC	NC
	TRH >C_{16}-C_{34} (F3)	100	<100	<100	NC	NC
	TRH >C_{34}-C_{40} (F4)	100	<100	<100	NC	NC
	Benzene	0.2	<0.2	<0.2	NC	NC
	Toluene	0.5	<0.5	<0.5	NC	NC
	Ethylbenzene	1	<1	<1	NC	NC
	m+p-xylene	2	<2	<2	NC	NC
	o-xylene	1	<1	<1	NC	NC

Explanation:
The RPD value is calculated as the absolute value of the difference between the initial and repeat results divided by the average value expressed as a percentage. The following acceptance criteria will be used to assess the RPD results:

Results > 10 times PQL = RPD value <= 50% are acceptable
Results between 5 & 10 times PQL = RPD value <= 75% are acceptable
Results < 5 times PQL = RPD value <= 100% are acceptable
If result is LPQL then 50% of the PQL is used for the calculation

RPD Results Above the Acceptance Criteria VALUE

TABLE D-2
SOIL INTRA-LABORATORY DUPLICATE RESULTS & RPD CALCULATIONS
All results in mg/kg unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	INITIAL	REPEAT	MEAN	RPD %
Sample Ref = BH27 (0.1-0.2)	Arsenic	4	6	<4	4.0	100
Dup Ref = DUPMP2	Cadmium	0.4	<0.4	<0.4	NC	NC
	Chromium	1	16	33	24.5	69
Envirolab Report: 202302	Copper	1	19	30	24.5	45
	Lead	1	24	8	16.0	100
	Mercury	0.1	<0.1	<0.1	NC	NC
	Nickel	1	8	32	20.0	120
	Zinc	1	59	39	49.0	41
	Naphthalene	0.1	<0.1	<0.1	NC	NC
	Acenaphthylene	0.1	<0.1	<0.1	NC	NC
	Acenaphthene	0.1	<0.1	<0.1	NC	NC
	Fluorene	0.1	<0.1	<0.1	NC	NC
	Phenanthrene	0.1	<0.1	0.2	0.1	120
	Anthracene	0.1	<0.1	<0.1	NC	NC
	Fluoranthene	0.1	<0.1	0.2	0.1	120
	Pyrene	0.1	<0.1	0.2	0.1	120
	Benzo(a)anthracene	0.1	<0.1	<0.1	NC	NC
	Chrysene	0.1	<0.1	0.2	0.1	120
	Benzo(b,j+k)fluoranthene	0.2	<0.2	0.2	0.2	67
	Benzo(a)pyrene	0.05	<0.05	0.1	0.1	120
	Indeno(123-cd)pyrene	0.1	<0.1	0.1	0.1	67
	Dibenzo(ah)anthracene	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	0.1	<0.1	0.2	0.1	120
	Total OCPs	0.1	<0.1	<0.1	NC	NC
	Total OPPs	0.1	<0.1	<0.1	NC	NC
	Total PCBs	0.1	<0.1	<0.1	NC	NC
	TRH C6-C10 (F1)	25	<25	<25	NC	NC
	TRH >C10-C16 (F2)	50	<50	<50	NC	NC
	TRH >C16-C34 (F3)	100	<100	240	145.0	131
	TRH >C34-C40 (F4)	100	<100	<100	NC	NC
	Benzene	0.2	<0.2	<0.2	NC	NC
	Toluene	0.5	<0.5	<0.5	NC	NC
	Ethylbenzene	1	<1	<1	NC	NC
	m+p-xylene	2	<2	<2	NC	NC
	o-xylene	1	<1	<1	NC	NC

Explanation:
The RPD value is calculated as the absolute value of the difference between the initial and repeat results divided by the average value expressed as a percentage. The following acceptance criteria will be used to assess the RPD results:

Results > 10 times PQL = RPD value <= 50% are acceptable
Results between 5 & 10 times PQL = RPD value <= 75% are acceptable
Results < 5 times PQL = RPD value <= 100% are acceptable
If result is LPQL then 50% of the PQL is used for the calculation

RPD Results Above the Acceptance Criteria VALUE

TABLE E-1
SOIL INTER-LABORATORY DUPLICATE RESULTS & RPD CALCULATIONS
All results in mg/kg unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	Envirolab VIC PQL	INITIAL	REPEAT	MEAN	RPD %
Sample Ref = BH1 (0-0.1)	Arsenic	4	4	5	28	16.5	139
Dup Ref = DUPMP2	Cadmium	0.4	0.4	<0.4	<0.4	NC	NC
	Chromium	1	1	22	4	13.0	138
Envirolab Report: 202302	Copper	1	1	19	14	16.5	30
Envirolab VIC Report: 15035	Lead	1	1	10	6	8.0	50
	Mercury	0.1	0.1	<0.1	<0.1	NC	NC
	Nickel	1	1	14	2	8.0	150
	Zinc	1	1	22	5	13.5	126
	Naphthalene	0.1	0.1	<0.1	<0.1	NC	NC
	Acenaphthylene	0.1	0.1	<0.1	<0.1	NC	NC
	Acenaphthene	0.1	0.1	<0.1	<0.1	NC	NC
	Fluorene	0.1	0.1	<0.1	<0.1	NC	NC
	Phenanthrene	0.1	0.1	0.4	<0.1	0.2	156
	Anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Fluoranthene	0.1	0.1	0.5	<0.1	0.3	164
	Pyrene	0.1	0.1	0.4	<0.1	0.2	156
	Benzo(a)anthracene	0.1	0.1	0.1	<0.1	0.1	67
	Chrysene	0.1	0.1	0.2	<0.1	0.1	120
	Benzo(b,j+k)fluoranthene	0.2	0.2	0.3	<0.2	0.2	100
	Benzo(a)pyrene	0.05	0.05	0.1	<0.05	0.1	120
	Indeno(123-cd)pyrene	0.1	0.1	0.1	<0.1	0.1	67
	Dibenzo(ah)anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	0.1	0.1	0.2	<0.1	0.1	120
	Total OCPs	0.1	0.1	<0.1	<0.1	NC	NC
	Total OPPs	0.1	0.1	<0.1	<0.1	NC	NC
	Total PCBs	0.1	0.1	<0.1	<0.1	NC	NC
	TRH C6-C10 (F1)	25	25	<25	<25	NC	NC
	TRH >C10-C16 (F2)	50	50	<50	<50	NC	NC
	TRH >C16-C34 (F3)	100	100	1200	<100	625.0	184
	TRH >C34-C40 (F4)	100	100	420	<100	235.0	157
	Benzene	0.2	0.2	<0.2	<0.2	NC	NC
	Toluene	0.5	0.5	<0.5	<0.5	NC	NC
	Ethylbenzene	1	1	<1	<1	NC	NC
	m+p-xylene	2	2	<2	<2	NC	NC
	o-xylene	1	1	<1	<1	NC	NC

Explanation:

The RPD value is calculated as the absolute value of the difference between the initial and repeat results divided by the average value expressed as a percentage. The following acceptance criteria will be used to assess the RPD results:

- Results > 10 times PQL = RPD value <= 50% are acceptable
- Results between 5 & 10 times PQL = RPD value <= 75% are acceptable
- Results < 5 times PQL = RPD value <= 100% are acceptable

If result is LPQL then 50% of the PQL is used for the calculation

RPD Results Above the Acceptance Criteria VALUE

TABLE E-2
SOIL INTER-LABORATORY DUPLICATE RESULTS & RPD CALCULATIONS
All results in mg/kg unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	Envirolab VIC PQL	INITIAL	REPEAT	MEAN	RPD %
Sample Ref = BH3 (0.1-0.2)	Arsenic	4	4	<4	5	3.5	86
Dup Ref = DUPMP4	Cadmium	0.4	0.4	<0.4	<0.4	NC	NC
	Chromium	1	1	13	5	9.0	89
Envirolab Report: 202302	Copper	1	1	46	8	27.0	141
Envirolab VIC Report: 15035	Lead	1	1	31	5	18.0	144
	Mercury	0.1	0.1	<0.1	<0.1	NC	NC
	Nickel	1	1	14	<1	7.3	186
	Zinc	1	1	52	6	29.0	159
	Naphthalene	0.1	0.1	0.1	<0.1	0.1	67
	Acenaphthylene	0.1	0.1	<0.1	<0.1	NC	NC
	Acenaphthene	0.1	0.1	<0.1	<0.1	NC	NC
	Fluorene	0.1	0.1	<0.1	<0.1	NC	NC
	Phenanthrene	0.1	0.1	1	<0.1	0.5	181
	Anthracene	0.1	0.1	0.2	<0.1	0.1	120
	Fluoranthene	0.1	0.1	1.2	<0.1	0.6	184
	Pyrene	0.1	0.1	1.1	<0.1	0.6	183
	Benzo(a)anthracene	0.1	0.1	0.5	<0.1	0.3	164
	Chrysene	0.1	0.1	0.4	<0.1	0.2	156
	Benzo(b,j+k)fluoranthene	0.2	0.2	0.6	<0.2	0.4	143
	Benzo(a)pyrene	0.05	0.05	0.4	<0.05	0.2	176
	Indeno(123-cd)pyrene	0.1	0.1	0.2	<0.1	0.1	120
	Dibenzo(ah)anthracene	0.1	0.1	<0.1	<0.1	NC	NC
	Benzo(ghi)perylene	0.1	0.1	0.2	<0.1	0.1	120
	Total OCPs	0.1	0.1	<0.1	<0.1	NC	NC
	Total OPPs	0.1	0.1	<0.1	<0.1	NC	NC
	Total PCBs	0.1	0.1	<0.1	<0.1	NC	NC
	TRH C6-C10 (F1)	25	25	<25	<25	NC	NC
	TRH >C10-C16 (F2)	50	50	<50	<50	NC	NC
	TRH >C16-C34 (F3)	100	100	<100	<100	NC	NC
	TRH >C34-C40 (F4)	100	100	140	<100	95.0	95
	Benzene	0.2	0.2	<0.2	<0.2	NC	NC
	Toluene	0.5	0.5	<0.5	<0.5	NC	NC
	Ethylbenzene	1	1	<1	<1	NC	NC
	m+p-xylene	2	2	<2	<2	NC	NC
	o-xylene	1	1	<1	<1	NC	NC

Explanation:

The RPD value is calculated as the absolute value of the difference between the initial and repeat results divided by the average value expressed as a percentage. The following acceptance criteria will be used to assess the RPD results:

- Results > 10 times PQL = RPD value <= 50% are acceptable
- Results between 5 & 10 times PQL = RPD value <= 75% are acceptable
- Results < 5 times PQL = RPD value <= 100% are acceptable

If result is LPQL then 50% of the PQL is used for the calculation

RPD Results Above the Acceptance Criteria VALUE

TABLE F
SUMMARY OF FIELD QA/QC RESULTS

ANALYSIS	Envirolab PQL		TB1[S]	TS1[S]	TS2[S]
			27/09/2018	27/09/2018	3/10/2018
	mg/kg	µg/L	mg/kg	% Recovery	% Recovery
TRH C6-C10 (F1)	10	10	<25	NA	NA
Benzene	1	0.2	<0.2	97%	97%
Toluene	1	0.5	<0.5	97%	98%
Ethylbenzene	1	1	<1	98%	97%
m+p-xylene	2	2	<2	98%	96%
o-xylene	1	1	<1	99%	96%

