Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Preliminary Site Investigation - Due Diligence

Proposed Commercial/Industrial Subdivision
144 - 228 Aldington Road, Kemps Creek, NSW

Prepared for
Stockland Commercial Property

Project 92364.00
October 2019

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	92364.00	Document No.	R.001.Rev0
Document title	Report on Preliminary Site Investigation - Due Diligence Proposed Commercial/Industrial Subdivision		
Site address	144 - 228 Aldington Road, Kemps Creek, NSW		
Report prepared for	Stockland Commercial Property		
File name	92364.00.R.001.Rev0		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Cindy Murphy	Dean Woods	11 October 2019

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	0	Stockland Commercial Property - Mr Marcus Donnelly

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

	Signature		Date
Author		pp for CKM	11 October 2019
Reviewer		pp for DW	11 October 2019

bsi. ISO 9001 Quality Management
FS 604853

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
18 Waler Crescent
Smeaton Grange NSW 2567
Phone (02) 4647 0075
Fax (02) 4646 1886

Douglas Partners
Geotechnics / Environment / Groundwater

Table of Contents

Page

Report on Preliminary Site Investigation - Due Diligence
Proposed Commercial/Industrial Subdivision
144 - 228 Aldington Road, Kemps Creek, NSW

1. Introduction

Douglas Partners Pty Ltd (DP) was commissioned by Stockland Development Pty Ltd (Stockland) to complete a Preliminary Site Investigation for contamination (PSI) of the properties located at 144 - 228 Aldington Road, Kemps Creek, NSW, NSW (the site) as shown on Drawing 1 (Appendix A). The site comprised five properties with an approximate area of 50 hectares (ha). It is understood that Stockland are currently considering purchasing the site for industrial/ commercial land use and require the PSI for due diligence purposes.

Previous investigations undertaken by KPMG SGA Property Consultancy Pty Ltd (KPMG)[1] identified a number of areas of potential environmental concern (AEC) at the site, and recommended that further investigation was undertaken to assess the potential for contamination.

The objectives of the PSI are to review the KPMG report to assess if further investigation at the identified AEC is required, to identify any additional past or present potentially contaminating activities not identified by KMPG, and to provide a preliminary assessment of site contamination.

This investigation was conducted in conjunction with preliminary geotechnical and salinity investigations (Project ref. 92264.01) that are to be reported separately.

This report details the findings of the PSI.

2. Scope of Works

The PSI included completion of the following scope of works:

- Undertake a desktop investigation to determine potential areas of environmental concern (PAEC) for the site including:
  - Review of previous reports and aerial photographs to identify land uses and changes in the land that may indicate potential for contamination;
  - Search on the Contaminated Land Register for Notices issued under the *Contaminated Land Management Act* 1997; and
  - NSW Office of Water groundwater bore search.

  Given the time frame for the investigation, a search and review of historic titles and deposited plans, SafeWork NSW information, Council records and Section 10.7 certificates were not conducted.

[1] KPMG *Environmental Assessment, 144-288 Aldington Road, Kemps Creek, NSW*, Project 354108 dated 6 March 2019 (KPMG 2019)

- An initial site inspection for PAEC and to identify actual AEC;
- Development of a preliminary conceptual site model (CSM);
- The excavation of 12 test pits positioned in a grid within the site. The grid based test pits were used for the preliminary geotechnical and salinity investigations. Excavation of an additional six test pits targeting areas of environmental concern (AEC) identified from the desktop investigation and site inspection;
- Collection of soil samples from approximate depth ranges of 0 - 0.2 m, 0.2 - 0.5 m and, if filling is encountered, from regular depth intervals down to natural soil (where possible) based on field observation;
- Survey of test pit locations using a handheld or differential GPS;
- Laboratory analysis of selected representative soil samples for one or more of the following contaminants:
  - metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc);
  - total petroleum hydrocarbons (TPH);
  - monocyclic aromatic hydrocarbons (benzene, toluene, ethylbenzene and total xylenes – BTEX);
  - polycyclic aromatic hydrocarbons (PAH);
  - total phenols;
  - organochlorine pesticides (OCP)
  - organophosphorus pesticides (OPP)
  - polychlorinated biphenyls (PCB); and
  - Asbestos.
- Selected samples were analysed for physico chemical characteristics including pH, electrical conductivity (EC) and cation exchange capacity (CEC) to determine appropriate ecological investigation levels;
- Field sampling and laboratory analysis in compliance with standard environmental protocols, including a Quality Assurance/Quality Control (QA/QC) plan consisting of 10% replicate sampling, appropriate Chain-of-Custody procedures and in-house laboratory QA/QC testing;
- Interpretation of laboratory results with reference to current NSW EPA endorsed guidelines; and
- Preparation of this PSI report outlining the methodology and results of the investigation, and an assessment of the site's suitability for the proposed development.

3. Site Description

3.1 Site Identification

The site comprises the following land parcels as detailed in Table 1 below and shown on Drawing 1 (Appendix A).

Table 1: Study Area Identification

Address	Lot / Deposited Plan	Approx. Area (ha)
144-160 Aldington Road	Lot 30 DP 258949	9.9
162-178 Aldington Road	Lot 23 DP 255560	10.1
180-196 Aldington Road	Lot 22 DP 255560	10
198-212 Aldington Road	Lot 21 DP 255560	10
214-228 Aldington Road	Lot 20 DP 255560	10
	Total Approximate Area	**50 ha**

3.2 Brief Site Description

The site is mostly grass-covered paddocks and market gardens and is largely cleared of trees. Houses, sheds, and multiple farm dams, are present on each lot. Greenhouses are present on Lots 20, 22 and 30.

3.3 Surrounding Land Use

Site inspection and review of Nearmap imagery identified land uses immediately surrounding the property comprises primarily rural residential to the north, south and west, with vacant paddocks to the east. Industrial developments are under construction approximately 450 m to the northeast of the site.

3.4 Regional Geology, Soils, Hydrogeology and Hydrology

Reference to the Penrith 1:100 000 Soils Landscape Sheet indicates that the site comprises the following soil types as shown on Figure 1:

- Residual soils of the Blacktown Landscape (shown as dark green);
- Erosional soils of the Luddenham Landscape (shown as pink); and
- Alluvial soils of the South Creek Landscape (shown as light green).

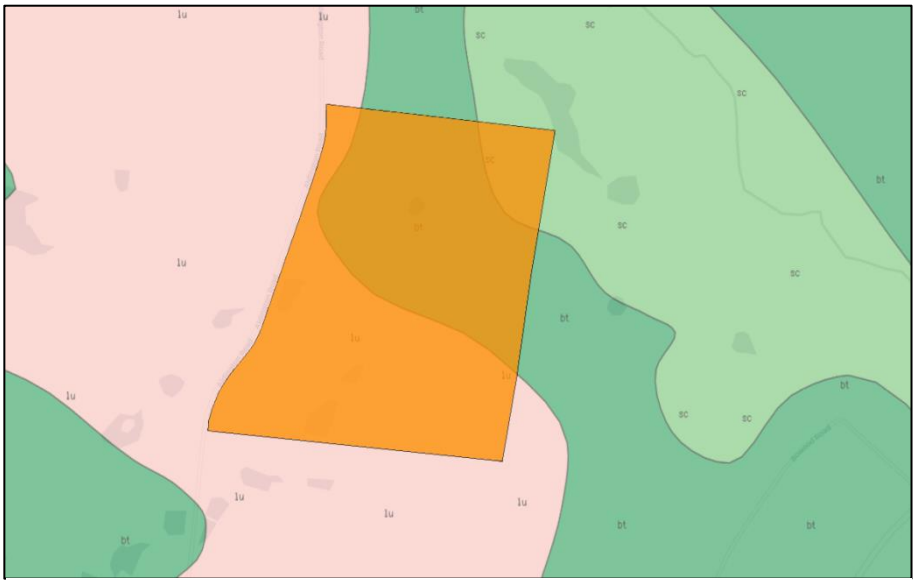


Figure 1. Soil Landscapes at the Site

Reference to the Penrith 1:100 000 Geological Series Sheet indicated that the site is mostly underlain by Bringelly Shale (Rwb) of the Wianamatta Group of Triassic age. This formation typically comprises shale, carbonaceous claystone, laminite, fine to medium grained lithic sandstone and some minor coal bands. The remaining northeast corner is underlain with fluvial sediments of Quaternary age and is categorised as fine-grained sand, silt and clay.

A search of the NSW Department of Primary Industries (DPI) groundwater bore database confirms that no registered groundwater bores are located within 1 km of the site boundary.

An unnamed tributary of Ropes Creek borders the north eastern boundary, with Ropes Creek located approximately 450 m east of the site.

The topography generally comprises mildly undulating hills (typical of Bringelly Shale) with the highest points located in the southeast and northwest portions of the site at heights of approximately 84 m and 82 m (respectively) above the Australian height Datum (AHD). Land in the south generally slopes west, while land in the north generally slopes towards the east.

3.5 Acid Sulfate Soils

Review of NSW Government Office of Environment and Heritage Acid Sulfate Soils Risk mapping indicates that the site is classified as having *'no known occurrence of acid sulfate soil'*.

3.6 Sensitive Receptors and Environments

The nearest sensitive receptors and environments have been identified as follows:

- Residents on site and immediately off-site;
- The unnamed tributary of Ropes Creek (bordering the northeast of the site) and Ropes Creek;

- Groundwater beneath the site;
- Current and future site workers; and
- Future site occupants.

4. Review of Site History Information

A desktop review of site history information has been undertaken to identify AEC and related COPC which may arise from previous and current land uses. The desktop investigation was limited to the following:

- A review of KPMG (2019);
- A review of recent aerial photographs;
- NSW EPA data base searches; and
- Listing of other potential site contamination issues based on DP's experience with sites of a similar nature and scale.

The following sections detail the findings of the desktop investigation.

4.1 KPMG (2019)

KPMG (2019) comprised a desktop study and site inspection and was undertaken to identify potential contamination issues at the site.

The desktop study included a review of historical aerial photographs from 1955, 1961, 1965, 1970, 1982, 1991 and 2004, and recent aerial photographs from 2009 and 2018.

KPMG (2019) noted the following:

- The site comprised vacant, cleared land prior to 1970. Two dams were present in the north and south, adjacent to an access track that cut through the centre of the site;
- Between 1970 and 1982 several houses and associated sheds had been constructed in the west and southeast. Market gardens were in operation in the southwest and northwest portions and additional dams had been constructed adjacent to the existing dams in the north and south;
- By 1991 an additional house had been constructed in the northwest, and glasshouses constructed in the south. Large areas of cultivation were present in the north and south. One dam was constructed adjacent to the eastern boundary;
- By 2004, glasshouses and an adjacent warehouse had been constructed in the centre of the site; and
- "No discernible change" was reported following the review of the 2009 and 2018 photographs.

KPMG inspected the site on 6 March 2019 and conducted a number of interviews with land owners. The results of the inspection are discussed in the following sections 4.1.1 to 4.1.4

4.1.1 Lot 30

- The single storey house was constructed of brick with fibre cement sheeting (FCS) which may or may not contain asbestos observed in the eaves;
- Market garden and flower growing activities were present in the northeast and southeast of the lot;
- Various pesticides and spraying equipment were observed throughout the site adjacent to the market garden activities;
- Areas adjacent to the dams appeared to be utilised for the mixing of pesticides. No bunding was observed around chemical mixing areas, although no spills were evident;
- Minor staining was observed beneath a tractor in the storage shed adjacent to the house; and
- The application of gravel road base along the driveway.

4.1.2 Lot 23

- The double storey house was constructed of brick with FCS observed in the eaves;
- Most of the lot was vacant and grass-covered;
- No potential contamination was identified; and
- The application of gravel road base along the driveway.

4.1.3 Lot 22

- The single storey house was constructed of brick with FCS observed in the eaves;
- Glasshouses covered most of the central and eastern portion of the lot;
- Pesticides were stored within a shipping container located adjacent to the glasshouses;
- Chemical mixing machinery was observed in the shipping container, no bunding was observed and minor staining was observed on the ground surface. An above-ground storage tank (AST) was located outside the shipping container which was reportedly filled with water and had not been filled with fuel for over 25 years;
- Several stockpiles of sands, gravelly, bitumen and imported fill were located adjacent to the shipping container;
- An oil refill area, containing drums of oil, jerry containers and a fill pump, was observed west of the storage warehouse. No bunding was present surrounding the fill area;
- Several liquid petroleum gas (LPG) tanks were present in the centre and east of the lot; and
- The application of gravel road base along the driveway.

4.1.4 Lot 21

- Two single storey houses were located in the northeast and southwest of the lot;
- Most of the lot comprised vacant grassland;
- A vegetable garden and storage shed were located adjacent to the western house. Minor quantities of pesticides, fuels and containers containing an unknown liquid were stored in the shed. No bunding surrounded the stored chemicals. No evidence of spills was observed;
- An AST was observed adjacent to the garage of the eastern house. No bunding was present and no evidence of spills was reported. The AST had reportedly not been in use for over 25 years; and
- The application of gravel road base along the southern driveway.

4.1.5 Lot 20

- The single storey house was constructed of brick with FCS observed in the eaves;
- A small chicken coop constructed of FCS, suspected of containing asbestos, was present adjacent to the house;
- An AST was observed between the shed and the house, no bunding or evidence of spills was reported;
- Approximately 3000 m^2 of market gardens and glasshouses were observed in the west of the lot;
- Multiple pesticide storage and mixing areas, and fuel storage and refuelling areas were scattered throughout the market garden area;
- Current and former pesticide mixing areas were observed adjacent to the dams; and
- The application of gravel road base along the driveway.

Based on the observations made during the historical aerial photograph review and site inspection, KPMG (2019) concluded that the site presented a moderate potential for significant soil and groundwater contamination to be present, with a low risk of off-site migration of potential contamination. Any significant contamination was considered likely to be attributed to market garden practices.

KPMG (2019) concluded that targeted investigations should be considered within the current and former market garden locations. No further investigation was recommended for any remaining AEC. KPMG (2019) also recommended that bunding should be constructed around all stored chemicals and fuels on site to meet environmental best practice.

4.2 Review of Aerial Imagery

To identify PAEC not identified by KPMG (2019), DP reviewed the historical aerial photographs provided in KPMG (2019) and Nearmap images from 2010 to 2019 to identify any recent changes and potentially contaminating activities occurring on the site. A summary of the review of aerial photography is detailed below.

A review of the historical aerial photographs undertaken by DP identified the following PAEC not identified in KPMG (2019):

- The demolition of greenhouses in Lot 20 between 1991 and 2002;
- A potential fill area in the south of Lot 22 in the 1991 aerial photograph;
- The demolition of greenhouses in Lot 22 between 2002 and 2009; and
- The construction of a dam in the north eastern corner of Lot 30.

A review of Nearmap aerial photography identified the following PAEC:

- Multiple applications of fill in the east of Lot 22 between 2015 and 2019;
- The presence of power poles in Lots 20, 21 and 22;
- The stockpiling of material in Lot 22 during 2018 and 2019; and
- Surficial waste in Lots 20 and 22.

Although dams were identified in KPMG (2019), they were not identified as areas of concern. DP considers dams as a PAEC given their potential to accumulate contaminants.

KPMG and DP identified PAEC are shown on Drawing 1. Given the extent of market garden (including greenhouses) across Lots 20 to 22 and Lot 30, market garden are not shown on Drawing 1.