Explanation:
[W] Sample type (water)
[S] Sample type (sand)
BTEX concentrations in trip spikes are presented as % recovery

Values above PQLs/Acceptance criteria **VALUE**

ASI Borehole & Test Pit Logs

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP101 1/1

SDUP101: 0-0.3m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, medium to high plasticity, dark brown, trace of igneous gravel and root fibres.	w<PL			GRASS COVER
									CI-CH	Silty CLAY: medium to high plasticity, brown mottled grey.	w<PL			SCREEN: 10.7kg 0-0.3m NO FCF
							1			Silty CLAY: medium to high plasticity, grey mottled brown.				RESIDUAL
							2			END OF TEST PIT AT 2.0m				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP102** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, medium to high plasticity, dark brown, trace of glass, plastic and root fibres.	w<PL			GRASS COVER
										FILL: Silty clay, medium to high plasticity, brown mottled red, orange and grey, trace of ash and root fibres.				SCREEN: 15.6kg 0-0.25m NO FCF
									CI-CH	Silty CLAY: medium to high plasticity, brown mottled red.	w<PL			SCREEN: 12.4kg 0.25-0.75m NO FCF
							1			END OF TEST PIT AT 0.9m				RESIDUAL
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH103 1/2

SDUP4: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 2/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel and ash.	w>PL			SCREEN: 1.8kg 0-0.4m NO FCF
						N = 14 5,7,7	1			FILL: Silty clay, low to medium plasticity, brown, trace of igneous and ironstone gravel, brick fragments and ash.	w<PL			SCREEN: 9.8kg 0.4-1.4m NO FCF
						N = 5 2,2,3								INSUFFICIENT RETURN FOR BULK SCREEN
							2			FILL: Silty clay, low to medium plasticity, dark brown, trace of ironstone gravel.	w>PL			SCREEN: 4.3kg 1.8-2.5m NO FCF
									CI-CH	Silty CLAY: medium to high plasticity, red brown, trace of ironstone gravel.				RESIDUAL
						N = 15 4,6,9	3			as above, but grey.				
									-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, brown.	XW			BRINGELLY SHALE
							4			SILTSTONE: grey, with iron indurated bands.	DW			LOW TO MODERATE 'TC' BIT RESISTANCE
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH103 2/2

SDUP4: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 2/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
										SILTSTONE: grey, with iron indurated bands.	DW			
							8			END OF BOREHOLE AT 8.0m				GROUNDWATER MONITORING WELL INSTALLED TO 8.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 8.0m TO 3.0m. CASING 3.0m TO 0m. 2mm SAND FILTER PACK 8.0m TO 2.8m. BENTONITE SEAL 2.8m TO 2.0m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							9							
							10							
							11							
							12							
							13							
							14							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP104** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty sand, fine to medium grained, dark brown grey, trace of timber, mulch and root fibres.	D			SCREEN: 8.9kg 0-0.1m NO FCF
									CI-CH	FILL: Silty clayey sand, fine to medium grained, dark brown, trace of asphaltic concrete fragments, igneous gravel, roots and root fibres.	w<PL			SCREEN: 16.7kg 0.1-0.5m NO FCF
							1			Silty CLAY: medium to high plasticity, brown mottled grey.				RESIDUAL
										Silty CLAY: medium to high plasticity, grey mottled red brown.				
							2			END OF TEST PIT AT 1.8m				TEST PIT TERMINATED DUE TO NEARBY SERVICE
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH105 1/1

SDUP13: 0-0.3m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 5/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0		-	CONCRETE: 30mm.t FILL: Silty sandy gravel, fine to coarse grained, grey, igneous, sub-angular, fine to medium grained sand.	M			SCREEN: 12.5kg 0.03-0.8m NO FCF
	■					N > 4 3,4,4/ 100mm REFUSAL	1		CI-CH	Silty CLAY: medium to high platicity, grey, trace of ironstone gravel.	w<PL			RESIDUAL
										END OF BOREHOLE AT 1.5m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH106 1/2

SDUP10: 0.19-0.4m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
							0			CONCRETE: 190mm.t				
									-	FILL: Silty sand, fine to medium grained, light brown.	M			SCREEN: 8.6kg 0.19-0.8m NO FCF
						N = 7 2,1,6								ORGNIC ODOUR
▶							1		CI-CH	Silty CLAY: medium to high plasticity, grey, trace of ironstone gravel.	w<PL			RESIDUAL
									-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey.	XW			BRINGELLY SHALE
						N = SPT 20/ 100mm REFUSAL				SILTSTONE: grey brown, with iron indurated bands.	DW			LOW TO MODERATE 'TC' BIT RESISTANCE
							2							
							3							
							4							
							5							HIGH RESISTANCE
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH106 2/2

SDUP10: 0.19-0.4m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
										SILTSTONE: grey brown, with iron indurated bands.	DW			
							8			END OF BOREHOLE AT 8.0m				GROUNDWATER MONITORING WELL INSTALLED TO 7.75m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 7.75m TO 1.75m. CASING 1.75m TO 0m. 2mm SAND FILTER PACK 7.75m TO 1.4m. BENTONITE SEAL 1.4m TO 0.9m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							9							
							10							
							11							
							12							
							13							
							14							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH107 1/1

SDUP110: 0.19-0.4m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			CONCRETE: 220mm.t				
									-	FILL: Silty clay, low to medium plasticity, brown and grey, trace of igneous and ironstone gravel and ash.	w<PL			INSUFFICIENT RETURN FOR BULK SCREEN
						N = 9 3,4,5			CI-CH	Silty CLAY: medium to high plasticity, grey, trace of ironstone gravel.	w<PL			RESIDUAL
							1			Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey.	XW			BRINGELLY SHALE
									-	SILTSTONE: grey brown, with iron indurated bands.	DW			LOW 'TC' BIT RESISTANCE
							2							
							3							
							4							MODERATE RESISTANCE
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH108 1/1

SDUP12: 0.03-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■	N = 8 3,3,5	0		-	ASPHALTIC CONCRETE: 30mm.t	D			SCREEN: 3.4kg 0.03-0.2m NO FCF
									CI-CH	FILL: Silty gravelly sand, fine to medium grained, grey, fine to coarse grained, igneous, sub-angular, trace of brick and tile fragments.	w<PL			RESIDUAL
										Silty CLAY: medium to high plasticity, grey mottled brown.				
							1			END OF BOREHOLE AT 0.95m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH109 1/1

SDUP5: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 2/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty sand, fine to medium grained, dark grey, trace of clay fines and igneous gravel.	M			SCREEN: 7.8kg 0-0.4m NO FCF
						N = 8 3,3,5			CI-CH	Silty CLAY: medium to high plasticity, red brown, trace of ironstone gravel.	w<PL			RESIDUAL
							1			as above, but grey.				
						N > 23 5,14, 9/50mm REFUSAL			-	Extremely Weathered siltstone: silty CLAy, low to medium plasticity, grey.	XW DW			BRINGELLY SHALE
							2			SILTSTONE: brown. END OF BOREHOLE AT 2.0m				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH110 1/1

SDUP111: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 5/2/21 **Datum:** -

Plant Type: - **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel, asphalt, brick and root fibres.	w<PL			SCREEN: 10.2kg 0-0.4m NO FCF
	■								CI-CH	Silty CLAY: medium to high plasticity, grey mottled orange brown.	w<PL			RESIDUAL
										END OF BOREHOLE AT 0.55m				HAND AUGER REFUSAL
							1							
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH111** **1/2**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 2/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			CONCRETE: 200mm.t				
									-	FILL: Silty clay, low to medium plasticity, grey, trace of igneous gravel.	w>PL			INSUFFICIENT RETURN FOR BULK SCREEN
						N = 3 1,2,1	1			FILL: Silty clay, medium to high plasticity, red brown and brown, trace of igneous and ironstone gravel, concrete fragments and ash.				SCREEN: 9.5kg 0.5-1.5m NO FCF
						N = 6 2,3,3	2		CI-CH	Silty CLAY: medium to high plasticity, grey mottled brown, trace of ironstone gravel.	w<PL			RESIDUAL
						N = 18 4,7,11	3		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity. grey.	XW			BRINGELLY SHALE
							4			SILTSTONE: grey brown, with iron indurated bands.	DW			LOW TO MODERATE 'TC' BIT RESISTANCE
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH111** **2/2**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 2/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
										SILTSTONE: grey brown, with iron indurated bands.	DW			
							8			END OF BOREHOLE AT 8.0m				GROUNDWATER MONITORING WELL INSTALLED TO 8.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 8.0m TO 2.0m. CASING 2.0m TO 0m. 2mm SAND FILTER PACK 8.0m TO 1.9m. BENTONITE SEAL 1.9m TO 0.5m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							9							
							10							
							11							
							12							
							13							
							14							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH112** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 2/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous gravel and ash.	w>PL			SCREEN: 9.3kg 0-0.4m NO FCF
						N = 6 3,3,3	1			FILL: Silty clay, medium to high plasticity, red brown, trace of igneous and ironstone gravel, glass fragments and ash.				SCREEN: 8.7kg 0.4-1.4kg NO FCF
						N = 7 1,2,5	2		CI-CH	Silty CLAY: medium to high plasticity, grey, trace of ironstone gravel.	w<PL			1.4-1.5m: INSUFFICIENT RETURN FOR BULK SCREEN
										END OF BOREHOLE AT 2.0m				RESIDUAL
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH113** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 5/2/21 **Datum:** -

Plant Type: - **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■	■	■		0			FILL: Silty clay, medium to high plasticity, brown, trace of igneous gravel and root fibres.	w<PL			SCREEN: 11.2kg 0-0.2m NO FCF
									CI-CH	Silty CLAY: medium to high plasticity, grey mottled yellow brown.	w<PL			RESIDUAL
										END OF BOREHOLE AT 0.4m				HAND AUGER REFUSAL
							1							
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP114 **1/1**

SDUP104: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty sand, fine to medium grained, dark brown grey, with igneous gravel, trace of plastic, concrete asphaltic concrete and timber fragments.	D			SCREEN: 16.6kg 0-0.3m NO FCF
	■								CI-CH		w<PL			RESIDUAL
										Silty CLAY: medium to high plasticity, grey mottled red brown and yellow brown.				
							1			END OF TEST PIT AT 0.8m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP115 1/1

SDUP105: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■		■		0			FILL: Gravelly sand, fine to medium grained, dark brown grey, fine to coarse grained, igneous gravel, sub-angular, trace of concrete and asphaltic concrete fragments.	D			SCREEN: 13.4kg 0-0.2m NO FCF
	■								CI-CH		w<PL			RESIDUAL
										Silty CLAY: medium to high plasticity, red brown mottled grey and brown.				
							1			END OF TEST PIT AT 0.6m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH116 1/2

SDUP111: 0.03-0.3m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0		-	ASPHALTIC CONCRETE: 30mm.t	w<PL			SCREN: 4.9kg 0.03-0.3m
									CI-CH	FILL: Silty clay, low to medium plasticity, grey, with igneous gravel, trace of asphalt fragments.	w<PL			NO FCF
						N = 8 3,3,5	1			Silty CLAY: medium to high plasticity, red brown mottled grey, trace of ironstone gravel.				RESIDUAL
						N = 21 4,10,11	2		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey.	XW			BRINGELLY SHALE LOW 'TC' BIT RESISTANCE
										SILTSTONE: grey brown, with iron indurated bands.	DW			
							3							
							4							MODERATE TO HIGH RESISTANCE
							5							
							6			END OF BOREHOLE AT 5.6m				'TC' BIT REFUSAL ON HIGH RESISTANCE SILTSTONE GROUNDWATER MONITORING WELL INSTALLED TO 5.5m. CLASS 18 MACHINE SLOTTED 50mm DIA.
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH116 2/2

SDUP111: 0.03-0.3m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
							8							PVC STANDPIPE 5.5m TO 2.5m. CASING 2.5m TO 0m. 2mm SAND FILTER PACK 5.5m TO 2.4m. BENTONITE SEAL 2.4m TO 1.4m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							9							
							10							
							11							
							12							
							13							
							14							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP117** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** M.M.P./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty sand, fine to medium grained, dark brown grey, with	D			SCREEN: 15.2kg
	■								CI-CH	igneous gravel, trace of concrete and asphaltic concrete fragments and timber.	w<PL			0-0.2m NO FCF
														RESIDUAL
										Silty CLAY: medium to high plasticity, grey mottled red brown.				
							1			END OF TEST PIT AT 0.6m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH118** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty gravelly clay, low to medium plasticity, grey brown, fine to coarse grained igneous gravel, sub-angular, trace of brick fragments.	w<PL			SCREEN: 3.5kg 0-0.3m NO FCF
						N = 7 3,3,4				FILL: Silty clay, low to medium plasticity, brown, trace of igneous, ironstone and siltstone gravel, brick, concrete and plastic fragments and ash.				SCREEN: 11.6kg 0.3-1.3m NO FCF
							1		CI-CH	Silty CLAY: medium to high plasticity, grey mottled red brown, trace of ironstone gravel.	w<PL			RESIDUAL
						N = 26 4,11,15			-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey brown.	XW			
							2			END OF BOREHOLE AT 2.0m				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH119 1/1

SDUP6: 0.16-0.3m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 2/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■		■		0			CONCRETE: 160mm.t				
									-	FILL: Silty gravelly sand, fine to medium grained, grey, fine to coarse grained igneous sub-angular, trace of sandstone gravel.	M			SCREEN: 3.0kg 0.16-0.4m NO FCF
	■								-		DW			
										SANDSTONE: brown grey.				BRINGELLY SHALE
							1			END OF BOREHOLE AT 1.0m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP120** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: - **Logged/Checked by:** M.M.P./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Sandy clay, medium to high plasticity, dark brown, trace of igneous and ironstone gravel, concrete and root fibres.	w<PL			GRASS COVER
	■		■		■				CI-CH	FILL: Silty clay, medium to high plasticity, red brown mottled grey, trace of ironstone gravel and concrete fragments.	w<PL			SCREEN: 13.3kg 0-0.2m NO FCF
							1			Silty CLAY: medium to high plasticity, red brown mottled yellow brown, trace of ironstone gravel.				SCREEN: 12.7kg 0.2-0.5m NO FCF
										END OF TEST PIT AT 0.8m				RESIDUAL
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP121** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, medium to high plasticity, grey mottled brown and orange brown, trace of igneous gravel, ash and root fibres.	w<PL			GRASS COVER SCREEN: 14.6kg 0-0.5 NO FCF
							1			FILL: Silty clay, medium to high plasticity, brown mottled red brown, trace of igneous and ironstone gravel and ash.				SCREEN: 13.8kg 0.5-1.1m NO FCF
										FILL: Silty clay, medium to high plasticity, brown mottled red brown, trace of igneous and sandstone gravel and ash.				SCREEN: 12.9kg 1.1-1.7m NO FCF
							2		CI-CH	Silty CLAY: medium to high plasticity, brown, trace of ironstone gravel.	w<PL			RESIDUAL
										END OF TEST PIT AT 2.0m				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP122 **1/1**

SDUP102: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, medium to high plasticity, red brown mottled grey, trace of igneous and sandstone gravel, ash and root fibres.	w<PL			GRASS COVER SCREEN: 14.9kg 0-0.6m NO FCF
										FILL: Silty clay, medium to high plasticity, red brown mottled grey, trace of igneous and sandstone gravel, ash, ceramic tile and root fibres.				SCREEN: 13.6kg 0.6-1.4m NO FCF
							1			FILL: Silty gravel, fine to medium grained, dark grey brown, igneous, sub-angular, trace of clay nodules.	D			SCREEN: 19.0kg 1.4-1.9m NO FCF
							2		CI-CH	Silty CLAY: medium to high plasticity, yellow brown mottled grey.	w<PL			RESIDUAL
										END OF TEST PIT AT 2.0m				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH123 1/2

SDUP9: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty gravelly sand, fine to medium grained, grey, fine to coarse grained, igneous, sub-angular, trace of brick fragments.	M			SCREEN: 5.4kg 0-0.3m NO FCF
						N = 9 7,5,4				FILL: Silty clay, medium to high plasticity, trace of igneous and ironstone gravel.	w<PL			SCREEN: 10.6kg 0.3-1.0m NO FCF
							1		CI-CH	Silty CLAY: medium to high plasticity, re brown, trace of ironstone gravel.	w<PL			RESIDUAL
						N > 20 7,13/ 100mm REFUSAL			-	as above, but grey mottled brown.	XW			BRINGELLY SHALE
							2			Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey, with ironstone bands.	DW			LOW TO MODERATE 'TC' BIT RESISTANCE
										SILTSTONE: grey brown, with iron indurated bands.				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH123 2/2

SDUP9: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
										SILTSTONE: grey brown, with iron indurated bands.	DW			HIGH RESISTANCE
							8			END OF BOREHOLE AT 7.9m				'TC' BIT REFUSAL ON HIGH RESISTANCE SILTSTONE GROUNDWATER MONITORING WELL INSTALLED TO 7.6m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 7.6m TO 1.6m. CASING 1.6m TO 0m. 2mm SAND FILTER PACK 7.6m TO 1.2m. BENTONITE SEAL 1.2m TO 0.5m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							9							
							10							
							11							
							12							
							13							
							14							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **TP124** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■	■	■	■	■		0			FILL: Silty sand, fine to medium grained, dark brown, grey, trace of igneous gravel, concrete and asphaltic concrete.	D			SCREEN: 15.2kg 0-0.2m NO FCF
									CI-CH		w<PL			RESIDUAL
										Silty CLAY: medium to high plasticity, red brown mottled grey.				
							1			Silty CLAY: medium to high plasticity, grey brown mottled red.				
	■		■	■					-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, brown.	XW			BRINGELLY SHALE
							2			END OF TEST PIT AT 1.9m				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP125
1/1

SDUP106: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	■	■	■	■	■		0			FILL: Silty sand, fine to medium grained, dark brown grey, with igneous gravel, trace of concrete and asphaltic concrete fragments.	D			SCREEN 14.9kg 0-0.2m NO FCF
	■		■						CI-CH		w<PL			RESIDUAL
										Silty CLAY: medium to high plasticity, red brown mottled grey, trace of siltstone gravel.				
	■		■				1			Silty CLAY: medium to high plasticity, grey mottled red and yellow brown.				
▶										END OF TEST PIT AT 1.2m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP126 1/1

SDUP107: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■	■	■	■	■		0			FILL: Silty sand, fine to medium grained, dark brown grey, with	D			SCREEN: 14.8kg 0-0.3m
									CI-CH	igneous gravel, trace of asphaltic concrete fragments, concrete and timber.	w<PL			NO FCF
	■			■										RESIDUAL
	■			■					-	Silty CLAY: medium to high plasticity, red brown mottled grey.	XW			
							1			Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey mottled yellow brown.				
										END OF TEST PIT AT 0.95m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH127** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■	N = 13 3,6,7	0		CI-CH	FILL: Silty sandy gravel, fine to coarse grained, grey, igneous, sub-angular, fine to medium grained sand.	D			SCREEN: 10.9kg 0-0.2m NO FCF
										Silty CLAY: medium to high plasticity, red brown mottled grey, trace of ironstone gravel.	w<PL			RESIDUAL
							1			as above, but grey mottled brown.				
										END OF BOREHOLE AT 0.95m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH128** **1/2**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 1/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			CONCRETE: 200mm.t				
									-	FILL: Silty sandy gravel, fine to coarse grained, sub-angular igneous, grey, fine to medium grained sand.	M			SCREEN: 4.4kg 0.2-0.4m NO FCF
						N = 8 3,3,5					w<PL			SCREEN: 10.4kg 0.4-1.3m NO FCF
							1			FILL: Silty clay, medium to high plasticity, red brown and brown, trace of igneous, ironstone and sandstone gravel and ash.				
						N = 20 7,9,11				FILL: Silty clay, medium to high plasticity, brown, trace of igneous, ironstone and sandstone gravel, concrete, brick and plastic fragments and ash.				SCREEN: 4.8kg 1.3-2.1m NO FCF
							2			FILL: Silty clay, low to medium plasticity, grey, with ironstone gravel.				INSUFFICIENT RETURN FOR BULK SCREEN
									CI-CH	Silty CLAY: medium to high plasticity, red brown, trace of ironstone gravel.	w<PL			
										as above, but grey mottled brown.				
						N = 16 6,10,6	3			as above, but grey mottled red brown.				
									-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, brown.	XW			BRINGELLY SHALE LOW 'TC' BIT RESISTANCE
							4			SILTSTONE: brown grey, with iron indurated bands.	DW			
							5							HIGH RESISTANCE
							6							
							7			END OF BOREHOLE AT 6.1m				'TC' BIT REFUSAL ON HIGH RESISTANCE SILTSTONE

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH128** **2/2**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 1/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
							8							GROUNDWATER MONITORING WELL INSTALLED TO 5.8m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 5.8m TO 2.8m. CASING 2.8m TO 0m. 2mm SAND FILTER PACK 5.8m TO 2.5m. BENTONITE SEAL 2.5m TO 1.5m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							9							
							10							
							11							
							12							
							13							
							14							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH129 1/1

SDUP3: 0.5-0.7m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 1/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
							0			CONCRETE: 500mm.t				
						N = SPT 8/50mm REFUSAL			-	FILL: Silty sandy gravel, fine to coarse grained, grey, igneous, sub-angular, fine to medium grained sand, trace of ironstone gravel and ash.	M			SCREEN: 2.1kg 0.5-1.0m NO FCF
▶							1			FILL: Silty clay, medium to high plasticity, red brown and brown, trace of igneous and ironstone gravel, and ash.	w>PL			SCREEN: 12.3kg 1.0-2.0m NO FCF
						N = 8 3,4,4	2							SCREEN: 11.4kg 2.0-2.8m NO FCF
						N = 15 4,7,8	3		CI-CH	Silty CLAY: medium to high plasticity, grey mottled red brown.	w<PL			RESIDUAL
										END OF BOREHOLE AT 3.45m				
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP130 1/1