4.3 Regulatory (NSW EPA) Notices Search

A search of the NSW EPA website on 6 August 2019 indicated that:

- No Licences have been issued for the site (or immediately adjacent sites) under the Protection of the Environment Operations Act, 1997;
- No Notices or Orders to investigate or remediate the site (or immediately adjacent sites) have been issued for the site under the Contaminated Land Management Act, 1997; and
- The site (or immediately adjacent sites) is not recorded on the list of NSW contaminated sites reported to the EPA.

5. Preliminary Conceptual Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways that may potentially link sources and receptors. The findings of KPMG (2019) and recent aerial photography have been assessed to identify possible source, receptors and exposure pathways of relevance to the proposed development.

5.1 Potential Sources of Contamination

Based on the site history review, the following potential sources and contaminants of concern were identified:

- **Market Gardening Activities (AEC 1)** – A high proportion of the site has been used for market gardening activities (including greenhouses) which commonly include the application of pesticides and herbicides (OCP, OPP and metals).
- **Building Construction, Degradation and Demolition Structures (AEC 2)** – Numerous building structures or former structure footprints (excluding greenhouses) are located within the site. These include residential dwellings sheds and market gardening green houses. Demolition and alterations to these buildings, including degradation of paints and renovations, may lead to hazardous materials being present within the near surface soils surrounding the building footprint. Residual pesticides may also be present on the ground surfaces of structure footprints (asbestos, synthetic mineral fibres, PCBs and metals).
- **Chemical and Fuel Use and Storage (AEC 3)** – The spillages and storage malpractice of chemicals and fuels stored in multiple locations on site. Three ASTs were also identified on site (TRH, BTEX, PAH, OCP, OPP, PCBs and metals).
- **Stockpiles, Fill and Ground Disturbances (AEC 4)** - Multiple stockpiles, areas of fill and ground disturbance were observed within the site. Stockpiles and fill may have been generated from impacted on or off-site sources. Areas of ground disturbance are potential indicators of filling. Imported aggregate fill has been placed on several access roads within the site (TRH, BTEX, PAH, OCP, OPP, PCB and metals).
- **Power Poles (AEC 5)** – The presence of power poles in Lots 20, 21 and 22. Timber power poles have the potential to leach timber treatment chemicals into the surrounding soil (TRH, BTEX, PAHs and metals).
- **Possible Asbestos Pipe Network (AEC 6)** – Asbestos pipes may be present at the site, both from legacy utility trenches and from private networks installed by lot owners. Degradation and damage of pipes may lead to hazardous materials being present within the near surface soils.
- **Refuse (AEC 7)** - Refuse including building demolition waste in multiple areas of the site. Building demolition waste is a potential indicator for asbestos.

5.2 Potential Receptors

The following potential human receptors (R) have been identified for the site:

- R1 – Current residents and workers;
- R2 - Future construction and maintenance workers (during site redevelopment);
- R3 – Future site users (following development of the site); and
- R4 – Land users in adjacent areas (residential).

The following potential ecological receptors (R) have been identified for the site:

- R5 – Local groundwater, and receiving water bodies;
- R6 – Surface water bodies (dams and off-site creeks); and
- R7 – Local terrestrial ecosystems. DP notes that potential terrestrial ecosystem receptors are usually associated with the upper 2 m (root zone and habitation zone for many species) of the soil profile.

5.3 Potential Pathways

Potential pathways for contamination include the following:

- P1 – Ingestion and dermal contact;
- P2 – Inhalation of fibres and/or dust and/or vapours;
- P3 – Leaching of contaminants and vertical migration into groundwater;
- P4 – Surface water run-off;
- P5 – Lateral migration of groundwater providing base flow to watercourses; and
- P6 – Direct contact with terrestrial ecosystem receptors.

5.4 Summary of Potential Complete Pathways

A 'source - pathway - receptor' approach has been used to assess the potential risks of harm being caused to human or ecological receptors from contamination sources on or in the vicinity of the sites, via exposure pathways. The possible pathways between the above sources (AEC 1 to AEC 7) and receptors (R1 to R7) are provided in Table 2 below. Assessment of the preliminary CSM was used to determine data gaps and the requirement for sampling and analysis to assess the suitability of the site for the proposed commercial/industrial use.

Table 2: Preliminary Conceptual Site Model

Potential Source and assigned AEC	Exposure Pathway	Receptor	Requirement for Additional Data and/or Management
AEC 1: Market Gardening Activities (Pesticides) AEC 2: Building Construction, Degradation and Demolition Structures (Hazardous building materials)	P1 – Ingestion and dermal contact; P2 – Inhalation of fibres and/or dust and/or vapours	R1 – Current residents and workers R2 – Future construction and maintenance workers. R3 – Future site users following development of the site. R4 – Land users in adjacent areas. R5 – Surface water bodies.	Given the identified potential contaminant sources, the initial fate (lay down mechanism) of most of the potential contaminants is likely to be expressed firstly in surface soils. An intrusive investigation is therefore required to assess potential contamination impact to surface soils.
	P3 – Leaching of contaminants and vertical migration into groundwater. P4 – Surface water run-off.		

Potential Source and assigned AEC	Exposure Pathway	Receptor	Requirement for Additional Data and/or Management
AEC 3: Chemical and Fuel Use and Storage (Potential Chemical and Fuel Spills)	P5 – Lateral migration of groundwater providing baseflow to watercourses.	R6 – Local groundwater and receiving water bodies.	(A further assessment of deeper soils and groundwater may be deemed necessary should significant contamination be identified in surface soils).
AEC 4: Stockpiles, Fill and Ground Disturbances (unknown contamination status) AEC 5: Presence of Timber Power Poles AEC 6: Possible Asbestos Pipe Network AEC 7: Refuse	P6 – Direct contact of contaminated ground with ecological receptors.	R7 – Local ecology.	

6. Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in this PSI have been informed by the proposed land use (i.e. commercial/industrial) and the CSM - which identified human and ecological receptors to potential contamination on the site. Analytical results are to be assessed (as a Tier 1 assessment) against the investigation and screening levels as per Schedule B1, National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013 (NEPC, 2013).

As the site is proposed to be redeveloped for commercial/industrial use, the investigation and screening levels adopted are consistent with a generic commercial/industrial land use scenario. The derivation of the SAC is included in Appendix C and the adopted SAC are listed in the analytical results tables (Tables E1 and E2 in Appendix E).

7. Field Work Observations

7.1 Site Inspection

The following site description is based on a site inspection completed by DP on 30 July 2019 that was undertaken to confirm AEC identified in KPMG (2019), and this desktop investigation, and identify additional AEC not identified the desktop investigation and KPMG (2019). Photographic plates are presented in Appendix B.

In general, all AEC identified in KPMG (2019), as discussed in Sections 4.1.1 to 4.1.5, were also identified by DP. The following additional AEC were identified by DP during the desktop review and walkover:

- Lot 30:
  - Areas of burned waste including paint cans adjacent to the two sheds in the north (Photograph 1);
  - Surficial waste including drums containing unknown liquids, burned empty drums, batteries, metal, refuse (foam and plastic), a vehicle, pallets and bottles were present predominantly surrounding dams and sheds;
  - DP confirmed that chemical storage and mixing areas remained unbunded at the time of the inspection (Photograph 2). Chemicals of note used at the site include the herbicide Bipyridilium, a chemical identified as 'exceedingly hazardous' to humans with the potential to pollute waterways, if exposure occurs. The use, storage and mixing of these chemicals were evident surrounding dams and market gardens. Most other chemical drums were unlabelled;
  - Hummocky ground, and small stockpiles surrounded the central dam (Photographs 3 and 4);
  - A graded aggregate path leading from the eastern market gardens to the western market gardens. Inclusions of brick, concrete and tile were observed in the aggregate (Photograph 5); and
  - Hummocky ground covered most of the central and eastern portions of the Lot.

- Lot 23:
  - No additional AEC was observed by DP.

- Lot 22:
  - One timber power pole, identified as PP1, was present adjacent to the lot entrance;
  - Fill on the surface of the stockpile area in the centre of the lot contained demolition refuse including bricks, tile, concrete and multiple fragments of asbestos-containing material on the surface. Several of the stockpiles contained refuse including demolition waste (Photographs 7 and 8);
  - The stockpile area appeared to be constructed on a fill platform;
  - Multiple septic tanks were observed surrounding the house and sheds;
  - Multiple large soil and vegetation stockpiles were observed north of the greenhouses and surrounding the eastern dam (Photograph 9);

- Stockpiles of waste containing demolition waste were located in the southeast of the lot. Fill had been spread out on the surface in this location. Multiple fragments of ACM were observed on the ground surface (Photographs 10 to 12); and
- Surficial waste associated with market gardening was located on the periphery of the greenhouses (Photograph 13).

- Lot 21:
  - Twelve timber power poles (identified as PP2 to PP13) were located on the lot, predominantly along the driveway entrance in the south;
  - A small shed containing drums of unknown material and refuse (fridge and washing machine) were located adjacent to the northern boundary in the centre of the lot (Photograph 14);
  - Most of the vacant areas were covered in hummocky ground, likely the result of former market gardening. Thick and long grass prevented access to much of the lot; and
  - Small stockpiles, some containing concrete, were located along the drainage line leading to the dam (Photograph 15).

- Lot 20:
  - Nine timber power poles (identified as PP14 to PP22) were located along the driveway leading to the house in the west (Photograph 16);
  - Minimal surficial waste, including paint tins and batteries, were located beneath an AST adjacent to the large shed along the driveway in the centre of the lot, partially burned surficial waste surrounded (metal, wooden pallets, plastic piping and wire) the southern portion of the shed (Photograph 17);
  - A small shed in the west (adjacent to the house) appeared to be partially constructed of ACM (Photograph 18);
  - A shed containing an underground tank was observed adjacent to the easternmost dam;
  - The large shed in the centre of the site was constructed on a fill platform (Photograph 19);
  - A shed located adjacent to the westernmost dam contained a pump and drum of unknown liquid and plastic pipes leading into the dam. The water of the dam appeared green in colour, likely polluted with cyanobacteria (Photograph 20);
  - Large amounts of surficial waste, old machinery, metal, wood, old furniture, refuse (foam and household waste), patches of burned material, and chemical storage/mixing/refilling areas were observed surrounding the market gardens and greenhouses in the east (Photograph 21);
  - Partially and near completely collapsed structures containing surficial waste (furniture, timber, plastic, containers and general refuse) were present adjacent to the greenhouses in the west of Lot 20 (Photograph 22); and
  - Multiple fragments of ACM were observed on the surface of the access paths between the greenhouses in the east (Photographs 23 and 24).

Based on the results of the walkover, the additional identified locations and sources of contamination have been assigned into existing AECs described in Section 5.

7.2 Test Pit and Bore Hole Observations

Relatively uniform conditions were encountered underlying the site with the general succession of strata broadly summarised as follows:

- TOPSOIL FILL – silty clay and clayey silt topsoil filling to depths of 0.1 m to 0.3 m in Pits 1 – 6, 8 to 15, 17, 18 & 26 and Bore 7;
- FILL – silty clay to depths of 0.25 m to 1.4 m in Pits 8 to 10, 16 to 18, & 26 and Bore 19. Some refuse materials (fabric, plastic, wood, wire and ceramic tile and road base gravel) encountered in pits 8, 9, 16 and Bore 19;
- RESIDUAL SOIL – variably stiff to hard clay and silty clay to depths of 0.6 – 3.3 m in Pits 1, 3 – 7, 9, 11 – 15, 19 & 26 and Bores 7 & 9, and to the termination depths in Pits 2, 8, 10, 16 – 18; and
- BEDROCK – very low strength sandstone or shale at first contact at depths of 0.6 – 2.6 m and continuing to the termination depths of 3 m in Pits 1, 4, 5, 11, 13 and 14. Pits 3, 6 & 12 were founded on low strength shale at depths of 2.5 m, 2.1 m and 2.6 m respectively. The recovered core from Bore 7 comprised variably very low to low strength siltstone to 5.26 m followed by a band of low strength sandstone to 6.0 m and then low strength siltstone, which becomes medium strength below 8.26 m, to the termination depth of 8.67 m. In Bore 19, low strength siltstone was intersected at 2.36 m and then variably very low to medium strength sandstone from 5.08 m and continuing to the termination depth of 8.37 m.

No free groundwater was observed in the pits for the short time that they were left open. No groundwater was intersected in Bores 7 & 19 whilst auger drilling. The use of water as a drilling fluid precluded groundwater observations whilst core drilling. It is also noted that the pits and boreholes were immediately backfilled following excavation which precluded longer term monitoring of groundwater levels. Groundwater levels are affected by factors such as soil permeability and weather conditions, and can therefore vary with time.

7.3 Methodology

Intrusive investigations were conducted on 30 and 31 July 2019 and included the excavation of 21 test pits (Pits 1 – 6, 8 – 18 & 26) and two boreholes (Bores 7 & 19) and collection of soil samples undertaken for the purposes of geotechnical, salinity and contamination purposes. Geotechnical and salinity conditions are to be reported separately.

Targeted soil samples were collected in AEC identified from the PSI desktop investigation and site walkover. Given the preliminary nature of the study, DP has adopted a total of 31 sampling points, including five samples collected from test pits and 26 from the surface at identified AEC. The remaining test pits and bore holes were utilised as inspection pits/bores. Given that no signs of contamination were observed in the inspection test pits, sampling of soils was not considered necessary. Additional samples were collected from these locations in the event that additional contamination data was required. Sample locations and their rationale are provided on Table 3 with the locations shown on Drawing 2, Appendix A. In addition, one fragment of suspected ACM and three fragments of ACM were collected during the site walkover at the following locations:

- Sample MAT-1 and MAT-3 was collected on surface fill in the stockpile area in the centre of Lot 22;
- MAT-2 was collected on surface fill in the stockpile area in the east of Lot 22; and
- MAT-4 was collected on surface fill of an access path in the west of Lot 20.

The field investigation was designed in accordance with the seven step data quality objectives (DQO) process provided in Appendix D, Schedule B2 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended 2013 (NEPC, 2013). The DQO adopted for this PSI are provided in Appendix C.

Table 3: Location, Sampling and Analysis Rationale

Test pit/ Surface Sample ID	Location and Sample Rationale	Laboratory Analysis (one or more analytes tested per sample)
SS1, SS5, SS6, SS13, SS21	Surficial waste (batteries, metal, paint tins and household refuse) stored adjacent to and within storage sheds	TRH, BTEX, metals, PAHs, OCP, OPP and asbestos
SS2, SS20 and SS25	Area beneath the ASTs in Lots 20, 21 and 22.	TRH, BTEX, metals and PAH
SS3, SS6, SS7, SS8, SS10, SS15, SS22, SS23 and SS26	Chemical mixing and refuelling areas	TRH, BTEX, metals, PAHs, OCP, OPP and asbestos
SS9, SS11, SS12, SS16, SS24, TP2, TP14	Market gardens	OCP, OPP and metals
SS4, SS14, SS17, SS18 and SS19	Timber power poles	TRH, BTEX, heavy metals (9), PAHs, OCPs and asbestos
TP8, TP9, TP10	Fill area	TRH, BTEX, metals, PAHs, OCP, OPP, PCB and asbestos

No sample analysis was undertaken for bipyridium as testing of soils is not available. Testing of water in adjacent dams should be undertaken in future investigations.

All samples were collected from the surface to 0.1 m bgl. All sampling data was recorded on DP test pit logs (Appendix F) with samples also recorded on chain-of-custody sheets. The general sampling procedure adopted for the collection of environmental samples is summarised below:

- Collection of soil samples was completed using disposable sampling equipment (new nitrile glove for each sample) from the bucket of the backhoe or the shovel. Samples were collected taking care to not include soil that was directly in contact with either the surface of the bucket or shovel;
- Transfer samples into laboratory-prepared glass jars, completely filled to ensure the headspace within the sample jar is minimised, and capping immediately to minimise loss of volatiles;
- Label sample containers with individual and unique identification, including project number, sample location and sample depth;
- Place the glass jars, with Teflon lined lid, into a cooled, insulated and sealed container for transport to the laboratory; and
- Collection of additional replicate samples at a rate of 10% for QA/QC requirements.

Samples designated for analysis were dispatched to NATA accredited laboratory Envirolab Services at Chatswood NSW for analysis of primary samples and intra-laboratory replicates.

8. Laboratory Analytical Results

The analytical results for the soil samples collected during this PSI are summarised in Tables E1 and E2 in Appendix E, together with the adopted SAC. The laboratory certificate of analysis for this PSI is provided in Appendix F.

TRH and BTEX

TRH and BTEX were not detected at concentrations exceeding SAC in all soil samples analysed.

PAHs

Sample SS18 reported benzo(a)pyrene (BaP) TEQ of 61 mg/kg, exceeding the health investigation level (HIL) criteria of 40 mg/kg and BaP of 39 mg/kg, exceeding the ecological investigation level (EIL of 1.4 mg/kg.

PAHs were not detected at concentrations exceeding the criteria in the remaining samples analysed.

Heavy Metals

The following exceedances were reported:

- SS14 reported arsenic of 230 mg/kg, exceeded the EIL criteria of 160 mg/kg;
- SS15 reported zinc of 2400 mg/kg, exceeded the EIL criteria of 670 mg/kg; and
- SS20 reported zinc of 780 mg/kg, exceeded the EIL criteria of 670 mg/kg.

Metals were not detected at concentrations exceeding the criteria in the remaining samples analysed.

OCPs, OPPs, PCBs and Phenols

OCPs, OPPs, PCBs and Phenols were not detected at concentrations exceeding SAC, in all samples analysed in all soil samples analysed. However OCPs were reported at concentrations below the SAC at SS8 and SS20.

Asbestos

The following was reported for asbestos:

- Chrysotile asbestos was detected in material sample MAT-1;
- Chrysotile and amosite asbestos was detected in material sample MAT-4;
- No asbestos was detected in material sample MAT-3; and
- Asbestos was not detected in any soil samples analysed.

8.1 QAQC

A review of the adopted QA/QC procedures and results (Appendix G) indicates that the data quality indicators (DQIs) have generally been met. On this basis, the sampling and laboratory methods used during the investigation were found to meet the DQO for this project (as discussed in Appendix C).

9. Discussion

AEC identified during the desktop investigation and site walkover, and the results of field work are discussed in the following sections. The AEC discussed below are shown on Drawing 3 (Appendix A).

9.1 AEC 1 - Market Gardening Activities

Market gardens have been in operation across the site, since between 1970 and 1982, with the exception of Lot 23, where market garden operations were not identified. Surface soils from SS9, SS11, SS12, SS16, SS24, TP2 and TP14 were collected in the locations of current and former market gardens and tested for COPC. While concentrations of COPC were below the SAC, additional site wide investigations are recommended. Investigations should target dam sediments given the potential for the accumulation of contaminants at these locations.

9.2 AEC 2 - Building Construction, Degradation and Demolition Structures

Samples SS1, SS5, SS6, SS13 and SS21 were collected adjacent to sheds, and within areas of surficial waste at the site. No samples were collected adjacent to houses as all appeared in good condition and were constructed of brick (albeit with intact potentially asbestos-containing material in the eaves).

All samples tested reported concentrations of analytes tested within the SAC. Notwithstanding, the potential remains for pockets of contamination to be present at untested locations. Therefore additional investigation is recommended in untested sheds to identify potential contamination. In addition, considering the dates of construction of structures on site, the potential also remains for hazardous building materials to have been used in construction of buildings. Therefore, DP recommends that a hazardous materials building survey is undertaken on all structures for the presence of hazardous building materials prior to demolition or alteration. Validation of building footprints will be will likely be required following demolition of structures.

9.3 AEC 3 - Chemical and Fuel Use and Storage

Several locations of chemical and fuel storage were observed across the site during KPMG (2019) and the site walkover, with most locations concentrated in Lots 30, 22 and 20. Of each of the locations identified, no bunding was observed to have specific equipment in place to control spills. Most chemicals were stored in unmarked drums with unknown contents, however chemicals such as herbicide Bipyridilium was in use at Lot 30.

Samples SS3, SS6, SS7, SS8, SS10, SS15, SS22, SS23 and SS26 were tested for COPC in the vicinity of chemical storage areas. Samples SS2, SS20 and SS25 were collected from the base of ASTs at Lots 20, 21 and 22. All COPC were within the SAC with the exception of SS15, where zinc was reported at 2400 mg/kg, exceeding the ecological criteria of 670 mg/kg. OCPs were also reported at two locations (SS8 and SS22), indicating the potential for OCPs above the SAC in untested locations.

Considering the limited nature of the investigation, and the improper storage of chemicals, it is possible that contamination to adjacent soils and surface water has occurred. Therefore additional testing of soils for residual chemicals in the vicinities of stored and applied chemicals is recommended.

Given the results obtained at the base of ASTs, further investigation in these locations is not considered to be necessary. Decommissioning and removal of these tanks should be undertaken prior to the proposed redevelopment of the site.

9.4 AEC 4 - Stockpiles, Fill and Ground Disturbances

Samples TP8, TP9, TP10 were collected and tested for COPC in fill locations in the centre and east of Lot 22, where applied fill with demolition waste and ACM was observed. No exceedances of the SAC for chemical analysis was identified, however the presence of ACM on the surface of fill is an exceedance of the SAC, and as such, remediation is required. The test pit logs identified fill to depths of 0.9 m bgl in these locations. Given the applied fill observed during the desktop review, and the fill observed on the surface, it is possible that the fill is impacted with asbestos to the full depth of the layer at these locations.

Multiple stockpiles of fill observed in the centre and east of Lot 22 contained high volumes of refuse including demolition waste. Therefore it is considered likely that ACM is present in the stockpiles. Investigation including sampling of the stockpiles is required to consider the material suitable for use on site. The stockpiled material, and the applied fill, does not appear to have originated from the site and was likely to have been imported.

Due to the limited nature of the investigation, small stockpiles and dam walls throughout the remainder of the site remain largely untested. Therefore further investigation in the locations of stockpiles and the dam walls is recommended to investigate the composition and the presence of potential contamination.

9.5 AEC 5 - Timber Power Poles

Sample SS18, collected at PP18 reported an exceedance of the HIL for PAH. Although no other power pole samples reported exceedances, given the preliminary nature of the investigation, the soil sampling was limited in the vicinity of power poles, and therefore additional exceedances for the remaining untested poles is likely. Timber power poles are known as a source of localised contamination to shallow soils due to the numerous treatment chemicals used specifically in the base of the power poles to prevent damage by termites, insects and moisture. Further assessment in the form of shallow soil sampling in the vicinity of power poles is required to confirm the presence or absence of related COPC.

9.6 AEC 6 - Possible Asbestos Pipe Network

Asbestos pipes may be present at the site, both from legacy utility trenches and from private networks installed by lot owners. Degradation and damage of pipes may lead to hazardous materials being present within the near surface soils. The locations of asbestos pipes are often only discovered during bulk earthworks as they are usually not provided service maps and cannot be detected by service locators. Therefore, although intrusive investigations may not detect the presence of asbestos pipes, there remains a risk that they are present on site.

9.7 AEC 7 - Refuse

Refuse including building demolition waste was observed to be spread across the ground surface in multiple areas of the site. Building demolition waste is a potential indicator for asbestos. Refuse will require investigation for asbestos following the removal of waste and prior to the proposed use.

9.8 Additional Considerations

Septic tanks were present adjacent to houses and in a number of locations within the site. Removal, following the decommissioning of the tanks, is recommended prior to development.

10. Conclusions and Recommendations

Based on the results of the PSI, DP considers that there is a moderate to high potential for contamination at the site. Therefore DP recommends further investigation to assess the contamination status and extent of the following identified AECs (as shown on Drawing 3):

- Further investigation in the current and former market gardens;
- Chemical and fuel mixing and storage areas;
- Dam sediments.
- Stockpiles, Fill, driveways and ground disturbances; and
- Timber power poles

Further investigation should be undertaken in the footprints of former sheds and soils in the vicinity of current structures following demolition to assess for the presence of COPC. Additionally, investigations for COPC in the locations of surficial waste (refuse) once removed is recommended.

With respect to site contamination, the recommended further assessment should build on the information provided in this report with reference to National Environment Protection Council (NEPC, 1999) National Environment Protection Council (Assessment of Site Contamination) Measure 1999 (amended 2013) (ASC NEPM). Further assessment should include intrusive investigations, sampling, analysis and assessment to determine the proposed land use suitability.

11. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at 144 to 228 Aldington Road, Kemps Creek, NSW in accordance with DP's proposal MAC190214 dated 23 July 2019 and acceptance received from Mr Marcus Donnelly. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Stockland Commercial Property for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

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

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

Building demolition materials, such as concrete, tile, terracotta and glass were located in previous below-ground filling, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

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

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk.

This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

Drawings 1 to 3

Legend

- Boundary
- Lot Boundary
- Current and Former Structures
- Chemical Storage and Mixing Area
- Areas of Fill
- Surficial Waste
- Dams
- power poles

nearmap Aerial Photograph - 20 July 2019

Lot 30

Lot 23

Lot 22

Lot 21

Lot 20

Site Locality

0 100 200 300 m

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Stockland Commercial Property	
OFFICE: Macarthur	DRAWN BY: CKM
SCALE: As shown	DATE: 23.8.19

TITLE: **Site Locality, Boundaries and PAEC**
Preliminary Site Investigation
144-228 Aldington Road, Kemps Creek, NSW

N
MGA

PROJ. #:	92364.00.R.001
DRAWING No:	1
REVISION:	0

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Stockland Commercial Property	
	OFFICE: Macarthur	DRAWN BY: CKM
	SCALE: As shown	DATE: 23.8.19

TITLE: **Test Pit, Bore Hole and Surface Sample Locations**
Preliminary Site Investigation
144-228 Aldington Road, Kemps Creek, NSW

MGA

PROJ. #:	92364.00.R.001
DRAWING No:	2
REVISION:	0

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Stockland Commercial Property	
OFFICE: Macarthur	DRAWN BY: CKM
SCALE: As shown	DATE: 23.8.19

TITLE: **Test Pit, Bore Hole and Surface Sample Locations**
Preliminary Site Investigation
144-228 Aldington Road, Kemps Creek, NSW

N
MGA

PROJ. #:	92364.00.R.001
DRAWING No:	2
REVISION:	0

Appendix B

Site Photographs

Photo 1: Surficial waste and burned material adjacent to a shed in Lot 30 (facing west)

Photo 2: Improperly stored chemicals adjacent to a dam in Lot 30 (facing west)

Photo 3: Stockpiled waste adjacent to the central dam and market gardens in Lot 30 (facing south)

Photo 4: Small stockpiles surrounding the central dam in Lot 30 (facing west)

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Stockland Commercial Property		**Site Photographs 1 to 4**	PROJECT No:	92364.00
	OFFICE: Macarthur	Prepared BY: CKM	**Preliminary Site Investigation - Due Diligence**	PLATE No:	1
	SCALE: NTS	DATE: 16.8.19	**144 - 228 Aldington Road, Kemps Creek**	REVISION:	0

Photo 5: Brick and concrete inclusions were observed in an aggregate driveway in Lot 30

Photo 6: Market gardens in the east of Lot 30 (facing south)

Photo 7: Stockpiled waste in the centre of Lot 22 (facing south)

Photo 8: Multiple fragments of ACM were observed on the surface of fill in the central stockpile are in Lot 22

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT:	Stockland Commercial Property		**Site Photographs 5 to 8**	PROJECT No: 92364.00
	OFFICE:	Macarthur	Prepared BY: CKM	**Preliminary Site Investigation - Due Diligence**	PLATE No: 2
	SCALE:	NTS	DATE: 16.8.19	**144 - 228 Aldington Road, Kemps Creek**	REVISION: 0

Photo 9: Multiple soil and vegetation stockpiles were observed along the north of Lot 22 (facing west)

Photo 10: Demolition waste was observed in stockpiles in the southeast of Lot 22

Photo 11: Applied fill in the southeast of Lot 22 where ACM was observed on the surface (facing east)

Photo 12: ACM on the surface of applied fill in the southeast of Lot 22

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Stockland Commercial Property		**Site Photographs 9 to 12**	PROJECT No:	92364.00
	OFFICE: Macarthur	Prepared BY: CKM	**Preliminary Site Investigation - Due Diligence**	PLATE No:	3
	SCALE: NTS	DATE: 16.8.19	**144 - 228 Aldington Road, Kemps Creek**	REVISION:	0

Photo 13: Surficial waste associated with market gardens surrounded the greenhouses in Lot 22 (facing south)

Photo 14: Timber and metal shed containing drums of unknown materials in Lot 21(facing east)

Photo 15: Stockpiles of concrete and metal were located along the drainage line leading to the dam in Lot 21 (facing west)

Photo 16: Timber power pole alignments in Lots 20 and 21 (facing south)

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Stockland Commercial Property		**Site Photographs 13 to 16**	PROJECT No:	92364.00
	OFFICE: Macarthur	Prepared BY: CKM	**Preliminary Site Investigation - Due Diligence**	PLATE No:	4
	SCALE: NTS	DATE: 16.8.19	**144 - 228 Aldington Road, Kemps Creek**	REVISION:	0

Photo 17: AST located adjacent to a large shed in the centre of Lot 20 (facing west)

Photo 18: Small sheds in the west of Lot 20 appeared to be partially constructed of ACM (facing west)

Photo 19: The large shed in the centre of the site was constructed on a fill platform in Lot 20 (facing south)

Photo 20: Green colouring (likely cyanobacteria) was observed in the westernmost dam in Lot 20 (facing southwest)

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT:	Stockland Commercial Property		**Site Photographs 17 to 20**	PROJECT No: 92364.00
	OFFICE:	Macarthur	Prepared BY: CKM	**Preliminary Site Investigation - Due Diligence**	PLATE No: 5
	SCALE:	NTS	DATE: 16.8.19	**144 - 228 Aldington Road, Kemps Creek**	REVISION: 0

Photo 21: Large volumes of surficial waste, and old machinery were located along corridors of the market gardens in the east of Lot 20 (facing south)

Photo 22: Collapsed structure contain refuse in the west of Lot 20 (facing north)

Photo 23: Multiple fragments of ACM observed on the surface of access paths between greenhouses in the west of Lot 20

Photo 24: Access path in Lot 20 where ACM was discovered on the ground surface (facing north)

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT:	Stockland Commercial Property		**Site Photographs 21 to 24**	PROJECT No: 92364.00
	OFFICE:	Macarthur	Prepared BY: CKM	**Preliminary Site Investigation - Due Diligence**	PLATE No: 6
	SCALE:	NTS	DATE: 16.8.19	**144 - 228 Aldington Road, Kemps Creek**	REVISION: 0

Photo 25: Fill overlying natural material in TP9

Photo 26: Fill in the dam wall in the east of Lot 22 (TP18)

Photo 27: Fill within a fill platform in the centre of Lot 22 (TP10)

Photo 28: Road base materials stockpiled in Lot 21 (TP16)

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Stockland Commercial Property		**Site Photographs 25 to 28**	PROJECT No:	92364.00
	OFFICE: Macarthur	Prepared BY: CKM	**Preliminary Site Investigation - Due Diligence**	PLATE No:	7
	SCALE: NTS	DATE: 16.8.19	**144 - 228 Aldington Road, Kemps Creek**	REVISION:	0

Appendix C

Data Quality Objectives and Site Assessment Criteria

Appendix C - 1 Data Quality Objectives

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

C1.1 State the Problem

Stockland Commercial Property (Stockland) is proposing purchase and redevelopment of the site for commercial/industrial purposes. Previous investigations undertaken by KPMG SGA Property Consultancy Pty Ltd (KPMG) have identified the following potentially contaminating activities occurring onsite that have the potential to impact surface soils at the site:

- Market Gardening activities; and
- Areas of improper chemical and fuel storage and mixing.