SDUP103: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■	■	■	■	■		0			FILL: Silty clay, medium to high plasticity, brown, trace of ash, brick fragments, igneous gravel and root fibres.	w<PL			GRASS COVER
	■			■					CI-CH	Silty CLAY: medium to high plasticity, yellow brown mottled red brown, trace of ironstone gravel.	w<PL			SCREEN: 12.7kg 0-0.3m NO FCF
		■					1			Silty CLAY: medium to high plasticity, dark brown mottled yellow brown.				RESIDUAL
	■			■						Silty CLAY: medium to high plasticity, red brown mottled grey.				
							2			END OF TEST PIT AT 2.0m				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH131** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 3/1/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty gravelly sand, fine to medium grained, grey, fine to coarse grained igneous, sub-angular, trace of brick fragments and slag.	M			SCREEN: 5.3kg 0-0.3m NO FCF
											w>PL			SCREEN: 2.5kg 0.3-0.5m NO FCF
						N = 13 3,6,7			CI-CH	FILL: Silty clay, medium to high plasticity, brown, trace of igneous, ironstone and sandstone gravel, brick fragments and ash.	w<PL			RESIDUAL
							1			Silty CLAY: medium to high plasticity, red brown, trace of ironstone gravel. END OF BOREHOLE AT 1.0m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **TP132** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty sand, fine to medium grained, dark brown grey.	D			SCREEN: 12.9kg
	■								CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey.	w<PL			0-0.15m NO FCF
	■									Silty CLAY: medium to high plasticity, grey mottled orange brown.				RESIDUAL
							1			END OF TEST PIT AT 0.95m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **TP133** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 5/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■		■		0			FILL: Silty sand, fine to medium grained, with igneous gravel, trace of brick, concrete and asphaltic concrete fragments.	D			SCREEN: 13.9kg
	■								CI-CH		w<PL			0-0.2m
														NO FCF
														RESIDUAL
										Silty CLAY: medium to high plasticity, red brown mottled grey.				
										END OF TEST PIT AT 0.6m				
							1							
							2							
							3							
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH134 1/2

SDUP14: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 5/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty sandy gravel, fine to coarse grained, grey, igneous, sub-angular,	D			SCREEN: 5.5kg 0-0.3m
									CI-CH	fine to medium grained sand, trace of ceramic fragments.	w<PL			NO FCF
						N = 8 2,3,5	1			Silty CLAY: medium to high plasticity, grey, trace of ironstone gravel.				RESIDUAL
						N = 30 6,13,17	2		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey.	XW			BRINGELLY SHALE
										SILTSTONE: grey brown, with iron indurated bands.	DW			LOW 'TC' BIT RESISTANCE
							3							
							4							
							5							
							6							HIGH RESISTANCE
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH134 2/2

SDUP14: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 5/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■						SILTSTONE: grey brown, with iron indurated bands.	DW			
							8			END OF BOREHOLE AT 8.0m				GROUNDWATER MONITORING WELL INSTALLED TO 7.8m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 7.8m TO 1.8m. CASING 1.8m TO 0m. 2mm SAND FILTER PACK 7.8m TO 1.3m. BENTONITE SEAL 1.3m TO 0.8m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							9							
							10							
							11							
							12							
							13							
							14							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP135 1/1

SDUP108: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 4/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty gravelly sand, fine to medium grained, dark brown, fine to coarse grained igneous gravel, sub-angular, trace of sandstone gravel, asphaltic concrete, brick and concrete fragments.	D			SCREEN: 15.2kg 0-0.3m NO FCF
	■								CI-CH		w<PL			RESIDUAL
										Silty CLAY: medium to high plasticity, red brown mottled grey.				
							1			END OF TEST PIT AT 0.9m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP136 1/1

SDUP109: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 5/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■		■		0			FILL: Silty gravelly sand, fine to medium grained, dark grey brown, fine to coarse grained igneous gravel, trace of brick, asphaltic concrete and tile fragments.				SCREEN: 13.4kg
									CI-CH		w<PL			0-0.2m
														NO FCF
										Silty CLAY: medium to high plasticity, red brown mottled grey.				RESIDUAL
							1			END OF TEST PIT AT 0.7m				
							2							
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH137** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty gravelly sand, fine to coarse grained, brown, fine to coarse grained, igneous, sub-angular, trace of tile fragments.	M			SCREEN: 4.9kg 0-0.3m NO FCF
						N = 11 2,5,6				FILL: Silty clay, medium to high plasticity, brown, trace of igneous an ironstone gravel, brick fragments and ash.	w<PL			SCREEN: 8.6kg 0.3-1.0m NO FCF
							1		CI-CH	Silty CLAY: medium to high plasticity, grey mottled brown, trace of ironstone gravel.	w<PL			RESIDUAL
						N = 14 4,7,7								
							2			END OF BOREHOLE AT 2.0m				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH138 1/1

SDUP2: 0.05-0.3m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 1/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■	■	■		0		-	CONCRETE: 50mm.t				
	■			■						FILL: Silty clay, low to medium plasticity, grey, with igneous gravel, trace of tile, ceramic and brick fragments and ash.	w<PL			SCREEN: 4.9kg 0.05-0.3m
	■			■		N > 16 3,11, 5/50mm REFUSAL			CI-CH		w<PL			NO FCF
														RESIDUAL
									-	Silty CLAY: medium to high plasticity, red brown, trace of ironstone gravel.	XW			BRINGELLY SHALE
							1			as above, but grey.	DW			
										Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey, with ironstone bands.				HIGH 'TC' BIT RESISTANCE
										SILTSTONE: grey, with iron indurated bands.				
							2			END OF BOREHOLE AT 1.7m				'TC' BIT REFUSAL ON HIGH RESISTANCE SILTSTONE
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH139** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 1/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0		-	CONCRETE: 50mm.t				
										FILL: Silty sand, fine to medium grained, grey, trace of igneous and ironstone gravel, and slag.	D			SCREEN: 1.9kg 0.05-0.3m
									CI-CH		w<PL			NO FCF
						N > 20 4,16/ 300mm								RESIDUAL
									-	Silty CLAY: medium to high plasticity, grey, trace of ironstone gravel.	XW			BRINGELLY SHALE
						REFUSAL	1			Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey.	DW			LOW 'TC' BIT RESISTANCE
										SILTSTONE: grey.				
										SILTSTONE: grey, with iron indurated bands.				
							2							
										SILTSTONE: brown and grey.				
							3							GROUNDWATER MONITORING WELL INSTALLED TO 7.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 7.0m TO 1.0m. CASING 1.0m TO 0m. 2mm SAND FILTER PACK 7.0m TO 1.0m. BENTONITE SEAL 1.0m TO 0.5m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							4							
							5							
							6			SILTSTONE: grey.	SW			HIGH RESISTANCE
										END OF BOREHOLE AT 7.0m				
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH140** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 1/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0		-	ASPHALTIC CONCRETE: 50mm.t				
										FILL: Silty gravelly sand, fine to medium grained, grey, fine to coarse grained igneous, sub-angular.	D			SCREEN: 2.8kg 0.05-0.3m NO FCF
											w<PL			
						N = 7 3,3,4			CI-CH	FILL: Silty clay, medium to high plasticity, red brown, trace of igneous and ironstone gravel.	w<PL			SCREEN: 3.1kg 0.3-0.5m NO FCF
							1			Silty CLAY: medium to high plasticity, grey, trace of ironstone gravel.				RESIDUAL
						N > 9 4,8, 1/300mm REFUSAL			-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey	XW			BRINGELLY SHALE
							2			SILTSTONE: brown.	DW			
										END OF BOREHOLE AT 2.0m				
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH141** **1/1**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** HAND AUGER **R.L. Surface:** N/A

Date: 5/2/21 **Datum:** -

Plant Type: - **Logged/Checked by:** M.M.P./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty sand, fine to medium grained, brown, with igneous gravel, trace of brick and concrete fragments and root fibres.	D			SCREEN: 9.8kg 0-0.3m NO FCF
	■										w<PL			
										FILL: Silty clay, medium to high plasticity, red brown mottled grey.				
										END OF BOREHOLE AT 0.5m				
							1							
							2							
							3							
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Log No. **BH142** 1/1

Environmental logs are not to be used for geotechnical purposes

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 2/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty gravelly clay, low to medium plasticity, brown, fine to coarse grained, igneous, sub-angular, trace of ironstone and sandstone gravel.	w<PL			SCREEN: 5.4kg 0-0.5m NOFCF
						N = 9 3,3,6	1			FILL: Silty clay, medium to high plasticity, brown and grey, trace of igneous, ironstone and sandstone gravel, sand brick fragments.				SCREEN: 8.1kg 0.5-1.2m NO FCF
									CI-CH	Silty CLAY: medium to high plasticity, grey mottled brown, trace of ironstone gravel.	w<PL			RESIDUAL
						N = 16 3,4,12	2			END OF BOREHOLE AT 2.0m				
							3							
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH143** **1/2**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 5/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty sandy gravel, fine to coarse grained, brown, sandstone, sub-angular, fine to medium grained sand, trace of igneous gravel.	D w<PL			SCREEN: 4.0kg 0-0.2m NO FCF
						N = 6 2,3,3			CI-CH	FILL: Silty clay, medium to high plasticity, brown, trace of ironstone gravel and ash.	w<PL			SCREEN: 2.1kg 0.2-0.4m NO FCF
							1			Silty CLAY: medium to high plasticity, grey, trace of ironstone gravel.				RESIDUAL
									-	SILTSTONE: brown grey, with iron indurated bands.	DW			BRINGELLY SHALE LOW 'TC' BIT RESISTANCE
							2							
							3							
							4							
							5							
							6							HIGH RESISTANCE
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH143** **2/2**

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 5/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■						SILTSTONE: brown grey, with iron indurated bands.	DW			
							8			END OF BOREHLE AT 7.6m				'TC' BIT REFUSAL ON HIGH RESISTANCE SILTSTONE GROUNDWATER MONITORING WELL INSTALLED TO 7.4m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 7.4m TO 1.4m. CASING 1.4m TO 0m. 2mm SAND FILTER PACK 7.4m TO 1.1m. BENTONITE SEAL 1.1m TO 0.5m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							9							
							10							
							11							
							12							
							13							
							14							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP144 **1/1**

SDUP110: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** EXCAVATOR **R.L. Surface:** N/A

Date: 5/2/21 **Datum:** -

Plant Type: JKX **Logged/Checked by:** C.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■	■	■	■	■		0			FILL: Silty sandy gravel, fine to coarse grained, grey brown, sandstone sub-rounded, trace of concrete and asphaltic concrete fragments.	D			SCREEN: 17.9kg
	■			■					CI-CH		w<PL			0-0.2m
										Silty CLAY: medium to high plasticity, red brown mottled grey.				NO FCF
	■						1			Silty CLAY: medium to high plasticity, grey mottled orange brown.				RESIDUAL
	■			■										
	■						2							
										END OF TEST PIT AT 2.2m				
							3							
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. BH145 1/1