The "problem" to be addressed is the extent and nature of potential contamination at the site and whether the site is suitable for the proposed development.

The objectives of this investigation are to conduct a preliminary assessment of the potentially contaminating activities identified by KPMG, and assess any additional areas/activities of concern not identified my KPMG to provide a preliminary assessment of site contamination.

C1.2 Identify the Decision/Goal of the Study

The contamination status of the site was assessed based on the findings of a review of KPMG, a limited desktop study, a site walkover and a comparison of the analytical results for contaminants of potential concern (COPC) with the adopted site assessment criteria (SAC). The adopted SAC are provided in Section C2 below.

Based on the identified areas and activities of concern, the main COPC are expected to be total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), organochlorine pesticides (OCP), organophosphate pesticides (OPP) heavy metals and asbestos. Other commonly found contaminants which may be present include phenols and polychlorinated biphenyls (PCB).

The following specific decisions were considered as part of the PSI:

- Did field observation and analytical results identify potential contamination sources which were not included in the preliminary CSM?
- Were COPC present in soil at concentrations that pose a potential risk to identified receptors?
- Is the data sufficient to make a decision regarding the abovementioned risks, the suitability of the site for the proposed development?
- Does contamination at the site, if encountered, trigger the Duty to Report requirements under the CLM Act 1997?
- Are there any off-site migration issues that need to be considered?

C1.3 Identify Information Inputs

Inputs into the decisions are as follows:

- Review of regional geology, topography and hydrogeology information;
- Review of site history information;
- Completion of a site inspection;
- Soil samples were collected in the immediate vicinity of identified potential sources of contamination across the site from a total of 26 surface sample locations and six test pits locations. An additional 12 test pits and 2 bore holes, excavated for geotechnical and salinity purposes, were utilized as inspection test pits;
- The lithology of the site as described in the test pit and bore logs;
- Field and laboratory QA/QC data to assess the suitability of the environmental data for the DSI (Appendix G);
- All analysis was undertaken at a NATA accredited laboratory; and
- Laboratory reported concentrations of contaminants of concern were compared with the ASC NEPM criteria as discussed in Section C2.

C1.4 Define the Study Boundaries

The site covers an approximate total area of 50 ha and the following land parcels

- 144-160 Aldington Road – Lot 30 DP 258949;
- 162-178 Aldington Road – Lot 23 DP 255560;
- 180-196 Aldington Road – Lot 22 DP 255560;
- 198-212 Aldington Road – Lot 21 DP 255560; and
- 214-228 Aldington Road – Lot 20 DP 255560.

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

The investigation was undertaken to a maximum depth of 3.0 m below ground level (bgl) in test pits across the site and to a maximum depth of 8.37 m in bore 19.

Field investigations were undertaken on 30 and 31 August 2019 by a DP Environmental Scientist and a DP Environmental Engineer.

C1.5 Develop the Analytical Approach (or decision rule)

The information obtained during the assessment was used to characterise the site in terms of contamination issues and risk to human health and the environment. The decision rules used in characterising the site were as follows:

- The adopted SAC was the NSW Environment Protection Authority (EPA) endorsed criteria; and
- The contaminant concentrations in soil were compared to the adopted SAC to determine whether further investigation or remedial action was required.

Laboratory test results were considered useable for the assessment after evaluation against the following data quality indicators (DQIs):

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

The specific limits are outlined in the data QA/QC procedures and results (Appendix G).

C1.6 Specify the Performance or Acceptable Criteria

Decision errors for the respective COPC for filling and natural soils are:

1. Deciding that fill and natural soil at the site exceeds the adopted SAC when they truly do not; and
2. Deciding that fill and natural soil at the site is within the adopted SAC when they truly do not.

Decision errors for the DSI were minimised and measured by the following:

- The sampling regime targeted each stratum identified to account for site variability;
- Sample collection and handling techniques were in accordance with DP's *Field Procedures Manual*;
- Samples were prepared and analysed by a NATA-accredited laboratory with the acceptance limits for laboratory QA/QC parameters based on the laboratory reported acceptance limits and those stated in ASC NEPM;
- The analyte selection is based on the available site history, past site activities and site features. The potential for contaminants other than those proposed to be analysed is considered to be low;

- The SAC were adopted from established and NSW EPA endorsed guidelines. The SAC have risk probabilities already incorporated; and
- A NATA accredited laboratory using NATA endorsed methods are used to perform laboratory analysis. Where NATA endorsed methods are not used, the reasons are stated. The effect of using non-NATA methods on the decision making process are explained.

C1.7 Optimise the design for obtaining data

Sampling design and procedures that were implemented to optimise data collection for achieving the DQOs included the following;

- A NATA accredited laboratory using NATA endorsed methods were used to perform laboratory analysis;
- Additional soil samples were collected but kept 'on hold' pending details of initial analysis so that they could be analysed if further delineation was required; and
- Adequately experienced environmental scientists/engineers were chosen to conduct field work and sample analysis interpretation.

Appendix C – 2 Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in the current investigation are adopted from the PSI which was informed by the CSM which identified human and environmental receptors to potential contamination on the site (refer to Section 7 of the PSI). Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising investigation and screening levels as per Schedule B1, *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013 (ASC NEPM).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic commercial/industrial land use scenario.

C2.1 Health Investigation and Screening Levels

The generic Health Investigation Levels (HILs) and Health Screening Levels (HSLs) are considered to be appropriate for the assessment of human health risk associated with contamination at the site. The adopted soil HILs and HSLs for the potential contaminants of concern are presented in Table C2, with inputs into their derivation shown in Table C1.

As shown in Table C2 the adopted HSLs are based on a potential vapour intrusion pathway, as identified in the CSM. Although the CSM also identifies a direct contact pathway as well as construction worker receptors, the corresponding HSLs are significantly higher than those for the vapour intrusion pathway and are therefore not drivers for further assessment and/or remediation. As such the direct contact and intrusive maintenance worker HSLs have not been listed.

Table C1: Inputs to the Derivation of HSLs

Variable	Input	Rationale
Potential exposure pathway	Inhalation of vapours	Potential exposure pathways
Soil Type	Silt and clay	Dominant soil type in surface soils
Depth to contamination	0 m to <1 m	Potential contamination sources likely to impact surface soils

Table C2: HIL and HSL in mg/kg Unless Otherwise Indicated

Contaminants		HIL- D	HSL- D
Metals	Arsenic	3000	-
	Cadmium	900	-
	Chromium (VI)	3600	-
	Copper	240000	-
	Lead	1500	-
	Mercury (inorganic)	730	-
	Nickel	6000	-
	Zinc	400000	-
PAH	Benzo(a)pyrene TEQ[1]	40	-
	Total PAH	4000	-
	Naphthalene	-	NL[3]
TRH	C6 – C10 (less BTEX) [F1]	-	310
	>C10-C16 (less Naphthalene) [F2]	-	NL
	>C16-C34 [F3]	-	-
	>C34-C40 [F4]	-	-
BTEX	Benzene	-	4
	Toluene	-	NL[3]
	Ethylbenzene	-	NL[3]
	Xylenes	-	NL[3]

Contaminants		HIL- D	HSL- D
OCP	Aldrin + Dieldrin	45	-
	Chlordane	530	-
	DDT+DDE+DDD	3600	-
	Endosulfan	2000	-
	Endrin	100	-
	Heptachlor	50	-
	HCB	80	-
	Methoxychlor	2500	-
OPP	Chlorpyrifos	2000	-
PCB [2]		7	-

Notes:

1 Sum of carcinogenic PAH

2 Non dioxin-like PCBs only.

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

C2.2 Ecological Investigation Levels

Ecological Investigation Levels (EILs) and Added Contaminant Limits (ACLs), where appropriate, have been derived in NEPC (2013) for only a short list of contaminants comprising As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn. The adopted EILs, derived using the *Interactive (Excel) Calculation Spreadsheet* (Standing Council on Environment and Water (SCEW) website (http://www.scew.gov.au/node/941)) are shown in the following Table C4, with inputs into their derivation shown on Table C3.

Table C3: Inputs to the Derivation of EILs

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years)	Given the potential sources of soil contamination are from historic use, the contamination is considered as "aged" (>2 years);
pH	6.16	Four selected samples from the PSI were tested for pH. The average pH value has been used as an initial screening. The pH value adopted is a pH of 6.16
CEC	9.44 cmolc/kg	Four selected samples from the PSI were tested for CEC. The average CEC value has been used as an initial screening. The CEC value adopted is 9.44 cmolc/kg.
Clay content	10 %	Conservative value for initial screen

Variable	Input	Rationale
Traffic volumes	low	The site is considered to be located within a low traffic area
State / Territory	New South Wales	-

Table C4: EIL in mg/kg

Analyte		EIL
Metals	Arsenic	160
	Copper	280
	Nickel	250
	Chromium III	670
	Lead	1800
	Zinc	670
PAH	Naphthalene	370
OCP	DDT	640

C2.3 Ecological Screening Levels

Ecological Screening Levels (ESLs) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESLs, based on a fine soil type are shown in the following Table C5.

Table C5: ESL in mg/kg

Analyte		ESL[1]	Comments
TRH	C6 – C10 (less BTEX) [F1]	215*	All ESLs are low reliability apart from those marked with * which are moderate reliability
	>C10-C16 (less Naphthalene) [F2]	170*	
	>C16-C34 [F3]	2500	
	>C34-C40 [F4]	6600	
BTEX	Benzene	95	
	Toluene	135	
	Ethylbenzene	185	
	Xylenes	95	
PAH	Benzo(a)pyrene	1.4	

C2.4 Management Limits

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

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

The adopted management limits, based on a fine soil type, are shown in the following Table C6.

Table C6: Management Limits in mg/kg

Analyte		Management Limit
TRH	$C_6 - C_{10}$ (F1) #	800
	$>C_{10}-C_{16}$ (F2) #	1000
	$>C_{16}-C_{34}$ (F3)	5000
	$>C_{34}-C_{40}$ (F4)	10 000

Separate management limits for BTEX and naphthalene are not available hence these have not been subtracted from the relevant fractions to obtain F1 and F2

C2.5 Asbestos in Soil

NEPC (2013) defines the various asbestos types as follows:

Bonded ACM: Asbestos containing material which is in sound condition, bound in a matrix of cement or resin, and cannot pass a 7 mm x 7 mm sieve.

FA: Fibrous asbestos material including severely weathered cement sheet, insulation products and woven asbestos material. This material is typically unbonded or was previously bonded and is now significantly degraded and crumbling.

AF: Asbestos fines including free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve.

Health Screening Levels (HSLs) for asbestos in soil, which are based on likely exposure levels for different scenarios, have been adopted in NEPC (2013) from the Western Australian Department of Health (WA DoH) publication Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia 2009 (WA DoH 2009).

On the basis of the proposed land use, and in accordance with Table 7, Schedule B1, NEPC (2013) the following asbestos HSLs have been adopted:

Table C7: Health Screening Levels for Asbestos Contamination in Soil (% w/w)

Form of Asbestos	HSL
Bonded ACM	0.05%
FA and AF	0.001 %
All Forms of Asbestos	No visible asbestos for surface soil

Appendix D

Test Pit and Bore Hole Logs

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 79.7 mAHD
EASTING: 296452
NORTHING: 6253052

PIT No: 1
PROJECT No: 92364.00
DATE: 30/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
79.7	0.2	FILL/TOPSOIL: Silty CLAY CI, medium plasticity, pale brown, with rootlets, w<PL		D	0.1				
		Silty CLAY CI: medium plasticity, red-brown, w~PL, stiff		D	0.5				
79	1	- becoming grey with extremely weathered shale bands below 0.7m		D	1.0				
		- with iron indurated bands below 1.3m		D	1.5				
78	1.9								
	2	SANDSTONE: fine grained, grey and brown, very low strength, highly weathered		D	2.0				
				D	2.5				
77	3			D	3.0				
	3.0	Pit discontinued at 3.0m - limit of investigation							
76	4								
75	5								
74	6								
73	7								
72	8								
71	9								
70									

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 66.3 mAHD
EASTING: 296761
NORTHING: 6253027

PIT No: 2
PROJECT No: 92364.00
DATE: 30/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
66	0.2	FILL/TOPSOIL: Clayey SILT MH: high plasticity, pale brown, trace rootlets, w<PL		E	0.1				
		Silty CLAY CH: medium plasticity, brown and red, trace ironstone gravel, w<PL, stiff		D	0.5				
	1			D	1.0				
65		- becoming brown, w~PL below 1.3m		D	1.5		pp = 300		
	2			D	2.0		pp = 250-300		
64		- with a grey band of extremely weathered shale below 2.4m		D	2.5				
	3	3.0		D	3.0				
63		Pit discontinued at 3.0m - limit of investigation							
	4								
62									
	5								
61									
	6								
60									
	7								
59									
	8								
58									
	9								
57									

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 75.3 mAHD
EASTING: 296450
NORTHING: 6252861

PIT No: 3
PROJECT No: 92364.00
DATE: 30/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
75	0.3	FILL/TOPSOIL: Clayey SILT MH, high plasticity, red and brown, trace ironstone gravel, w<PL, stiff		D	0.1				
		Silty CLAY CH: medium to high plasticity, red and brown, trace ironstone gravel, w<PL, stiff		D	0.5				
				U_{50}	0.85				
		- becoming red below 0.8m		D	1.0				
74		- band of extremely weathered shale below 1.1m							
		- becoming brown, with sand below 1.4m		D	1.5				
	1.9	SANDSTONE: white, very low strength, highly weathered		D	2.0				
73	2.5	Pit discontinued at 2.5m - refusal on low strength sandstone		D	2.5				
72									
71									
70									
69									
68									
67									
66									

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 70.8 mAHD
EASTING: 296566
NORTHING: 6252795

PIT No: 4
PROJECT No: 92364.00
DATE: 30/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
70	0.2	FILL/TOPSOIL: Silty CLAY CI, medium plasticity, brown, with rootlets, w<PL		D	0.1				
		Silty CLAY CI: medium plasticity, brown, with ironstone gravel, w~>PL, stiff		D	0.5				
69	1	- becoming brown and mottled grey, with iron indurated bands below 0.9m		D	1.0				
				D/B	1.5		pp = 300-400		
68	2			D	2.0		pp = 300-400		
	2.6	- bands of extremely weathered shale below 2.4m		D	2.5		pp = 400-500		
		SANDSTONE: fine grained, white and red, very low strength, highly weathered, with bands of extremely weathered shale							
67	3			D	3.0				
	3.0	Pit discontinued at 3.0m - limit of investigation							
66	4								
65	5								
64	6								
63	7								
62	8								
61	9								

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 73.7 mAHD
EASTING: 296819
NORTHING: 6252776