SDUP7: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 3/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty clay, low to medium plasticity, dark brown, trace of igneous and sandstone gravel.	w<PL			SCREEN: 8.5kg 0-0.5m NO FCF
	■		■		■	N = 11 5,5,6				FILL: Silty clay, medium to high plasticity, brown, trace of igneous and ironstone gravel and ash.	w>PL			SCREEN: 7.3kg 0.5-1.5m NO FCF
	■		■		■		1							
	■		■		■	N = 6 3,3,3								SCREEN: 7.5kg 1.5-2.5m NO FCF
	■				■		2							
									-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey, with iron indurated bands.	XW			BRINGELLY SHALE
						N = SPT 5/50mm REFUSAL	3			END OF BOREHOLE AT 3.05m				
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH146** **1/1**

SDUP1: 0-0.2m

Client: WOOLWORTHS GROUP

Project: ADDITIONAL SITE INVESTIGATION

Location: 250 VICTORIA STREET, WETHERILL PARK, NSW

Job No.: E31888BR **Method:** SPIRAL AUGER **R.L. Surface:** N/A

Date: 1/2/21 **Datum:** -

Plant Type: JK205 **Logged/Checked by:** A.M./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
							0			FILL: Silty sandy clay, low to medium plasticity, dark brown, fine to medium grained, trace of ironstone gravel, and brick fragments.	w>PL			MULCH COVER
											w<PL			SCREEN: 9.3kg 0-0.3m NO FCF
						N = 6 3,3,3	1			FILL: Silty clay, medium to high plasticity, brown, trace of igneous, ironstone and sandstone gravel, and ash.				SCREEN: 10.4kg 0.3-1.3m NO FCF
						N = 3 2,2,1	2							SCREEN: 9.1kg 1.3-2.3m NO FCF
														SCREEN: 10.3kg 2.3-3.3m NO FCF
						N = 0 0,0,0	3				w>PL			SPT SUNK UNDER SELF WEIGHT
▶									-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, brown grey.	XW			BRINGELLY SHALE
							4			SILTSTONE: grey, with iron indurated bands.	DW			LOW 'TC' BIT RESISTANCE
										END OF BOREHOLE AT 4.5m				
							5							
							6							
							7							

ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

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

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

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

DESCRIPTION AND CLASSIFICATION METHODS

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

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

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

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

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

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

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

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

INVESTIGATION METHODS

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

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

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

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

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

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

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

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

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

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

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

The test results are reported in the following form:

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

  N = 13
  4, 6, 7

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

  N > 30
  15, 30/40mm

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

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

LOGS

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

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

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

GROUNDWATER

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

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

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

FILL

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

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

LABORATORY TESTING

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

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

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

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

Laboratory Classification Criteria

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

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

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

NOTES:

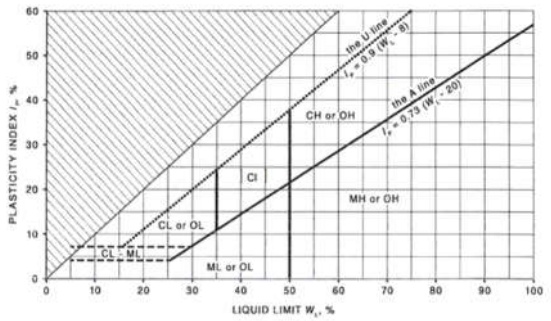
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

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

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

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

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



LOG SYMBOLS

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

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

Classification of Material Weathering

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

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

Rock Material Strength Classification

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

Preliminary Stage 2 ESA Borehole Logs

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 1
1/2

Easting: 307159.3
Northing: 6253132

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK305

R.L. Surface: 38.34m
Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			FILL: Gravelly sand, fine to coarse grained, yellow brown, fine to coarse grained sandstone gravel.	D w≈PL			
					N = 5 2,2,3	1		CI-CH	as above, but dark grey. Silty CLAY: medium to high plasticity, brown mottled grey.	w>PL	VSt	330 260 350	RESIDUAL
					N = 16 5,5,11	2			Silty CLAY: medium to high plasticity, red brown and grey.		(VSt-Hd)		
								-	Extremely Weathered claystone: silty CLAY, medium plasticity, grey.	XW	(Hd)		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						3			CLAYSTONE: brown and grey.	DW	VL-L		LOW RESISTANCE
						4		-	SILTSTONE: dark grey and dark brown.				
						5							
						6				SW	M		MODERATE RESISTANCE WITH HIGH BANDS
						7							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 1 2/2

Easting: 307159.3
Northing: 6253132

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK305

R.L. Surface: 38.34m
Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
									SILTSTONE: dark grey and dark brown.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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BOREHOLE LOG

Borehole No. **2** 1/2

Easting: 307220.6
Northing: 6253127

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK305 **R.L. Surface:** 37.67m

Date: 2/10/18 **Datum:** AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■			■		0			FILL: Gravelly silty sand, fine to coarse grained, yellow brown, fine to coarse grained sandstone gravel, trace of sandstone cobbles.	D			
								CI-CH	Silty CLAY: medium to high plasticity, red and grey.	w>PL	VSt		RESIDUAL
	■			■	N = 9 4,4,5							350 330 340	
						1			Silty CLAY: medium to high plasticity, orange brown and grey.		Hd		
	■			■	N > 23 11,12 11/100mm							>600 >600 >600	
					REFUSAL	2			as above, but with extremely weathered claystone bands.				
				■				-	CLAYSTONE: brown and grey.	DW	L		BRINGELLY SHALE LOW 'TC' BIT RESISTANCE
						3							
				■		4		-	SILTSTONE: dark grey and dark brown, with medium strength bands.				BANDS OF MODERATE RESISTANCE
						5							
				■		6				SW	M		MODERATE RESISTANCE
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **2** 2/2

Easting: 307220.6
Northing: 6253127

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK305

Logged/Checked by: A.V./A.J.H.

R.L. Surface: 37.67m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SILTSTONE: dark grey and dark brown.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 3 1/2

Easting: 307293.8
Northing: 6253125

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 27/9/18

Method: SPIRAL AUGER
JK305

R.L. Surface: 37.02m
Datum: AHD

Logged/Checked by: S.M./A.H.J.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 60mm.t				
								-	FILL: Silty gravelly sand, fine to medium grained, dark grey, fine grained igneous gravel.	D			
								CH	Silty CLAY: high plasticity, light grey.	w≈PL	Hd		RESIDUAL
					N = 12 7,7,5							450 410 530	
						1							
					N = 26 7,13,13							>600 >600 >600	
						2							
									as above, but light grey mottled red brown, with ironstone gravel bands.				
					N = SPT 9/120mm REFUSAL	3						>600 >600 >600	
								-	Extremely Weathered claystone: silty CLAY, medium plasticity, light grey, with low strength iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						4							
									CLAYSTONE: dark grey and dark brown.	DW	VL		
						5		-	Interbedded CLAYSTONE and SILLTSTONE: dark grey and dark brown.		L		LOW RESISTANCE
						6							
						7							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 3
2/2

Easting: 307293.8
Northing: 6253125

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 27/9/18

Method: SPIRAL AUGER
JK305

Logged/Checked by: S.M./A.H.J.

R.L. Surface: 37.02m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					Interbedded CLAYSTONE and SILLTSTONE: dark grey and dark brown.	SW	M		MODERATE TO HIGH RESISTANCE
									END OF BOREHOLE AT 7.5m				

8
9
10
11
12
13
14

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BOREHOLE LOG

Borehole No. **4** 1/2

Easting: 307358.9
Northing: 6253114

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK305 **R.L. Surface:** 36.66m

Date: 26/9/18 **Datum:** AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 30mm.t	D			
	■								FILL: Silty sandy gravel, fine grained, igneous, dark grey, fine to coarse grained sand.				
				■	N > 18 9,18/ 130mm REFUSAL			CH	Silty CLAY: high plasticity, red brown, with sub angular fine grained ironstone gravel.	w≒PL	Hd	>600 >600 >600	RESIDUAL
						1			as above, but light grey.				
								-	Extremely Weathered claystone: silty CLAY: medium to high plasticity, light grey, with low strength iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE WITH LOW BANDS
				■	N = SPT 15/90mm REFUSAL	2							
						3						>600 >600 >600	
						4			CLAYSTONE: light grey	DW	VL		LOW RESISTANCE
						5							
						6							
				■					as above, but dark grey		VL-L		
						7							

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BOREHOLE LOG

Borehole No. 4 2/2

Easting: 307358.9
Northing: 6253114

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 26/9/18

Method: SPIRAL AUGER JK305

Logged/Checked by: S.M./A.J.H.

R.L. Surface: 36.66m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
									CLAYSTONE: dark grey.	DW	VL-L		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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BOREHOLE LOG

Borehole No. 5
1/2

Easting: 307157.8
Northing: 6253089

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 40.27m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0		-	ASPHALTIC CONCRETE: 50mm.t	D			
								CH	FILL: Silty sand, fine to coarse grained, dark grey, with fine grained igneous gavel.	w>PL	St		RESIDUAL
					N = 8 3,4,4				Silty CLAY: high plasticity, brown.			160	
									as above, but red brown.			160	
						1			as above, but red brown mottled brown and light grey, with rounded fine grained ironstone gravel.	w≈PL	VSt-Hd	180	
					N = 20 5,7,13				Silty CLAY: high plasticity, light grey, with ironstone gravel bands.			300 430 520	
						2		-	Extremely Weathered siltstone: silty CLAY: medium plasticity, dark grey mottled yellow brown.	XW	HD		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
									SILTSTONE: dark grey.	DW	VL		LOW RESISTANCE
						3							
						4							
						5				SW	L-M		MODERATE RESISTANCE
						6							
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **5** 2/2

Easting: 307157.8
Northing: 6253089

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 40.27m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SILTSTONE: dark grey.	SW	L-M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 6
1/2

Easting: 307208.1
Northing: 6253079

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK305

R.L. Surface: 39.23m
Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■					0			FILL: Gravelly silty sand, fine to coarse grained, brown and grey, fine to medium grained sandstone gravel.	D			
				■	N = 10 3,4,6			CI-CH	FILL: Silty clay, medium to high plasticity, red and grey.	w>PL	VSt	300	RESIDUAL
	■					1			Silty CLAY: medium to high plasticity, grey and brown mottled red brown.			300 350	
				■	N = 26 6,10,16				Silty CLAY: medium to high plasticity, orange brown and grey mottled dark grey.	w<PL	Hd	400 420 500	
						2		-	CLAYSTONE: brown and grey, with extremely weathered bands.	DW	VL		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						3							
				■		4			CLAYSTONE: brown and grey.		L		LOW RESISTANCE
						5							
				■		6		-	SILTSTONE: dark grey.	SW	M		MODERATE RESISTANCE
											H		HIGH RESISTANCE
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 6 2/2

Easting: 307208.1
Northing: 6253079

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK305

Logged/Checked by: A.V./A.J.H.

R.L. Surface: 39.23m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SILTSTONE: dark grey.	SW	H		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 7
1/1

Easting: 307293.3
Northing: 6253069

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 27/9/18

Method: SPIRAL AUGER
JK350

R.L. Surface: 36.23m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			CONCRETE: 248mm.t				10mm DIA. REINFORCEMENT
	■							-	FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel.	D			208mm TOP COVER
	■			■	N = 7 2,3,4					w>PL		200 170 180	APPEARS MODERATELY COMPACTED
				■		1		CH	FILL: Silty clay, high plasticity, red brown mottled light grey and brown, trace of fine grained ironstone gravel and slag.	w>PL	St	200 190 150	RESIDUAL
									Silty CLAY: high plasticity, brown mottled dark grey, trace of ash.		VSt		
	■			■	N = 12 5,4,8				as above, but light grey mottled yellow brown, with sandy clay nodules and fine grained ironstone gravel.			300 280 270	
						2		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey mottled dark grey.	XW	Hd		BRINGELLY SHALE
								-	Interbedded SILTSTONE and CLAYSTONE: dark grey and dark brown.	DW	L		VERY LOW 'TC' BIT RESISTANCE
				■		3							LOW RESISTANCE
											L-M		
				■		4							
						5				SW	M-H		MODERATE TO HIGH RESISTANCE
				■		6			END OF BOREHOLE AT 6.0m				'TC' BIT REFUSAL
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 8
1/1

Easting: 307361.8
Northing: 6253060

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 27/9/18

Method: SPIRAL AUGER
JK350

R.L. Surface: 35.75m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			CONCRETE: 495mm.t				8mm DIA. REINFORCEMENT 270mm TOP COVER
					N = SPT 10/70mm REFUSAL			-	FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel.	D			APPEARS WELL COMPACTED
						1			FILL: Silty clay, high plasticity, red brown mottled grey and brown, trace of slag and glass fragments.				
								CH	Silty CLAY: high plasticity, red brown mottled light grey.	w>PL	VSt		RESIDUAL
					N = 13 4,4,9				as above, but light grey mottled yellow brown.			230 290 260	
						2							
								-	Extremely Weathered claystone: silty CLAY, medium to high plasticity, light grey mottled red brown, with low strength bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
					N = SPT 19/150mm REFUSAL	3						600 >600 >600	
						4							
								-	Interbedded CLAYSTONE and SILLTSTONE: dark grey and dark brown,	DW	L		LOW RESISTANCE
						5				SW	M		MODERATE RESISTANCE
						6					H		HIGH RESISTANCE
						7			END OF BOREHOLE AT 7.0m				

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 9
1/2

Easting: 307149.9
Northing: 6253026

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 42.52m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■					0			FILL: Silty gravelly sand, fine to coarse grained, yellow brown and brown, fine to medium grained sandstone gavel.	D			
				■	N = 4 2,1,3			CH	Silty CLAY: high plasticity, red brown mottled light grey, trace of rounded fine grained ironstone gravel.	w>PL	St		RESIDUAL
	■					1			Silty CLAY: high plasticity, light grey, with ironstone gravel bands.	w<PL	Hd		
				■	N > 12 8,12/ 120mm REFUSAL			-	Extremely Weathered siltstone: silty CLAY, medium plasticity, grey.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
				■		2			SILTSTONE: dark grey.	DW	VL-L		LOW RESISTANCE
				■		3							
				■		4				SW	L-M		MODERATE RESISTANCE
				■		5							
				■		6		-	SANDSTONE: fine to medium grained, grey, with siltstone bands.	SW	L-M		
						7							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **9** 2/2

Easting: 307149.9
Northing: 6253026

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 42.52m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SANDSTONE: fine to medium grained, grey, with siltstone bands.	SW	L-M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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BOREHOLE LOG

Borehole No. 10 1/2

Easting: 307203.5
Northing: 6253004

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 39.94m
Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 50mm.t FILL: Gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel.	D			
					N = 16 7,8,8	1		CI-CH	Silty CLAY: medium to high plasticity, grey mottled brown.	w<PL	Hd	>600 >600 >600	RESIDUAL
					N = 39 5,13,26	2			as above, but with extremely weathered claystone bands.			>600 >600 >600	
					N = SPT 12/100mm REFUSAL	3		-	Extremely Weathered claystone: silty CLAY, medium to high plasticity, grey mottled orange brown.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						4			CLAYSTONE: brown mottled light grey.	DW	VL L		LOW RESISTANCE
						5		-	SIILTSTONE: dark grey.				
						6				SW	M		MODERATE RESISTANCE
						7					H		HIGH RESISTANCE

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **10** 2/2

Easting: 307203.5
Northing: 6253004

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 39.94m
Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SIILTSTONE: dark grey.	SW	H		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **11** 1/1

Easting: 307284.5
Northing: 6253007

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK350 **R.L. Surface:** 36.15m

Date: 27/9/18 **Datum:** AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			CONCRETE: 205mm.t				8mm DIA. REINFORCEMENT 165 TOP COVER
	■							-	FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel, with slag.	D			
	■			■	N = 10 4,4,6			CH	Silty CLAY: high plasticity, light grey mottled red brown.	w>PL	VSt	290 280 260	RESIDUAL
						1							
	■			■	N = 21 5,9,12			CI-CH	Silty CLAY: medium to high plasticity, light grey mottled red brown.	w≈PL	Hd	>600 >600 >600	
				■		2		-	CLAYSTONE: dark grey and dark brown.	DW	VL-L		BRINGELLY SHALE
				■							L-M		VERY LOW 'TC' BIT RESISTANCE
				■		3		-	SILTSTONE: dark grey.	SW			LOW RESISTANCE
				■						SW	H		MODERATE RESISTANCE
						5			END OF BOREHOLE AT 5.0m				'TC' BIT REFUSAL
						6							
						7							

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BOREHOLE LOG

Borehole No. 12
1/2

Easting: 307351.8
Northing: 6252997

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 3/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 36.24m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			FILL: Silty sandy gravel, fine to coarse grained igneous gravel, dark grey, fine to coarse grained sand, with concrete fragments.	D w>PL			GRAVEL COVER APPEARS POORLY COMPACTED
					N = 4 1,2,2				FILL: Silty clay, high plasticity, brown mottled red brown and grey, with fine grained igneous and ironstone gravel.			150 270 300	
					N = 12 3,5,7	1 2			as above, but with sandy gravel bands.			400 430 190	APPEARS WELL COMPACTED
					N = 22 5,13,9	3						520 550 >600	
								CH	Silty CLAY: high plasticity, red brown mottled yellow brown, with fine grained ironstone gravel.	w>PL	VSt	300 360	RESIDUAL
						4			as above, but light grey mottled yellow brown, with ironstone gravel bands.	w≒PL	Hd		
					N = 28 7,13,15	5						>600 >600 >600	
					N = SPT 10/70mm REFUSAL	6		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, grey.	XW	Hd		BRINGELLY SHALE
						7		-	SILTSTONE: dark grey.	DW	VL-L		VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **12** 2/2

Easting: 307351.8
Northing: 6252997

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 3/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 36.24m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SILTSTONE: dark grey.	DW	VL-L		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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BOREHOLE LOG

Borehole No. 13 1/1

Easting: 307142.7
Northing: 6252967

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK205 **R.L. Surface:** 43.14m

Date: 2/10/18 **Datum:** AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■					0			FILL: Silty gravelly sand, fine to coarse grained, grey and yellow brown, fine to medium grained sandstone gravel, trace of asphaltic concrete fragments, igneous gravel and slag.	D			
	■			■	N = 5 2,2,3			CH	Silty CLAY: high plasticity, red brown.	w>PL	St	160 180 180	RESIDUAL
						1			as above, but light grey, with low strength iron indurated bands.		Hd		
				■	N = 15 5,7,8							440 470 440	
						2		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, dark grey.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
				■		3			SILTSTONE: dark grey.	DW	VL		
				■		4							
						5			as above, but with fine to medium grained sandstone bands.		L-M		MODERATE RESISTANCE
				■		6							
										SW	M		HIGH RESISTANCE
						7			END OF BOREHOLE AT 6.6m				'TC' BIT REFUSAL

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BOREHOLE LOG

Borehole No. 14 1/2

Easting: 307192.1
Northing: 6252961

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 40.16m
Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0		-	ASPHALTIC CONCRETE: 50mm.t	D	St		
								-	FILL: Gravelly sand, fine to coarse grained, dark grey, fine to coarse grained igneous gravel.				
								CI-CH	Silty CLAY: medium to high plasticity, red brown.	w≒PL	VSt		RESIDUAL
					N = 13 5,6,7							250 300 260	
						1			Silty CLAY: medium to high plasticity, yellow brown.				
					N = 22 6,9,13						VSt-Hd	440 380 >600	
						2							
								-	Extremely Weathered siltstone: silty CLAY, medium plasticity, grey and brown, with clay bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
					N > 10 14,10/ 100mm REFUSAL	3			SILTSTONE: grey.	DW	VL		
											L		LOW RESISTANCE
						4							
									SILTSTONE: dark grey and brown.	SW	M		MODERATE RESISTANCE
						5							
						6			as above, but dark brown.		M-H		
											H		HIGH RESISTANCE
						7							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **14** 2/2

Easting: 307192.1
Northing: 6252961

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

Logged/Checked by: A.V./A.J.H.