PIT No: 5
PROJECT No: 92364.00
DATE: 30/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
73	0.2	FILL/TOPSOIL: Clayey SILT MH, high plasticity, brown, with rootlets, w<PL		D	0.1				
		Silty CLAY CH: high plasticity, brown-red, trace ironstone gravel, w<PL, very stiff		D	0.5				
	0.9	SANDSTONE: fine grained, brown, very low strength, highly weathered		D	1.0				
72				D	1.5				
				D	2.0				
		- interbedded with dark grey shale below 2.4m		D	2.5				
71	3.0	Pit discontinued at 3.0m		D	3.0				
		- limit of investigation							
70									
69									
68									
67									
66									
65									
64									

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 70.5 mAHD
EASTING: 296307
NORTHING: 6252715

PIT No: 6
PROJECT No: 92364.00
DATE: 30/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
70	0.2	FILL/TOPSOIL: Clayey SILT MH, high plasticity, brown, with rootlets, w<PL		D/E	0.1				
		Silty CLAY CI: medium plasticity, red, w<PL, very stiff - becoming hard below 0.3m		D/B	0.5				
69	1	- becoming brown below 0.8m		D	1.0				
		- becoming dark grey-brown below 1.4m		D	1.5		pp = 300-400		
	1.9	SHALE: brown, very low strength, highly weathered		D	2.0				
68	2.1	Pit discontinued at 2.1m - refusal on low strength shale		D	2.1				

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 73.6 mAHD
EASTING: 296795
NORTHING: 6252613

PIT No: 8
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
73	0.1	FILL/TOPSOIL: Organic SILT OH, dark brown, trace rootlets, w<PL		E	0.1				
		FILL/Silty CLAY CH: high plasticity, pale brown, with textiles, pieces of broken plastic pipe and wooden stake, w<PL		E	0.5				
	0.9								
	1	Silty CLAY CH: high plasticity, red-brown, trace ironstone gravel, w<PL		D	1.1				
	1.2	Pit discontinued at 1.2m - limit of investigation							
72	2								
71	3								
70	4								
69	5								
68	6								
67	7								
66	8								
65	9								
64									

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 73.4 mAHD
EASTING: 296820
NORTHING: 6252578

PIT No: 9
PROJECT No: 92364.00
DATE: 30/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
73	0.3	FILL/Clayey GRAVEL GL: grey-white, dry, typically loosely placed		D/E	0.1				
	0.6	FILL/Silty CLAY CI: medium plasticity, brown, with rootlets, trace metallic wires and ceramic tile, w<PL (uncontrolled fill)		D/E	0.5				
72	1	Silty CLAY CI: medium plasticity, brown-red, trace gravel, w<PL		D U_{50}	0.9 1.0 1.25				
				D	1.5				
	2.0	- brown and grey bands of extremely weathered shale below 1.8m		D	2.0				
71	2.5	SANDSTONE: fine grained, brown, very low strength, highly weathered		D	2.5				
		Pit discontinued at 2.5m - limit of investigation							
70	3								
69	4								
68	5								
67	6								
66	7								
65	8								
64	9								

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 77.6 mAHD
EASTING: 296526
NORTHING: 6252611

PIT No: 10
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
77	0.2	FILL/TOPSOIL: Silty CLAY CH, high plasticity, pale brown, with rootlets, w<PL		E	0.1				
		FILL/Silty CLAY CH: high plasticity, brown, trace siltstone gravel, w<PL		E	0.5				
	0.7	Silty CLAY CH: high plasticity, red and grey, w<PL							
	1			D	1.0				
	1.2	- bands of extremely weathered shale below 1.1m							
76		Pit discontinued at 1.2m - limit of investigation							
75	2								
74	3								
73	4								
72	5								
71	6								
70	7								
69	8								
68	9								

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 68.9 mAHD
EASTING: 296235
NORTHING: 6252516

PIT No: 11
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
68	0.2	FILL/TOPSOIL: Silty CLAY CI, medium plasticity, brown, with rootlets, w<PL		D	0.1				
		Silty CLAY CH: high plasticity, red-brown, trace gravel, w>PL, stiff		D/B	0.5				
				U_{50}	0.6				
					0.85				
67	1	- becoming grey and brown, hard below 0.9m		D	1.0				
		- becoming grey and red, sandstone gravel below 1.4m		D	1.5		pp = 300-400		
66	2			D	2.0		pp = 400-500		
	2.4	SANDSTONE: fine grained, red and grey, very low strength, highly weathered		D	2.5				
65	3	Pit discontinued at 3.0m - limit of investigation		D	3.0				
64	4								
63	5								
62	6								
61	7								
60	8								
59	9								

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 69.1 mAHD
EASTING: 296549
NORTHING: 6252533

PIT No: 12
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
69	0.15	FILL/TOPSOIL: Clayey SILT MH, high plasticity, brown, with rootlets, w<PL		D	0.1				
		Silty CLAY CI: medium plasticity, red-brown, trace ironstone gravel, w<PL, hard		D	0.5				
68	1			D	1.0				
		- becoming brown mottled grey below 1.1m							
		- with bands of extremely weathered shale below 1.4m		D	1.5		pp = 400-500		
67	1.9	SHALE: dark grey, very low strength, highly weathered, with bands of fine grained, brown sandstone gravel							
	2			D	2.5				
	2.6	Pit discontinued at 2.6m - refusal on low strength shale							
66	3								
65	4								
64	5								
63	6								
62	7								
61	8								
60	9								

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 71.9 mAHD
EASTING: 296691
NORTHING: 6252472

PIT No: 13
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
71	0.15	FILL/TOPSOIL: Silty CLAY CI, medium plasticity, brown, with rootlets, w<PL		D	0.1				
		Silty CLAY CH: high plasticity, red-brown, trace ironstone gravel, w<PL, stiff		D	0.5				
	1	- with bands of brown and grey extremely weathered shale below 0.8m		D	1.0				
70				D	1.5				
	2			D	2.0				
	2.3	SHALE: brown and grey, very low strength, highly weathered		D	2.5				
69	3			D	3.0				
	3.0	Pit discontinued at 3.0m - limit of investigation							
68	4								
67	5								
66	6								
65	7								
64	8								
63	9								
62									

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 60.1 mAHD
EASTING: 296231
NORTHING: 6252333

PIT No: 14
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
60	0.3	FILL/TOPSOIL: Clayey SILT MH, high plasticity, brown, with rootlets, w<PL		D/E	0.1				
		Silty CLAY CH: high plasticity, red-brown, trace gravel, w<PL, hard		D	0.4				
				U_{50}	0.5 – 0.65				
59	1	- becoming red mottled grey, w~PL below 0.9m		D/B	1.0				
				D	1.5				
58	2	- with band of brown and grey extremely weathered shale below 1.9m		D	2.0				
	2.3	SHALE: brown, very low strength, highly weathered, with bands of low strength, highly weathered		D	2.5				
57	3			D	3.0				
	3.0	Pit discontinued at 3.0m - limit of investigation							
56	4								
55	5								
54	6								
53	7								
52	8								
51	9								

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 77.6 mAHD
EASTING: 296689
NORTHING: 6252284

PIT No: 15
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
77	0.2	FILL/TOPSOIL: Silty CLAY CI, medium plasticity, brown, with rootlets, w<PL		D/E	0.1				
	0.6	Silty CLAY CI: medium plasticity, brown, with gravel, w<PL, hard		D	0.5				
76	1	SANDSTONE: pale brown, very low strength, highly weathered, with bands of low strength, highly weathered		D	1.0				
				D	1.5				
	2			D	2.0				
75	2.1	Pit discontinued at 2.1m - limit of investigation							
74	3								
73	4								
72	5								
71	6								
70	7								
69	8								
68	9								

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 79.5 mAHD
EASTING: 296809
NORTHING: 6252397

PIT No: 16
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
79	0.6	FILL/ROADBASE: black roadbase gravel		E	0.2				
		Silty CLAY CH: high plasticity, red mottled grey, trace gravel, w<PL		D	0.7				
78	1.0	Pit discontinued at 1.0m - limit of investigation							
77									
76									
75									
74									
73									
72									
71									
70									

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20; 1 to 9

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 64.5 mAHD
EASTING: 296441
NORTHING: 6252409

PIT No: 17
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
64	0.2	FILL/TOPSOIL: Silty CLAY CH, high plasticity, brown, with rootlets, w<PL		E	0.1				
		FILL/Silty CLAY CI: medium plasticity, pale brown, with gravel, w<PL		E	0.5				
	0.9								
63	1	Silty CLAY CI: medium plasticity, brown, trace gravel, w<PL		D	1.0				
	1.2	Pit discontinued at 1.2m - limit of investigation							
62	2								
61	3								
60	4								
59	5								
58	6								
57	7								
56	8								
55	9								

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 71.4 mAHD
EASTING: 296862
NORTHING: 6252693

PIT No: 18
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
71	0.1	FILL/TOPSOIL: Silty CLAY CI, medium plasticity, pale brown, with rootlets, w<PL		E	0.1				
		FILL/Silty CLAY CI: medium plasticity, brown, trace sandstone gravel, w<PL		E	0.5				
70	1.1	Silty CLAY CH: high plasticity, red, trace ironstone gravel, w<PL		D	1.2				
	1.6	Pit discontinued at 1.6m - limit of investigation							
69									
68									
67									
66									
65									
64									
63									
62									

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 67.9 mAHD
EASTING: 296516
NORTHING: 6252385

PIT No: 26
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
67	0.15	FILL/TOPSOIL: Silty CLAY CI, medium plasticity, brown, with rootlets, w<PL		E	0.1				
		FILL/Silty CLAY CI: medium plasticity, brown, with shale and siltstone gravel, w<PL		E	0.5				
66	1.4	SHALE: brown and grey, extremely weathered, with band of grey, very low strength, highly weathered		D	1.5				
	2.0	Pit discontinued at 2.0m - limit of investigation		D	2.0				

RIG: John Deere 315SE backhoe - 450mm bucket

LOGGED: ABB

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: w = moisture content; PL = plastic limit

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 74.3 mAHD
EASTING: 296479
NORTHING: 6252656
DIP/AZIMUTH: 90°/--

BORE No: 7
PROJECT No: 92364.00
DATE: 30/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
74	0.1	FILL/TOPSOIL: Clayey SILT, brown, with rootlets										
		Silty CLAY CH: high plasticity, red brown, w<PL, very stiff, residual							S			7,12,19 N = 31
73	1	- becoming grey, with iron indurated bands, extremely weathered shale, hard below 1.3m										
72	2											
	2.63	CLAY CI: medium plasticity, grey mottled red, trace gravel and cobbles, w<PL										
71	3											
	3.33	SILTSTONE: fine grained, brown, low strength, highly weathered										PL(A) = 0.21
	4	- becoming extremely weathered between 3.96m to 5.0m						3.8m: J, 40°, pl, ro, fe, he 3.88m: B, pl, ro, fe, he 4.2m: sm, pl, clay 200mm thick	C	100	87	PL(A) = 0.17
70	5							4.79m: sm, pl, clay 90mm thick				
69	5.26	SANDSTONE: fine grained, brown, low strength, distinctly weathered						5.2m: J, 15°, pl, ro, fe, he 5.3m: J, 35°, pl, ro, fe, he				PL(A) = 0.67
	6							5.37m: B, pl, ro, clay 5.73m: B, pl, ro, clay 5.97m: B, pl, ro, clay 6.04m: Cs, pl, ro, fe 60mm thick 6.35m: Cs, pl, ro, fe 40mm thick 6.55m: B, pl, sm, clay, he				
68	6.0	SILTSTONE - fine grained, brown, low strength, highly weathered										
	7	- becoming dark grey, distinctly weathered below 6.53m						6.84m: B, pl, ro, clay	C	100	30	PL(A) = 0.13
67	8											
66		- becoming medium strength, moderately weathered below 8.26m										PL(A) = 0.4
	8.67	Bore discontinued at 8.67m - limit of investigation										
65	9											

RIG: Scout 1/DT100 **DRILLER:** Groundtest **LOGGED:** FH **CASING:**

TYPE OF BORING: 150mm diameter Solid flight auger (TC-bit) to 1.5m, wash boring to 5.26m, NMLC coring to 8.67m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. w = moisture content; PL = plastic limit

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Stockland Commercial Property
PROJECT: Proposed Commerical/Industrial Subdivision
LOCATION: 144 - 228 Aldington Road, Kemps Creek

SURFACE LEVEL: 80.7 mAHD
EASTING: 296839
NORTHING: 6252374
DIP/AZIMUTH: 90°/--

BORE No: 19
PROJECT No: 92364.00
DATE: 31/7/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering	Graphic Log	Rock Strength	Water	Fracture Spacing (m)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
80	0.25	FILL/Silty Sandy GRAVEL: dark brown and grey, trace root fibres, w<PL							D			
		CLAY CI: medium plasticity, red brown, trace fine sand and gravel, w<PL, hard							D			pp = 500
1		- becoming very stiff below 0.8m							D			pp = 300-350
		- becoming grey mottled red orange below 1.0m							S			6,12,16 N = 28
79												
2												
	2.36	SILTSTONE: fine grained, brown, low strength, highly weathered							S			25/60mm,-,- refusal
78								2.69m: B, pl, ro, clay				
3												PL(A) = 0.51
		- with interbedded fine grained sandstone below 3.09m						3.26m: B, pl, ro, clay				
								3.46m: B, pl, ro, clay				
77									C	100	100	
4								3.91m: B, pl, ro, clay				
								4.19m: B, pl, ro, clay				
		- becoming grey, moderately weathered below 4.32m										PL(A) = 0.2
76								4.69m: J, 40°, pl, ro, fe, he				
5	5.08	SANDSTONE: fine grained, pale brown, medium strength, moderately weathered						5.13m: J, 80°, pl, ro, fe, he				PL(A) = 2.66
		- with interbedded siltstone bands between 5.18m to 7.0m						5.19m: B, pl, ro, clay				
75								5.85m: B, pl, ro, clay				
6												PL(A) = 1.35
								6.8m: B, pl, ro, clay	C	100	60	
74												
7		- becoming grey below 7.0m										PL(A) = 3.96
								7.54m: B, pl, ro, clay				
73												
8												
	8.37	Bore discontinued at 8.37m										PL(A) = 0.33
72		- limit of investigation										
9												
71												

RIG: Scout 1 **DRILLER:** Groundtest **LOGGED:** FH **CASING:**

TYPE OF BORING: Solid flight auger (TC-bit) to 1.0m, rotary to 2.3m, NMLC coring to 8.37m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. 50% water loss at approximately 7.1m; w = moisture content; PL = plastic limit

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

Sampling

[illegible]

[illegible]

[illegible]

[illegible]

Test Pits

[illegible]

Large Diameter Augers

[illegible]

Continuous Spiral Flight Augers

[illegible]

[illegible]

Non-core Rotary Drilling

[illegible]

Continuous Core Drilling

[illegible]

Standard Penetration Tests

[illegible]

[illegible]

[illegible]

- [illegible]
- [illegible]

Sampling Methods

□□□□ r□□□□□□□ of □□□□ □□□□ □□□□□□ □□□□ □□□ r□□□□□d □□ pr□□□□□□□ □□ □□□□ □□□□□□□□r□□□ prop□r□□□□ of □□□□ □o□□□□

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

D□□□□ □□ p□□□□ro□ □□□r □□□□□ □DC□ or □□□□ □r□ □□rr□d o□□ □□□ dr□□□□ □ □□□□□rod □□□ □□□ □ro□□d □□□□□ □ □□□□d□rd □□□□□□ of □□□ □ □r f□□□□□ □ □p□□f□d d□□□□□□□□□ □□ □□□ rod p□□□r□□□ □□□ □o□□ □□□ □□□ □□r of □□o□□ r□□□□r□d □o p□□□□r□□ □□□□ □□□□□□□□□□□ □□□ □ □ d□p□ □r□ r□□ord□d□ □or□ □□□□ □□r□ □□ □ d□p□ □□□ □□□□□□o□ of □□□ □ □□□□□□□□□□ □ □□□ □□ □□□□□d□d □□ □□r□□□ □o□d□o□ □□ □□□ □□□□ of □□□□□□□o□ rod□ □□o □p□□ of p□□□ro□ □□r □r□ □o□ □ o□□□ □□□d□

- □r□ □□□d p□□□□ro□ □□r □□ □□ □ □ d□□ □□r f□□□□d□d rod □ dr□□□ □□□□ □ □ □□ □□□ □ r dropp□ □□□ □ □ □□ □□□□□□□□□□□□□□□□ □□□ □□□□ d□□□op□d for □□□□□□ □□□ d□□□□ of □□d□ □d □□ □ □□□□ □□d □ r□□□□r □o□ □d □□□□□□□□□□ □□□□□□o□ rod□ □□o □p□□ of p□□□ro□ □□r □r□ □o□ □ o□□□ □□d□
- Co□□ p□□□□ro□ □□r □ □□ □ □ d□□□ □□r rod □□□ □ □□ □ □ d□□□ □□r □o□□ □□d □□ dr□□□ □□□□ □ □ □□ □□□ □ r dropp□ □□□ □ □ □□□ □□□□□□ □□□□ □□□□□□ □□□ □□□ □ □□ d□□□op□d □□□□□□□□ for p□□□□ □□□ □□□□□r□d□ □□□□□□□□□o□□ □d □orr□□□o□ of □□□ □□□□ r□□□□□ □□□ C□□for□ □□□r□ □ □□o □□□□ □□□□ p□□□□□d □□ □r□o□ro□d □□□□or□□□

Soil Descriptions

Douglas Partners

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

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

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

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

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

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

Cohesive Soils

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

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

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

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

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

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Symbols & Abbreviations

Introduction

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

Drilling or Excavation Methods

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

Water

▷	Water seep
▽	Water level

Sampling and Testing

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

Description of Defects in Rock

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

Defect Type

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

Orientation

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

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

Coating or Infilling Term

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

Coating Descriptor

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

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

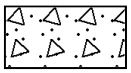
Symbols & Abbreviations

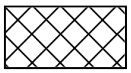
Graphic Symbols for Soil and Rock

General

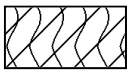

Asphalt

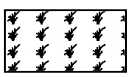

Road base

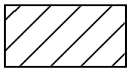

Concrete

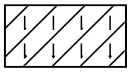

Filling

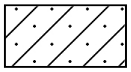
Soils


Topsoil

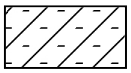

Peat

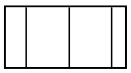

Clay

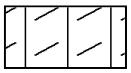

Silty clay

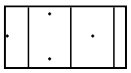

Sandy clay

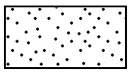

Gravelly clay

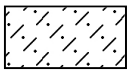

Shaly clay

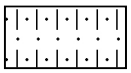

Silt


Clayey silt


Sandy silt

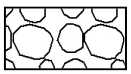

Sand

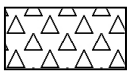

Clayey sand


Silty sand


Gravel

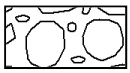

Sandy gravel


Cobbles, boulders

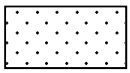

Talus

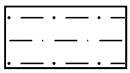
Sedimentary Rocks

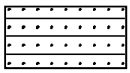

Boulder conglomerate

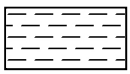

Conglomerate


Conglomeratic sandstone

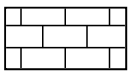

Sandstone


Siltstone

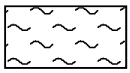

Laminite

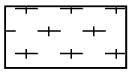

Mudstone, claystone, shale

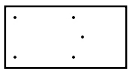

Coal


Limestone

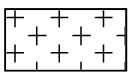
Metamorphic Rocks

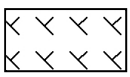

Slate, phyllite, schist

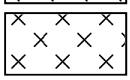

Gneiss

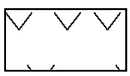

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

Appendix E

Summary Tables

Table E1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH

			Metals								TRH						BTEX				PAH			
			Arsenic	Cadmium	Chromium (VI)	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
		PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.05
Sample ID	Depth	Sampled Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SS1	0 - 0.1m	30/07/2019	**7**	<0.4	**30**	**17**	**73**	**0.2**	**7**	**110**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS2	0 - 0.1m	30/07/2019	**16**	<0.4	**19**	**24**	**12**	<0.1	**19**	**60**	<25	<50	<25	<50	**180**	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS3	0 - 0.1m	30/07/2019	<4	**0.7**	**170**	**200**	**59**	<0.1	**51**	**350**	<25	<50	<25	<50	**190**	**120**	<0.2	<0.5	<1	<1	<1	**0.4**	<0.5	**4.3**
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS4	0 - 0.1m	30/07/2019	**7**	<0.4	**18**	**28**	**21**	**0.2**	**13**	**150**	<25	<50	<25	<50	**170**	<100	<0.2	<0.5	<1	<1	<1	**0.56**	**0.9**	**4.7**
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS5	0 - 0.1m	30/07/2019	**6**	**4.1**	**19**	**110**	**43**	**0.4**	**9**	**380**	<25	**170**	<25	**170**	**1500**	**560**	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	**1.7**
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS6	0 - 0.1m	30/07/2019	**7**	<0.4	**16**	**30**	**14**	<0.1	**8**	**160**	<25	**56**	<25	**56**	**210**	**100**	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS7	0 - 0.1m	30/07/2019	**8**	<0.4	**20**	**50**	**23**	**0.1**	**7**	**50**	<25	<50	<25	<50	**220**	**100**	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS8	0 - 0.1m	30/07/2019	**4**	<0.4	**16**	**150**	**13**	<0.1	**8**	**160**	<25	**66**	<25	**66**	**630**	**220**	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS10	0 - 0.1m	30/07/2019	**9**	<0.4	**23**	**13**	**17**	<0.1	**4**	**67**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS13	0 - 0.1m	30/07/2019	**7**	**2**	**20**	**71**	**24**	<0.1	**8**	**110**	<25	**67**	<25	**67**	**360**	**240**	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	**0.3**
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS14	0 - 0.1m	30/07/2019	**230**	<0.4	**40**	**79**	**20**	<0.1	**12**	**180**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS15	0 - 0.1m	30/07/2019	**9**	**0.9**	**17**	**63**	**110**	<0.1	**11**	**2400**	<25	<50	<25	<50	**120**	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS17	0 - 0.1m	30/07/2019	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS18	0 - 0.1m	30/07/2019	NT	NT	NT	NT	NT	NT	NT	NT	<25	**72**	<25	**72**	**1700**	**220**	<0.2	<0.5	<1	<1	<1	**39**	**61**	**300**
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS19	0 - 0.1m	30/07/2019	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.1	**0.4**	<0.5	**1.1**
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
BD2	0 - 0.1m	30/07/2019	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.1	**0.5**	**0.6**	**1.5**
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS20	0 - 0.1m	30/07/2019	**5**	**5.6**	**16**	**31**	**35**	<0.1	**11**	**780**	<25	**160**	<25	**160**	**1400**	**490**	<0.2	<0.5	<1	<1	<1	**0.08**	<0.5	**2.9**
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS21	0 - 0.1m	30/07/2019	**5**	<0.4	**11**	**23**	**15**	<0.1	**8**	**130**	<25	<50	<25	<50	**320**	**120**	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	**0.2**
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
BD3	0 - 0.1m	30/07/2019	**6**	<0.4	**11**	**24**	**14**	<0.1	**9**	**130**	<25	<50	<25	<50	**400**	**120**	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	**0.1**
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS22	0 - 0.1m	30/07/2019	**8**	<0.4	**16**	**41**	**23**	<0.1	**15**	**220**	<25	<50	<25	<50	**150**	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS23	0 - 0.1m	30/07/2019	**10**	<0.4	**19**	**88**	**26**	<0.1	**9**	**110**	<25	**50**	<25	**50**	**220**	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS24	0 - 0.1m	30/07/2019	**9**	<0.4	**15**	**64**	**17**	<0.1	**10**	**63**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
TP8/0.1	0 - 0.1m	31/07/2019	**6**	<0.4	**16**	**25**	**24**	<0.1	**12**	**41**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
TP9/0.1	0 - 0.1m	31/07/2019	**5**	<0.4	**4**	**59**	**7**	<0.1	**2**	**9**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NT	NT	NT
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
TP10/0.1	0 - 0.1m	31/07/2019	<4	<0.4	**7**	**24**	**54**	<0.1	**9**	**74**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
TP14/0.1	0 - 0.1m	31/07/2019	**9**	<0.4	**17**	**48**	**18**	<0.1	**11**	**190**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS25/0.1	0 - 0.1m	31/07/2019	**6**	<0.4	**18**	**26**	**56**	<0.1	**15**	**400**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
SS27/0.1	0 - 0.1m	31/07/2019	**5**	<0.4	**13**	**40**	**18**	**0.2**	**18**	**450**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NT	NT	NT
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
TP2/0.1	0 - 0.1m	30/07/2019	**7**	<0.4	**17**	**8**	**16**	<0.1	**3**	**10**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
BD5	0 - 0.1m	30/07/2019	**6**	<0.4	**15**	**8**	**13**	<0.1	**4**	**11**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
TP6	0 - 0.1m	30/07/2019	**4**	<0.4	**15**	**31**	**15**	**0.1**	**16**	**40**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC
BD4	0 - 0.1m	30/07/2019	**5**	<0.4	**14**	**29**	**15**	<0.1	**14**	**35**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			3000 160	900 NC	3600 670	2E+05 280	1500 1800	730 NC	6000 250	400000 670	NC NC	NC NC	310 215	NL 170	NC 2500	NC 6600	4 95	NL 135	NL 185	NL 95	NL 370	NC 1.4	40 NC	4000 NC

Lab result
HIL/HSL value EIL/ESL value

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

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

Notes:

HIL/HSL/DC	NEPC, Schedule B1 - HIL D (Commercial / Industrial), HSL D (Commercial / Industrial), DC HSL D (Direct contact HSL D Commercial/Industrial)
EIL/ESL	NEPC, Schedule B1 - EIL C/Ind (Commercial and Industrial), ESL C/Ind (Commercial and Industrial)
ML	NEPC, Schedule B1 - ML C/Ind (Commercial and Industrial)
a	QA/QC replicate of sample listed directly below the primary sample
b	reported naphthalene laboratory result obtained from BTEXN suite
c	criteria applies to DDT only

Table E2: Summary of Laboratory Results – Phenol, OCP, OPP, PCB, Asbestos

			Phenol	OCP								OPP	PCB	Asbestos		
			Phenol	DDT+DDE+DDD [c]	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	HCB	Methoxychlor	Chlorpyriphos	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (50 g)
		PQL	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
Sample ID	Depth	Sampled Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
SS1	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS2	0 - 0.1m	30/07/2019	NT 660 NC	NT 3600 640	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC	NAD	NAD	NAD
SS3	0 - 0.1m	30/07/2019	<5 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS5	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS6	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS7	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS8	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	**2.4** 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	<0.1 7 NC	NT	NT	NT
SS9	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	NT 7 NC	NT	NT	NT
SS10	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS11	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	NT 7 NC	NT	NT	NT
SS12	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	NT 7 NC	NT	NT	NT
SS13	0 - 0.1m	30/07/2019	<5 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS14	0 - 0.1m	30/07/2019	NT 660 NC	NT 3600 640	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC	NAD	NAD	NAD
SS15	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS16	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC	NT	NT	NT
SS20	0 - 0.1m	30/07/2019	<5 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS21	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	<0.1 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS22	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	**0.1** 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS23	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	<0.1 7 NC	NAD	NAD	NAD
SS24	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	NT 7 NC	NAD	NAD	NAD
TP2/0.1	0 - 0.1m	30/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	NT 7 NC	NT	NT	NT
TP8/0.1	0 - 0.1m	31/07/2019	NT 660 NC	NT 3600 640	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC	NAD	NAD	NAD
TP9/0.1	0 - 0.1m	31/07/2019	NT 660 NC	NT 3600 640	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC	NAD	NAD	NAD
TP10/0.1	0 - 0.1m	31/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	NT 7 NC	NAD	NAD	NAD
TP14/0.1	0 - 0.1m	31/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	NT 7 NC	NAD	NAD	NAD
SS25/0.1	0 - 0.1m	31/07/2019	NT 660 NC	NT 3600 640	NT 45 NC	NT 530 NC	NT 2000 NC	NT 100 NC	NT 50 NC	NT 80 NC	NT 2500 NC	NT 2000 NC	NT 7 NC	NAD	NAD	NAD
SS27/0.1	0 - 0.1m	31/07/2019	NT 660 NC	<0.1 3600 640	<0.1 45 NC	<0.1 530 NC	<0.1 2000 NC	<0.1 100 NC	<0.1 50 NC	<0.1 80 NC	<0.1 2500 NC	NT 2000 NC	NT 7 NC	NAD	NAD	NAD

Lab result
HIL/HSL value EIL/ESL value

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

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

Notes:

HIL/HSL/DC	NEPC, Schedule B1 - HIL D (Commercial / Industrial), HSL D (Commercial / Industrial), DC HSL D (Direct contact HSL D Commercial/Industrial)
EIL/ESL	NEPC, Schedule B1 - EIL C/Ind (Commercial and Industrial), ESL C/Ind (Commercial and Industrial)
ML	NEPC, Schedule B1 - ML C/Ind (Commercial and Industrial)
a	QA/QC replicate of sample listed directly below the primary sample
b	reported naphthalene laboratory result obtained from BTEXN suite
c	criteria applies to DDT only

Table E3: Derivation Table

Sample ID	Sample Depth	Soil Type	Soil Texture	Clay Content	CEC	pH
SS1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS2	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS3	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS4	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS5	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS6	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS7	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS8	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS9	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS10	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS11	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS12	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS13	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS14	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS15	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS16	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS17	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS18	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS19	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
BD2	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS20	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS21	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
BD3	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS22	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS23	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS24	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
MAT-1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
MAT-2	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
MAT-4	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
BD1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
MAT3	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS15 - [TRIPLICATE]	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP2/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP6/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP7/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP8/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP9/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP10/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP14/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP15/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP16/0.2	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP17/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP18/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP26/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS25/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS27/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP2/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
BD5	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP6/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP7/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP8/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP9/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP10/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP14/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP15/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP16/0.2	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP17/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP18/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP26/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS25/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
SS27/0.1	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP6	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
BD4	0 - 0.1m	Clay	Fine	10.00	9.44	6.16
TP6 - [TRIPLICATE]	0 - 0.1m	Clay	Fine	10.00	9.44	6.16