R.L. Surface: 40.16m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SILTSTONE: dark grey.	SW	H		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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BOREHOLE LOG

Borehole No. 15 1/1

Easting: 307275.9
Northing: 6252950

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 27/09/18
Method: SPIRAL AUGER JK350
Logged/Checked by: S.M./A.J.H.
R.L. Surface: 34.60m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			CONCRETE: 248mm.t				8mm DIA. REINFORCEMENT
	■							CI-CH	Silty sandy CLAY: medium to high plasticity, light grey mottled yellow brown, fine to medium grained sand.	w>PL	(St)		148mm TOP COVER
	■			■	N = 14 10,8,6			SC	Clayey SAND: fine to medium grained, light grey and yellow brown, with sandy clay bands.	M	MD	410 320 >600	RESIDUAL
						1							
				■	N > 13 6,13/ 150mm REFUSAL							340 350 340	
						2		-	Extremely Weathered sandstone: clayey SAND: fine to medium grained, light grey and yellow brown.	XW	D		BRINGELLY SHALE
									as above, but with quartz gravel.				VERY LOW 'TC' BIT RESISTANCE
									as above, but without quartz gravel and with low strength bands.				
						3		-	Interbedded CLAYSTONE and SILTSTONE: dark grey and dark brown, with extremely weathered seams.	DW	VL-L		VERY LOW TO LOW RESISTANCE
								-	SILTSTONE: dark grey.		L		
						4				SW	L-M		MODERATE RESISTANCE
											H		HIGH RESISTANCE
									END OF BOREHOLE AT 4.5m				'TC' BIT REFUSAL
						5							
						6							
						7							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **16** 1/2

Easting: 307316.7
Northing: 6252941

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK205 **R.L. Surface:** 35.43m

Date: 3/10/18 **Datum:** AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			FILL: Silty gravelly sand, fine to coarse grained, grey brown, fine grained ironstone and igneous gravel.	D w>PL			APPEARS MODERATELY COMPACTED
					N = 11 4,5,6				FILL: Silty clay, high plasticity, brown mottled light grey, yellow brown and red brown, with fine grained ironstone and igneous gravel, sand, trace of ash.			130 130 150	
						1			as above, but with gravelly sand bands.				
					N = 19 3,10,9							270 270 280	APPEARS WELL COMPACTED
						2		CH	Silty CLAY: high plasticity, dark brown mottled orange brown, with fine grained ironstone gravel.	w>PL	Hd	400 >600	RESIDUAL
									Silty sandy CLAY: high plasticity, red brown mottled yellow brown and light grey, fine to medium grained sand.				
						3		-	Extremely Weathered sandstone: clayey SAND, fine to medium grained, light grey, with low strength iron indurated bands.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						4			SANDSTONE: fine to medium grained, light grey, with medium strength iron indurated bands.	DW	L		MODERATE RESISTANCE
									as above, but with siltstone bands.		VL-L		LOW TO MODERATE RESISTANCE
						5							
						6		-	SILTSTONE: dark grey.	SW	L-M		
						7							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **16** 2/2

Easting: 307316.7
Northing: 6252941

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 3/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 35.43m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SILTSTONE: dark grey.	SW	L-M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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BOREHOLE LOG

Borehole No. **17** 1/2

Easting: 307146.1
Northing: 6252933

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK205 **R.L. Surface:** 42.67m

Date: 2/10/18 **Datum:** AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■					0			FILL: Silty gravelly sand, fine to coarse grained, grey and yellow brown, medium to coarse grained sandstone gravel, trace of asphaltic concrete fragments and slag.	D			
								CH		w>PL	VSt		RESIDUAL
	■			■	N = 7 3,3,4	1			Silty CLAY: high plasticity, red brown mottled light grey, trace of fine grained ironstone gravel.			330 290 330	
									as above, but light grey.				
				■	N > 12 7,12/90mm REFUSAL	2		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey mottled yellow brown.	XW	Hd	>600 >600 >600	BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
				■					SILTSTONE: dark grey.	DW	VL-L		LOW RESISTANCE
				■		3		-	SANDSTONE: fine to medium grained, grey.	DW	L		
				■		4							
				■		5				SW	L-M		MODERATE RESISTANCE
				■		6			as above, but with siltstone bands.		M		MODERATE TO HIGH RESISTANCE
				■		7							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 17
2/2

Easting: 307146.1
Northing: 6252933

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

Logged/Checked by: S.M./A.J.H.

R.L. Surface: 42.67m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SANDSTONE: fine to medium grained, grey, with siltstone bands.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **18** 1/2

Easting: 307183.3
Northing: 6252930

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 40.15m
Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0		-	ASPHALTIC CONCRETE: 50mm.t	D			
									FILL: Gravelly sand, fine to coarse grained, dark grey, fine to medium grained igneous gravel.				
								CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey.	w≈PL	VSt		RESIDUAL
					N = 9 4,4,5							240 250 300	
						1							
					N = 26 7,11,15							290 350 300	
						2							
								-	Extremely Weathered sandstone: clayey SAND, fine to medium grained, brown, with clay bands.	XW	D		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
					N = SPT 10/150mm REFUSAL	3							
									CLAYSTONE: brown and light grey and yellow brown.	DW	L		LOW RESISTANCE
						4							
									SILTSTONE: dark grey.	SW	M		MODERATE RESISTANCE
						5							
						6							
						7							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **18** 2/2

Easting: 307183.3
Northing: 6252930

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

Logged/Checked by: A.V./A.J.H.

R.L. Surface: 40.15m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
									SILTSTONE: dark grey.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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BOREHOLE LOG

Borehole No. **19** 1/1

Easting: 307255.5
Northing: 6252908

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 27/9/18

Method: SPIRAL AUGER
JK350

R.L. Surface: 33.27m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			CONCRETE: 205mm.t				8mm DIA. REINFORCEMENT 105mm TOP COVER
-	■							-	FILL: Sandy gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel, with slag.	D			
	■			■	N = SPT 8/80mm REFUSAL			-	Extremely Weathered sandstone: clayey SAND, fine to medium grained, light grey and yellow brown.	XW	D		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
				■		1			SANDSTONE: fine to medium grained, light grey.	SW	M		MODERATE RESISTANCE
				■							H		HIGH RESISTANCE
						2			END OF BOREHOLE AT 1.8m				'TC' BIT RESISTANCE
						3							
						4							
						5							
						6							
						7							

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BOREHOLE LOG

Borehole No. **20** 1/2

Easting: 307313.1
Northing: 6252907

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK350 **R.L. Surface:** 32.52m

Date: 28/9/18 **Datum:** AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			CONCRETE: 195mm.t				8mm DIA. REINFORCEMENT
								-	FILL: Silty gravelly sand, fine to	D			110mm TOP COVER
								CH	coarse grained, dark grey, fine	w>PL	(VSt)		RESIDUAL
					N > 15 15,15/ 110mm			CI	grained igneous gravel.	w<PL	Hd	>600	
					REFUSAL				Silty CLAY: high plasticity, yellow brown mottled light grey.			>600	
						1			Silty CLAY: medium plasticity, light grey, with fine grained ironstone gravel.			>600	
									as above, but with sandy clay nodules.		VSt- Hd	530	
					N = 15 5,5,10							300	
						2			Sandy CLAY: medium plasticity, light grey mottled yellow brown, fine to medium grained sand.			380	
					N > 13 6,13/ 130mm	3						490	
					REFUSAL			-	Extremely Weathered sandstone: clayey SAND, fine to medium grained, light grey and yellow brown.	XW	D	430 280	BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
								-	SILTSTONE: dark grey.	SW	L-M		LOW TO MODERATE RESISTANCE
						4							
						5							
						6					M		MODERATE RESISTANCE
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **20** 2/2

Easting: 307313.1
Northing: 6252907

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 28/9/18

Method: SPIRAL AUGER
JK350

R.L. Surface: 32.52m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
									SILTSTONE: dark grey.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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BOREHOLE LOG

Borehole No. 21 1/2

Easting: 307128.9
Northing: 6252848

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 20/9/18
Method: SPIRAL AUGER JK205
Logged/Checked by: A.V./A.J.H.
R.L. Surface: 41.02m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■					0			CONCRETE: 130mm.t				NO OBSERVED REINFORCEMENT
								-	FILL: Silty clay, medium to high plasticity, grey mottled brown, trace of organic matter.	w>PL	VSt		APPEARS WELL COMPACTED
				■	N = 11 3,5,6							300 400 250	
						1		CH	Silty CLAY: high plasticity, grey mottled dark grey and red brown.	w<PL	Hd		RESIDUAL
				■	N > 16 6,16/ 130mm							>600 >600 >600	
					REFUSAL			-	CLAYSTONE: brown.	DW	VL		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
						2							
						3		-	SILTSTONE: dark grey.	DW	L		LOW RESISATANCE
				■		4							
										SW	M		MODERATE RESISTANCE
				■		5							
						6							
											H		HIGH RESISTANCE
						7							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **21** 2/2

Easting: 307128.9
Northing: 6252848

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 20/9/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 41.02m
Datum: AHD

Logged/Checked by: A.V./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SILTSTONE: dark grey.	SW	H		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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BOREHOLE LOG

Borehole No. **22** 1/1

Easting: 307218.7
Northing: 6252881

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 3/10/18
Method: SPIRAL AUGER JK350
Logged/Checked by: S.M./A.J.H.
R.L. Surface: 36.6m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
						0		-	ASPHALTIC CONCRETE: 40mm.t	D			
								CH	FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel.	w>PL	St-VSt		RESIDUAL
	■			■	N = 8 2,3,5				Silty CLAY: high plasticity, yellow brown mottled dark grey, with fine grained ironstone gravel.			190 240 240	
	■					1			as above, but light grey.		VSt		
									as above, but mottled yellow brown.				
				■	N > 26 6,16, 10/80mm			-	Extremely Weathered siltstone: silty CLAY, low to medium grained, dark grey.	XW	Hd	300 360 370	BRINGELLY SHALE
				■	REFUSAL	2			SILTSTONE: dark grey.	DW	VL		VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE
				■		3							
				■				-	SANDSTONE: fine to medium grained, grey.	SW	L-M		MODERATE RESISTANCE
▶▼ ON COMPLET-ION				■		4					H		HIGH RESISTANCE
						5			END OF BOREHOLE AT 5.0m				'TC' BIT REFUSAL
						6							
						7							

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BOREHOLE LOG

Borehole No. **24** 1/2

Easting: 307322
Northing: 6252811

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 28/9/18
Method: SPIRAL AUGER JK350
Logged/Checked by: S.M./A.J.H.
R.L. Surface: 32.53m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			CONCRETE: 130mm.t				8mm DIA. REINFORCEMENT 80mm TOP COVER
	■			■	N = 6 2,3,5			-	FILL: Silty gravelly sand, fine to coarse grained, dark grey, fine grained igneous gravel, trace of glass fragments and slag.	D			
										w>PL		230 240 220	APPEARS MODERATELY COMPACTED
						1			FILL: Silty clay, high plasticity, red brown mottled grey and yellow brown, trace of fine grained ironstone gravel, ash and slag.				
				■	N = 7 2,3,4							170 180 130	
						2							
								CH	Silty CLAY: high plasticity, light grey mottled yellow brown, with fine grained ironstone gravel bands and sandy clay nodules.	w>PL	VSt		RESIDUAL
	■			■	N = 11 12,5,6	3						340 280 380	
						4			as above, but without ironstone gravel bands.	w≒PL	VSt-Hd		
				■	N = 22 7,10,12							340 360 410	
						5							
								-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey mottled yellow brown.	XW	Hd		BRINGELLY SHALE
				■					SILTSTONE: dark grey.	DW	VL		VERY LOW 'TC' BIT RESISTANCE
						6				SW	L-M		LOW RESISTANCE
				■									
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **24** 2/2

Easting: 307322
Northing: 6252811

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 28/9/18

Method: SPIRAL AUGER
JK350

R.L. Surface: 32.53m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
									SILTSTONE: dark grey.	SW	L-M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **25** 1/2

Easting: 307121.5
Northing: 6252796

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 41.45m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			FILL: Silty sand, fine to medium grained, dark brown, with root fibres.	D			GRASS COVER
								CH	Silty CLAY: high plasticity, red brown, trace of fine grained ironstone gravel.	w<PL	Hd		RESIDUAL
					N = 13 6,6,7				as above, but mottled red brown and light grey.			>600 >600 >600	
						1							
					N = 28 9,12,16				as above, but mottled yellow brown, with ironstone gravel bands.			450 530 550	
						2							
								-	Extremely Weathered siltstone: silty CLAY: low to medium plasticity, dark grey.	XW	Hd		BRINGELLY SHALE
					N = SPT 20/120mm REFUSAL	3		-	SILTSTONE: dark grey.	DW	VL-L		VERY LOW 'TC' BIT RESISTANCE LOW RESISTANCE
										SW	L-M		LOW TO MODERATE RESISTANCE
						4							
						5							
											M		MODERATE RESISTANCE
						6							
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **25** 2/2