Appendix F

Laboratory Certificates and Chain of Custody Information

Analysis Recd 010819 1754

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY

Project Name:	Kemps Creek, 144-228 Aldington Rd, PSI			**To:**	Envirolab Services
Project No:	92361.01	**Sampler:**	Cindy Murphy		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	Rod Gray	**Mob. Phone:**	0427 102 041	**Attn:**	
Email:	Cindy.Murphy@DouglasPartners.com.au; Rod.Gray@DouglasPartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - Soil, W - Water, M - Material)	Container Type (G - Glass, P - Plastic)	Analytes									# 222854 Notes/preservation
					METALS	PAH	TRH & BTEX	OCP	OPP & PCB	PHENOLS	Ph & CEC	ASBESTOS (50 g)	ASBESTOS	
SS1	1	30.7.19	S	G	x	x	x	x				x		combo 5a
SS2	2	30.7.19	S	G	x	x	x					x		combo 3a
SS3	3	30.7.19	S	G	x	x	x	x	x	x		x		combo 8a
SS4	4	30.7.19	S	G	x	x	x							combo 3
SS5	5	30.7.19	S	G	x	x	x	x				x		combo 5a
SS6	6	30.7.19	S	G	x	x	x	x				x		combo 5a
SS7	7	30.7.19	S	G	x	x	x	x	x			x		combo 6a
SS8	8	30.7.19	S	G	x	x	x	x						combo 5
SS9	9	30.7.19	S	G				x						
SS10	10	30.7.19	S	G	x	x	x	x				x		combo 6a
SS11	11	30.7.19	S	G				x			x			
SS12	12	30.7.19	S	G				x						
SS13	13	30.7.19	S	G	x	x	x	x	x	x		x		combo 8a
SS14	14	30.7.19	S	G	x	x						x		
SS15	15	30.7.19	S	G	x	x	x	x	x			x		combo 6a
SS16	16	30.7.19	S	G				x	x		x			

Lab Report No:		**Note:**	
Send Results to:	Douglas Partners Pty Ltd	**Address:** 18 Waler Crescent, Smeaton Grange 2567	**Phone:** (02) 4647 0075 **Fax:** (02) 4646 1886
Relinquished by:	Cindy Murphy	**Transported to laboratory by:**	
Signed:	**Date & Time:** 31.7.19	**Received by:**	

Analysis Recd 01819 1754

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY

Project Name:	Kemps Creek, 144-228 Aldington Rd, PSI			**To:**	Envirolab Services
Project No:	92361.01	**Sampler:**	Cindy Murphy		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	Rod Gray	**Mob. Phone:**	0427 102 041	**Attn:**	
Email:	Cindy.Murphy@DouglasPartners.com.au; Rod.Gray@DouglasPartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - Soil, W - Water, M - Material)	Container Type (G - Glass, P - Plastic)	Analytes: METALS	PAH	TRH & BTEX	OCP	OPP & PCB	PHENOLS	Ph & CEC	ASBESTOS (50 g)	ASBESTOS	#222854 Notes/preservation
SS17	17	30.7.19	S	G		x								
SS18	18	30.7.19	S	G		x	x							
SS19	19	30.7.19	S	G		x								
SS20	20	30.7.19	S	G	x	x	x	x	x	x		x		**combo 8a**
SS21	21	30.7.19	S	G	x	x	x	x	x			x		**combo 6a**
SS22	22	30.7.19	S	G	x	x	x	x				x		**combo 5a**
SS23	23	30.7.19	S	G	x	x	x	x				x		**combo 5a**
SS24	24	30.7.19	S	G	x			x				x		
MAT-1	25	30.7.19	M	P									x	
MAT-2	26	30.7.19	M	P										**hold**
MAT-4	27	30.7.20	M	P									x	
BD1	28	30.7.21	S	G										
BD2	29	30.7.22	S	G		x								
MAT3	31	300719											x	
BD3	30	300719												

Lab Report No:		**Note:**	
Send Results to:	Douglas Partners Pty Ltd	**Address:** 18 Waler Crescent, Smeaton Grange 2567	**Phone:** (02) 4647 0075 **Fax:** (02) 4646 1886
Relinquished by:	Cindy Murphy	**Transported to laboratory by:**	
Signed:	**Date & Time:** 31.7.19	**Received by:**	

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Kemps Creek, 144-228 Aldington Rd, PSI			**To:**	Envirolab Services
Project No:	92361.01	**Sampler:**	Cindy Murphy		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	Rod Gray	**Mob. Phone:**	0427 102 041	**Attn:**	
Email:	Cindy.Murphy@DouglasPartners.com.au; Rod.Gray@DouglasPartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - Soil, W - Water, M - Material)	Container Type (G - Glass, P - Plastic)	Analytes: METALS	PAH	TRH & BTEX	OCP	OPP & PCB	PHENOLS	Ph & CEC	ASBESTOS		Notes/preservation
SS1	1	30.7.19	S	G										
SS2	2	30.7.19	S	G										
SS3	3	30.7.19	S	G										
SS4	4	30.7.19	S	G										
SS5	5	30.7.19	S	G										
SS6	6	30.7.19	S	G										
SS7	7	30.7.19	S	G										
SS8	8	30.7.19	S	G										
SS9	9	30.7.19	S	G										
SS10	10	30.7.19	S	G										
SS11	11	30.7.19	S	G										
SS12	12	30.7.19	S	G										
SS13	13	30.7.19	S	G										
SS14	14	30.7.19	S	G										
SS15	15	30.7.19	S	G										
SS16	16	30.7.19	S	G										

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

Job No: 222854
Date Received: 31.07.19
Time Received: 16:54
Received by: TC
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Lab Report No:		**Note:**	
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567	**Phone:** (02) 4647 0075 **Fax:** (02) 4646 1886
Relinquished by:	Cindy Murphy	**Transported to laboratory by:**	
Signed:	**Date & Time:** 31.7.19	**Received by:** ELS, Truncated courier	31.07.19.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY

Project Name:	Kemps Creek, 144-228 Aldington Rd, PSI			**To:**	Envirolab Services
Project No:	92361.01	**Sampler:**	Cindy Murphy		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	Rod Gray	**Mob. Phone:**	0427 102 041	**Attn:**	
Email:	Cindy.Murphy@DouglasPartners.com.au; Rod.Gray@DouglasPartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - Soil, W - Water, M - Material)	Container Type (G - Glass, P - Plastic)	Analytes: METALS	PAH	TRH & BTEX	OCP	OPP & PCB	PHENOLS	Ph & CEC	ASBESTOS		Notes/preservation
SS17	17	30.7.19	S	G										
SS18	18	30.7.19	S	G										
SS19	19	30.7.19	S	G										
SS20	20	30.7.19	S	G										
SS21	21	30.7.19	S	G										
SS22	22	30.7.19	S	G										
SS23	23	30.7.19	S	G										
SS24	24	30.7.19	S	G										
MAT-1	25	30.7.19	M	P										
MAT-2	26	30.7.19	M	P										
MAT-4	27	30.7.19	M	P										
BD1 recd broken env.	28	30.7.19	S	G										
BD2	29	30.7.19	S	G										
BD3	30	30.7.19	S	G										
MAT-3	31	30.7.19	S	G										

Lab Report No:		**Note:**	
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567	**Phone:** (02) 4647 0075 **Fax:** (02) 4646 1886
Relinquished by:	Cindy Murphy	**Transported to laboratory by:**	
Signed:	**Date & Time:** 31.7.19	**Received by:** ELS Mitulad Comales	

222854

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Rod Gray, Cindy Murphy

Sample Login Details

Your reference	92361.01, Kemps Creek, 144-228 Aldington Rd PSI
Envirolab Reference	222854
Date Sample Received	31/08/2019
Date Instructions Received	02/08/2019
Date Results Expected to be Reported	08/08/2019

Sample Condition

Samples received in appropriate condition for analysis	No
No. of Samples Provided	27 Soil, 4 Material
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	13.9
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Sample SS19 was received broken but retrieved, additionally sample BD1 also received broken but could not salvaged.

Please contact the laboratory within 24 hours if you wish to cancel the aformentioned testing. Otherwise testing will proceed as per the COC and hence invoice accordingly.

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticidesin soil	Organophosphorus Pesticides	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils	Misc Soil - Inorg	Misc Inorg - Soil	CEC	Asbestos ID - materials	On Hold
SS1	✓	✓	✓	✓		✓	✓	✓					
SS2	✓	✓	✓				✓	✓					
SS3	✓	✓	✓	✓	✓	✓	✓	✓	✓				
SS4	✓	✓	✓				✓						
SS5	✓	✓	✓	✓		✓	✓	✓					
SS6	✓	✓	✓	✓		✓	✓	✓					
SS7	✓	✓	✓	✓	✓	✓	✓	✓					
SS8	✓	✓	✓	✓		✓	✓						
SS9				✓									
SS10	✓	✓	✓	✓	✓	✓	✓	✓					
SS11				✓						✓	✓		
SS12				✓									
SS13	✓	✓	✓	✓	✓	✓	✓	✓	✓				
SS14			✓				✓	✓					
SS15	✓	✓	✓	✓	✓	✓	✓	✓					
SS16				✓	✓	✓				✓	✓		
SS17			✓										
SS18	✓	✓	✓										
SS19			✓										
SS20	✓	✓	✓	✓	✓	✓	✓	✓	✓				
SS21	✓	✓	✓	✓	✓	✓	✓	✓					
SS22	✓	✓	✓	✓		✓	✓	✓					
SS23	✓	✓	✓	✓		✓	✓	✓					
SS24				✓			✓	✓					
MAT-1												✓	
MAT-2													✓
MAT-4												✓	
BD1													✓
BD2			✓										
BD3													✓
MAT3												✓	

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

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 222854

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Rod Gray, Cindy Murphy
Address	18 Waler Crescent, Smeaton Grange, NSW, 2567

Sample Details

Your Reference	**92361.01, Kemps Creek, 144-228 Aldington Rd PSI**
Number of Samples	27 Soil, 4 Material
Date samples received	31/08/2019
Date completed instructions received	02/08/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	08/08/2019
Date of Issue	08/08/2019

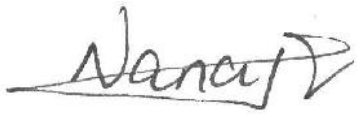
NATA Accreditation Number 2901. This document shall not be reproduced except in full.

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

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Panika Wongchanda, Wonnie Condos
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Jaimie Loa-Kum-Cheung, Metals Supervisor
Lucy Zhu, Senior Asbestos Analyst
Nick Sarlamis, Inorganics Supervisor
Steven Luong, Organics Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		222854-1	222854-2	222854-3	222854-4	222854-5
Your Reference	UNITS	SS1	SS2	SS3	SS4	SS5
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	128	110	93	117	106

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		222854-6	222854-7	222854-8	222854-10	222854-13
Your Reference	UNITS	SS6	SS7	SS8	SS10	SS13
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	130	123	102	123	109

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		222854-15	222854-18	222854-20	222854-21	222854-22
Your Reference	UNITS	SS15	SS18	SS20	SS21	SS22
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	98	120	124	128	121

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		222854-23	222854-30
Your Reference	UNITS	SS23	BD3
Date Sampled		30/07/2019	30/07/2019
Type of sample		Soil	Soil
Date extracted	-	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<3	<3
Surrogate aaa-Trifluorotoluene	%	126	95

svTRH (C10-C40) in Soil						
Our Reference		222854-1	222854-2	222854-3	222854-4	222854-5
Your Reference	UNITS	SS1	SS2	SS3	SS4	SS5
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	07/08/2019	07/08/2019	07/08/2019	07/08/2019	07/08/2019
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	120
TRH C_{15} - C_{28}	mg/kg	<100	160	<100	<100	910
TRH C_{29} - C_{36}	mg/kg	<100	<100	170	130	860
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	170
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	170
TRH >C_{16} -C_{34}	mg/kg	<100	180	190	170	1,500
TRH >C_{34} -C_{40}	mg/kg	<100	<100	120	<100	560
Total +ve TRH (>C10-C40)	mg/kg	<50	180	310	170	2,200
Surrogate o-Terphenyl	%	92	132	103	95	#

svTRH (C10-C40) in Soil						
Our Reference		222854-6	222854-7	222854-8	222854-10	222854-13
Your Reference	UNITS	SS6	SS7	SS8	SS10	SS13
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	07/08/2019	07/08/2019	07/08/2019	07/08/2019	07/08/2019
TRH C_{10} - C_{14}	mg/kg	50	<50	51	<50	50
TRH C_{15} - C_{28}	mg/kg	120	120	320	<100	200
TRH C_{29} - C_{36}	mg/kg	140	150	440	<100	270
TRH >C_{10} -C_{16}	mg/kg	56	<50	66	<50	67
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	56	<50	66	<50	67
TRH >C_{16} -C_{34}	mg/kg	210	220	630	<100	360
TRH >C_{34} -C_{40}	mg/kg	100	100	220	<100	240
Total +ve TRH (>C10-C40)	mg/kg	370	320	910	<50	670
Surrogate o-Terphenyl	%	110	100	#	108	123

svTRH (C10-C40) in Soil						
Our Reference		222854-15	222854-18	222854-20	222854-21	222854-22
Your Reference	UNITS	SS15	SS18	SS20	SS21	SS22
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	07/08/2019	08/08/2019	08/08/2019	08/08/2019	08/08/2019
TRH C_{10} - C_{14}	mg/kg	<50	<50	110	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	1,000	720	110	<100
TRH C_{29} - C_{36}	mg/kg	<100	770	980	290	140
TRH >C_{10} -C_{16}	mg/kg	<50	72	160	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	72	160	<50	<50
TRH >C_{16} -C_{34}	mg/kg	120	1,700	1,400	320	150
TRH >C_{34} -C_{40}	mg/kg	<100	220	490	120	<100
Total +ve TRH (>C10-C40)	mg/kg	120	2,000	2,100	440	150
Surrogate o-Terphenyl	%	111	126	#	112	92

svTRH (C10-C40) in Soil			
Our Reference		222854-23	222854-30
Your Reference	UNITS	SS23	BD3
Date Sampled		30/07/2019	30/07/2019
Type of sample		Soil	Soil
Date extracted	-	05/08/2019	05/08/2019
Date analysed	-	08/08/2019	08/08/2019
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	150	150
TRH C_{29} - C_{36}	mg/kg	120	350
TRH >C_{10} -C_{16}	mg/kg	50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	50	<50
TRH >C_{16} -C_{34}	mg/kg	220	400
TRH >C_{34} -C_{40}	mg/kg	<100	120
Total +ve TRH (>C10-C40)	mg/kg	270	520
Surrogate o-Terphenyl	%	117	83

PAHs in Soil						
Our Reference		222854-1	222854-2	222854-3	222854-4	222854-5
Your Reference	UNITS	SS1	SS2	SS3	SS4	SS5
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.8
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.3	<0.1	0.6
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	1	0.2	0.1
Pyrene	mg/kg	<0.1	<0.1	0.8	0.4	0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.4	0.2	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.5	0.5	0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	0.7	2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.4	0.56	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.2	0.4	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.2	0.3	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	4.3	4.7	1.7
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	0.9	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	0.5	0.9	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	0.6	0.9	<0.5
Surrogate p-Terphenyl-d14	%	89	100	97	98	100

PAHs in Soil						
Our Reference		222854-6	222854-7	222854-8	222854-10	222854-13
Your Reference	UNITS	SS6	SS7	SS8	SS10	SS13
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	0.3
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	97	101	103	96	104

PAHs in Soil						
Our Reference		222854-14	222854-15	222854-17	222854-18	222854-19
Your Reference	UNITS	SS14	SS15	SS17	SS18	SS19
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	1.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	1.6	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	10	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	16	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	37	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	53	0.2
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	110	0.3
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	39	0.4
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	13	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	5.8	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	10	0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	300	1.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	61	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	61	0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	61	0.6
Surrogate p-Terphenyl-d14	%	94	100	98	107	99