Easting: 307121.5
Northing: 6252796

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 2/10/18

Method: SPIRAL AUGER
JK205

R.L. Surface: 41.45m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SILTSTONE: dark grey.	SW	M		
											H		HIGH RESISTANCE
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **26** 1/1

Easting: 307163.8
Northing: 6252791

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 28/9/18

Method: SPIRAL AUGER
JK350

R.L. Surface: 38.78m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty sand, fine to medium grained, dark brown, with fine grained igneous and ironstone gravel, clay nodules and slag.	M			GRASS COVER
					N = 12 1,6,6			CH	Silty CLAY: high plasticity, yellow brown mottled red brown, with fine grained ironstone gravel.	w≒PL	Hd	>600 >600 >600	RESIDUAL
						1			as above, but light grey mottled red brown.				
					N = 19 6,9,10							>600 >600 >600	
						2		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, light grey.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
									SILTSTONE: dark grey.	DW	L		LOW RESISTANCE
						3							
									SANDSTONE: fine to medium grained, light grey.	SW	M		MODERATE RESISTANCE
						4							
											H		HIGH RESISTANCE
						5			END OF BOREHOLE 5.0m				'TC' BIT REFUSAL
						6							
						7							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 27 1/2

Easting: 307224.1
Northing: 6252778

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 28/9/18

Method: SPIRAL AUGER
JK350

R.L. Surface: 35.17m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■					0			FILL: Silty sand, fine to medium grained, dark brown, with ironstone gravel, clay nodules and slag.				GRASS COVER APPEARS WELL COMPACTED
				■	N = 11 5,6,5							>600 >600 >600	
						1		CH	Silty CLAY: high plasticity, dark yellow brown mottled red brown, with fine grained ironstone gravel.	w≒PL	Hd	>600 >600 >600	RESIDUAL
	■			■	N = 11 5,6,5				Silty CLAY: high plasticity, light grey mottled yellow brown.			>600 >600 >600	
						2			as above, but with ironstone gravel bands.				
				■	N > 6 9,6/50mm	3		-	Extremely Weathered siltstone: silty CLAY, high plasticity, light grey mottled yellow brown.	XW	Hd		BRINGELLY SHALE VERY LOW 'TC' BIT RESISTANCE
					REFUSAL				SILTSTONE: dark grey.	DW	L		LOW RESISTANCE
				■		4							
						5							
				■		6							
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **27** 2/2

Easting: 307224.1
Northing: 6252778

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 28/9/18

Method: SPIRAL AUGER
JK350

R.L. Surface: 35.17m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
				■					SILTSTONE: dark grey.	DW	L		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **28** 1/2

Easting: 307265.3
Northing: 6252773

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 28/9/18
Method: SPIRAL AUGER JK350
R.L. Surface: 33.73m
Datum: AHD
Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty sand, fine to medium grained, brown, with root fibres.	D			APPEARS WELL COMPACTED
					N = 18 8,10,8				FILL: Silty clay, medium to high plasticity, light grey mottled yellow brown and red brown, with fine grained ironstone gravel and sand.	w≈PL		>600 >600 >600	
						1							
					N = 8 5,4,4			CH	Silty CLAY: high plasticity, dark yellow brown mottled yellow brown, trace of fine grained ironstone gravel and ash.	w>PL	VSt- Hd	420 370 380	RESIDUAL
						2			as above, but yellow brown mottled orange brown.				
									as above, but light grey and yellow brown.		VSt		
					N = 9 4,4,5	3						240 290 280	
						4			as above, but with ironstone bands.		Hd		
					N > 15 13,15/ 50mm							>600 >600 >600	
					END	5		-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, dark grey.	XW	Hd		BRINGELLY SHALE
									SILTSTONE: dark grey.	DW	L		VERY LOW 'TC' BIT RESISTANCE
													LOW RESISTANCE
										SW	L-M		MODERATE RESISTANCE
						6					M		
						7							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **28** 2/2

Easting: 307265.3
Northing: 6252773

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 28/9/18

Method: SPIRAL AUGER
JK350

Logged/Checked by: S.M./A.J.H.

R.L. Surface: 33.73m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
									SILTSTONE: dark grey.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 29 1/2

Easting: 307310.6
Northing: 6252768

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 28/9/18
Method: SPIRAL AUGER JK350
Logged/Checked by: S.M./A.J.H.
R.L. Surface: 32.09m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■					0			FILL: Silty sand, fine to medium grained, brown, with clay nodules, slag and root fibres.	M			GRASS COVER APPEARS MODERATELY COMPACTED
				■	N = 8 4,4,4								
						1			FILL: Silty sand, fine to coarse grained, red brown and brown, with fine grained igneous gravel, brick and tile fragments and slag.				
	■			■	N = 9 5,4,5								
						2							
								CI	Silty CLAY: medium plasticity, dark grey mottled yellow brown, trace of ash.	w>PL	S-F		RESIDUAL
						3						50 40 70	
	■			■	N = 7 2,2,5			CH	Silty CLAY: high plasticity, light grey mottled yellow brown.		VSt	300 320 260	
						4		CI	Silty sandy CLAY: medium plasticity, light grey mottled yellow brown, fine to medium grained sand.				
				■	N > 22 10,13, 9/120mm							200 290 250	
					REFUSAL	5		-	Extremely Weathered sandstone: clayey SAND, fine to medium grained, light grey and yellow brown.	XW	D	>600	BRINGELLY SHALE
										DW	L		VERY LOW 'TC' BIT RESISTANCE
									SANDSTONE: fine to medium grained, light grey and yellow brown.				LOW RESISTANCE
				■		6				SW	M		MODERATE RESISTANCE
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. **29** 2/2

Easting: 307310.6
Northing: 6252768

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH
Date: 28/9/18

Method: SPIRAL AUGER
JK350

R.L. Surface: 32.09m
Datum: AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
									SANDSTONE: fine to medium grained, light grey and yellow brown.	SW	M		
									END OF BOREHOLE AT 7.5m				
						8							
						9							
						10							
						11							
						12							
						13							
						14							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 30 1/1

Easting: 307302.3
Northing: 6253026

Client: FABCOT PTY LTD

Project: PROPOSED HIGHBAY DISTRIBUTION WAREHOUSE

Location: 250-266 VICTORIA STREET, WETHERILL PARK, NSW

Job No. 31888AH **Method:** SPIRAL AUGER JK350 **R.L. Surface:** 36.35m

Date: 27/9/18 **Datum:** AHD

Logged/Checked by: S.M./A.J.H.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			CONCRETE: 525mm.t				8mm DIA. REINFORCEMENT 405mm + 85mm TOP COVER
					N = SPT 11/80mm REFUSAL	1		-	FILL: Silty gravelly sand, fine to coarse grained, dark grey, angular fine grained igneous gravel, with glass fragments and slag.	D			APPEARS WELL COMPACTED
					N = 14 5,6,8				FILL: Silty clay, high plasticity, brown mottled red brown and grey, trace of slag.	w>PL		380 480 270	
						2		CH	Silty CLAY: high plasticity, light grey mottled yellow brown.	w≒PL	Hd	500 460 450	RESIDUAL
						3		-	Extremely Weathered siltstone: silty CLAY, medium to high plasticity, light grey and red brown.	XW	Hd		BRINGELLY SHALE
									SILTSTONE: dark grey.	SW	L-M		VERY LOW 'TC' BIT RESISTSANCE LOW RESISTANCE
						4							
						5					H		HIGH RESISTANCE
									END OF BOREHOLE AT 5.4m				'TC' BIT REFUSAL
						6							
						7							

ENVIRONMENTAL LOGS EXPLANATORY 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.

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SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

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

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

Laboratory Classification Criteria

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

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

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:

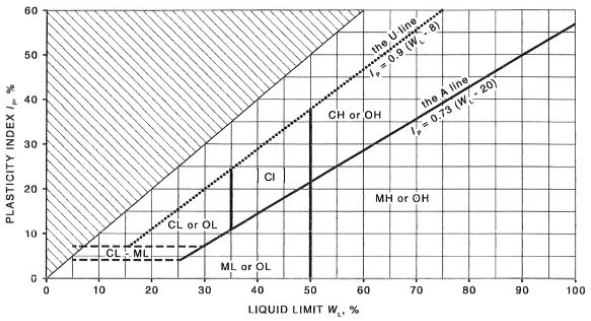
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

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

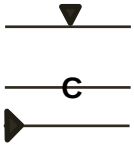
3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

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

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



LOG SYMBOLS

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

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

Classification of Material Weathering

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

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

Rock Material Strength Classification

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

Appendix D: Example Waste Tracking Record

Offsite Disposal

Waste Classification Report/ Letter			Source Area Matches Area in Classification Letter/ Report?	Stockpile [2]					Material Observations		Treatments [7]				Statistics [7]	
Reference	Classification Under Letter[1]	Volume Classified Under Letter (m^3)		ID	Volume	Temporary Storage Area/ Reference	Volume (m^3)	Bulking Factor Used	Description	Evidence of Contamination	Treatment Details	Post-Treatment	Post Treatment Sampling	Post Treatment Classification [1]	Type	Results

[1] After NSW EPA Waste Classification Guidelines/ The excavated natural material order 2014 / Meets POEO VENM Definition / other

[2] If material was excavated and stockpiled post classification

[3] Samples must include those collected specifically for waste classification purposes and samples collected from the source area for purposes other than waste classification

[4] Keep Units Consistant

[5] If volume on docket is different to volume on Waste Classification Letter

[6] If one is available

[7] If undertaken

Disposal						
Receiving Facility	Receiving Facility Licence Numbr	Disposal Docket Reference	Quantity on Docket (m^3/ tonnes) [4]	Bulking Factor [5]	Consignment Note Reference [6]	Running Total Under the Waste Classification Letter (m3/ tonnes) [4]

Appendix E: Guidelines and Reference Documents

Contaminated Land Management Act 1997 (NSW)

Conveyancing Act (1919) (NSW).

Environmental Planning and Assessment Act 1979 (NSW)

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

NSW DECCW, (2010). UPSS Technical Note: Decommissioning, Abandonment and Removal of UPSS

NSW DECCW, (2010). UPSS Technical Note: Site Validation Reporting

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

NSW EPA, (2020). Guidelines for the Implementation of the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019

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

Protection of the Environment Operations Act 1997 (NSW)

Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019 (NSW)

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

Standards Australia, (2002). AS2460: Acoustics – Measurement of the Reverberation Time in Rooms

Standards Australia, (2008). AS4976: The Removal and Disposal of Underground Petroleum Storage Tanks

State Environmental Planning Policy No.55 – Remediation of Land 1998 (NSW)

WA DOH, (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia

Work Health and Safety Regulation 2017 (NSW)

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