PAHs in Soil						
Our Reference		222854-20	222854-21	222854-22	222854-23	222854-29
Your Reference	UNITS	SS20	SS21	SS22	SS23	BD2
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Naphthalene	mg/kg	0.8	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.5	0.2	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.3	<0.1	<0.1	<0.1	0.3
Benzo(b,j+k)fluoranthene	mg/kg	0.3	<0.2	<0.2	<0.2	0.5
Benzo(a)pyrene	mg/kg	0.08	<0.05	<0.05	<0.05	0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	<0.1	<0.1	<0.1	0.1
Total +ve PAH's	mg/kg	2.9	0.2	<0.05	<0.05	1.5
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.6
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.6
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.7
Surrogate p-Terphenyl-d14	%	97	97	96	95	96

PAHs in Soil		
Our Reference		222854-30
Your Reference	UNITS	BD3
Date Sampled		30/07/2019
Type of sample		Soil
Date extracted	-	05/08/2019
Date analysed	-	06/08/2019
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d14	%	90

Organochlorine Pesticides in soil						
Our Reference		222854-1	222854-3	222854-5	222854-6	222854-7
Your Reference	UNITS	SS1	SS3	SS5	SS6	SS7
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	111	103	103	104	102

Organochlorine Pesticides in soil						
Our Reference		222854-8	222854-9	222854-10	222854-11	222854-12
Your Reference	UNITS	SS8	SS9	SS10	SS11	SS12
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	1.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	0.8	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	103	104	102	105

Organochlorine Pesticides in soil						
Our Reference		222854-13	222854-15	222854-16	222854-20	222854-21
Your Reference	UNITS	SS13	SS15	SS16	SS20	SS21
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	108	105	102	100	97

Organochlorine Pesticides in soil					
Our Reference		222854-22	222854-23	222854-24	222854-30
Your Reference	UNITS	SS22	SS23	SS24	BD3
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	101	101	97	95

Organophosphorus Pesticides						
Our Reference		222854-3	222854-7	222854-10	222854-13	222854-15
Your Reference	UNITS	SS3	SS7	SS10	SS13	SS15
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	102	104	108	105

Organophosphorus Pesticides					
Our Reference		222854-16	222854-20	222854-21	222854-30
Your Reference	UNITS	SS16	SS20	SS21	BD3
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	100	97	95

PCBs in Soil						
Our Reference		222854-1	222854-3	222854-5	222854-6	222854-7
Your Reference	UNITS	SS1	SS3	SS5	SS6	SS7
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	111	103	103	104	102

PCBs in Soil						
Our Reference		222854-8	222854-10	222854-13	222854-15	222854-16
Your Reference	UNITS	SS8	SS10	SS13	SS15	SS16
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	104	108	105	102

PCBs in Soil						
Our Reference		222854-20	222854-21	222854-22	222854-23	222854-30
Your Reference	UNITS	SS20	SS21	SS22	SS23	BD3
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	97	101	101	95

Acid Extractable metals in soil						
Our Reference		222854-1	222854-2	222854-3	222854-4	222854-5
Your Reference	UNITS	SS1	SS2	SS3	SS4	SS5
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Arsenic	mg/kg	7	16	<4	7	6
Cadmium	mg/kg	<0.4	<0.4	0.7	<0.4	4.1
Chromium	mg/kg	30	19	170	18	19
Copper	mg/kg	17	24	200	28	110
Lead	mg/kg	73	12	59	21	43
Mercury	mg/kg	0.2	<0.1	<0.1	0.2	0.4
Nickel	mg/kg	7	19	51	13	9
Zinc	mg/kg	110	60	350	150	380

Acid Extractable metals in soil						
Our Reference		222854-6	222854-7	222854-8	222854-10	222854-13
Your Reference	UNITS	SS6	SS7	SS8	SS10	SS13
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Arsenic	mg/kg	7	8	4	9	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	2
Chromium	mg/kg	16	20	16	23	20
Copper	mg/kg	30	50	150	13	71
Lead	mg/kg	14	23	13	17	24
Mercury	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	8	7	8	4	8
Zinc	mg/kg	160	50	160	67	110

Acid Extractable metals in soil						
Our Reference		222854-14	222854-15	222854-20	222854-21	222854-22
Your Reference	UNITS	SS14	SS15	SS20	SS21	SS22
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Arsenic	mg/kg	230	9	5	5	8
Cadmium	mg/kg	<0.4	0.9	5.6	<0.4	<0.4
Chromium	mg/kg	40	17	16	11	16
Copper	mg/kg	79	63	31	23	41
Lead	mg/kg	20	110	35	15	23
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	12	11	11	8	15
Zinc	mg/kg	180	2,400	780	130	220

Acid Extractable metals in soil					
Our Reference		222854-23	222854-24	222854-30	222854-32
Your Reference	UNITS	SS23	SS24	BD3	SS15 - [TRIPLICATE]
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Arsenic	mg/kg	10	9	6	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	1
Chromium	mg/kg	19	15	11	19
Copper	mg/kg	88	64	24	41
Lead	mg/kg	26	17	14	76
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	9	10	9	11
Zinc	mg/kg	110	63	130	1,600

Moisture						
Our Reference		222854-1	222854-2	222854-3	222854-4	222854-5
Your Reference	UNITS	SS1	SS2	SS3	SS4	SS5
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Moisture	%	9.3	7.3	16	13	21

Moisture						
Our Reference		222854-6	222854-7	222854-8	222854-9	222854-10
Your Reference	UNITS	SS6	SS7	SS8	SS9	SS10
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Moisture	%	8.7	11	21	11	9.7

Moisture						
Our Reference		222854-11	222854-12	222854-13	222854-14	222854-15
Your Reference	UNITS	SS11	SS12	SS13	SS14	SS15
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Moisture	%	10	6.0	28	12	28

Moisture						
Our Reference		222854-16	222854-17	222854-18	222854-19	222854-20
Your Reference	UNITS	SS16	SS17	SS18	SS19	SS20
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Moisture	%	5.4	15	11	5.5	7.7

Moisture						
Our Reference		222854-21	222854-22	222854-23	222854-24	222854-29
Your Reference	UNITS	SS21	SS22	SS23	SS24	BD2
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Moisture	%	6.0	14	13	8.0	4.1

Moisture		
Our Reference		222854-30
Your Reference	UNITS	BD3
Date Sampled		30/07/2019
Type of sample		Soil
Date prepared	-	05/08/2019
Date analysed	-	06/08/2019
Moisture	%	8.1

Asbestos ID - soils						
Our Reference		222854-1	222854-2	222854-3	222854-5	222854-6
Your Reference	UNITS	SS1	SS2	SS3	SS5	SS6
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Sample mass tested	g	Approx. 35g	Approx. 55g	Approx. 40g	Approx. 20g	Approx. 30g
Sample Description	-	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		222854-7	222854-10	222854-13	222854-14	222854-15
Your Reference	UNITS	SS7	SS10	SS13	SS14	SS15
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Sample mass tested	g	Approx. 45g	Approx. 50g	Approx. 35g	Approx. 30g	Approx. 45g
Sample Description	-	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		222854-20	222854-21	222854-22	222854-23	222854-24
Your Reference	UNITS	SS20	SS21	SS22	SS23	SS24
Date Sampled		30/07/2019	30/07/2019	30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Sample mass tested	g	Approx. 30g	Approx. 40g	Approx. 30g	Approx. 30g	Approx. 45g
Sample Description	-	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected Synthetic mineral fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Misc Soil - Inorg				
Our Reference		222854-3	222854-13	222854-20
Your Reference	UNITS	SS3	SS13	SS20
Date Sampled		30/07/2019	30/07/2019	30/07/2019
Type of sample		Soil	Soil	Soil
Date prepared	-	05/08/2019	05/08/2019	05/08/2019
Date analysed	-	05/08/2019	05/08/2019	05/08/2019
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5

Misc Inorg - Soil			
Our Reference		222854-11	222854-16
Your Reference	UNITS	SS11	SS16
Date Sampled		30/07/2019	30/07/2019
Type of sample		Soil	Soil
Date prepared	-	06/08/2019	06/08/2019
Date analysed	-	06/08/2019	06/08/2019
pH 1:5 soil:water	pH Units	6.9	6.4

CEC			
Our Reference		222854-11	222854-16
Your Reference	UNITS	SS11	SS16
Date Sampled		30/07/2019	30/07/2019
Type of sample		Soil	Soil
Date prepared	-	07/08/2019	07/08/2019
Date analysed	-	07/08/2019	07/08/2019
Exchangeable Ca	meq/100g	4.8	4.6
Exchangeable K	meq/100g	3.6	0.7
Exchangeable Mg	meq/100g	5.6	4.9
Exchangeable Na	meq/100g	0.26	0.25
Cation Exchange Capacity	meq/100g	14	10

Asbestos ID - materials				
Our Reference		222854-25	222854-27	222854-31
Your Reference	UNITS	MAT-1	MAT-4	MAT3
Date Sampled		30/07/2019	30/07/2019	30/07/2019
Type of sample		Material	Material	Material
Date analysed	-	06/08/2019	06/08/2019	06/08/2019
Mass / Dimension of Sample	-	35x25x4mm	40x30x5mm	110x80x5mm
Sample Description	-	Grey fibre cement material	Grey fibre cement material	Beige fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Amosite asbestos detected	Chrysotile asbestos detected	No asbestos detected Organic fibres detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.

Method ID	Methodology Summary
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	222854-7
Date extracted	-			05/08/2019	3	05/08/2019	05/08/2019		05/08/2019	05/08/2019
Date analysed	-			06/08/2019	3	06/08/2019	06/08/2019		06/08/2019	06/08/2019
TRH C_6 - C_9	mg/kg	25	Org-016	<25	3	<25	<25	0	121	110
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	3	<25	<25	0	121	110
Benzene	mg/kg	0.2	Org-016	<0.2	3	<0.2	<0.2	0	99	82
Toluene	mg/kg	0.5	Org-016	<0.5	3	<0.5	<0.5	0	132	129
Ethylbenzene	mg/kg	1	Org-016	<1	3	<1	<1	0	120	107
m+p-xylene	mg/kg	2	Org-016	<2	3	<2	<2	0	127	116
o-Xylene	mg/kg	1	Org-016	<1	3	<1	<1	0	127	114
naphthalene	mg/kg	1	Org-014	<1	3	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	128	3	93	121	26	124	106

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	05/08/2019	05/08/2019		[NT]	[NT]
Date analysed	-			[NT]	15	06/08/2019	06/08/2019		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	[NT]	15	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	[NT]	15	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	15	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	15	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	15	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	15	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	15	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	15	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	15	98	100	2	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	222854-7
Date extracted	-			05/08/2019	3	05/08/2019	05/08/2019		05/08/2019	05/08/2019
Date analysed	-			07/08/2019	3	07/08/2019	07/08/2019		07/08/2019	07/08/2019
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	3	<50	<50	0	138	117
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	3	<100	<100	0	124	100
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	3	170	150	12	100	#
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	3	<50	<50	0	138	117
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	3	190	180	5	124	100
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	3	120	130	8	100	#
Surrogate o-Terphenyl	%		Org-003	91	3	103	111	7	128	100

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	05/08/2019	05/08/2019		[NT]	[NT]
Date analysed	-			[NT]	15	07/08/2019	07/08/2019		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	[NT]	15	<50	59	17	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	[NT]	15	<100	110	10	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	[NT]	15	<100	100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	[NT]	15	<50	66	28	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	[NT]	15	120	170	34	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	[NT]	15	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	15	111	110	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	222854-7
Date extracted	-			05/08/2019	3	05/08/2019	05/08/2019		05/08/2019	05/08/2019
Date analysed	-			06/08/2019	3	06/08/2019	06/08/2019		06/08/2019	06/08/2019
Naphthalene	mg/kg	0.1	Org-012	<0.1	3	<0.1	<0.1	0	124	126
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	3	<0.1	<0.1	0	122	122
Phenanthrene	mg/kg	0.1	Org-012	<0.1	3	0.3	<0.1	100	116	112
Anthracene	mg/kg	0.1	Org-012	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	3	1	<0.1	164	110	108
Pyrene	mg/kg	0.1	Org-012	<0.1	3	0.8	<0.1	156	114	112
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	3	0.4	<0.1	120	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	3	0.5	<0.1	133	108	110
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	3	0.7	<0.2	111	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	3	0.4	<0.05	156	114	122
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	3	0.2	<0.1	67	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	3	0.2	<0.1	67	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	105	3	97	102	5	98	97

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	05/08/2019	05/08/2019		[NT]	[NT]
Date analysed	-			[NT]	15	06/08/2019	06/08/2019		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	15	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	15	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	15	100	100	0	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	222854-7
Date extracted	-			05/08/2019	3	05/08/2019	05/08/2019		05/08/2019	05/08/2019
Date analysed	-			06/08/2019	3	06/08/2019	06/08/2019		06/08/2019	06/08/2019
HCB	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	87	93
gamma-BHC	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	87	83
Heptachlor	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	81	84
delta-BHC	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	92	89
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	90	91
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	93	97
Dieldrin	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	105	110
Endrin	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	86	89
pp-DDD	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	93	95
Endosulfan II	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	83	92
Methoxychlor	mg/kg	0.1	Org-005	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	102	3	103	105	2	96	100

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	8	05/08/2019	05/08/2019		[NT]	[NT]
Date analysed	-			[NT]	8	06/08/2019	06/08/2019		[NT]	[NT]
HCB	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	8	0.5	0.7	33	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-005	[NT]	8	1.1	1.6	37	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	8	0.8	1	22	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-005	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	8	97	99	2	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	05/08/2019	05/08/2019		[NT]	[NT]
Date analysed	-			[NT]	15	06/08/2019	06/08/2019		[NT]	[NT]
HCB	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-005	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	15	105	105	0	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	222854-7
Date extracted	-			05/08/2019	3	05/08/2019	05/08/2019		05/08/2019	05/08/2019
Date analysed	-			06/08/2019	3	06/08/2019	06/08/2019		06/08/2019	06/08/2019
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	121	117
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	90	96
Dimethoate	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	122	115
Fenitrothion	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	110	79
Malathion	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	104	109
Parathion	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	108	109
Ronnel	mg/kg	0.1	Org-008	<0.1	3	<0.1	<0.1	0	109	107
Surrogate TCMX	%		Org-008	102	3	103	105	2	96	100

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	05/08/2019	05/08/2019		[NT]	[NT]
Date analysed	-			[NT]	15	06/08/2019	06/08/2019		[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-008	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-008	[NT]	15	105	105	0	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	222854-7
Date extracted	-			05/08/2019	3	05/08/2019	05/08/2019		05/08/2019	05/08/2019
Date analysed	-			06/08/2019	3	06/08/2019	06/08/2019		06/08/2019	06/08/2019
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	3	<0.1	<0.1	0	102	101
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	102	3	103	105	2	96	100

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	8	05/08/2019	05/08/2019		[NT]	[NT]
Date analysed	-			[NT]	8	06/08/2019	06/08/2019		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	8	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	[NT]	8	97	99	2	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	05/08/2019	05/08/2019		[NT]	[NT]
Date analysed	-			[NT]	15	06/08/2019	06/08/2019		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	[NT]	15	105	105	0	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	222854-7
Date prepared	-			05/08/2019	3	05/08/2019	05/08/2019		05/08/2019	05/08/2019
Date analysed	-			05/08/2019	3	05/08/2019	05/08/2019		05/08/2019	05/08/2019
Arsenic	mg/kg	4	Metals-020	<4	3	<4	<4	0	108	89
Cadmium	mg/kg	0.4	Metals-020	<0.4	3	0.7	0.6	15	101	75
Chromium	mg/kg	1	Metals-020	<1	3	170	200	16	107	84
Copper	mg/kg	1	Metals-020	<1	3	200	210	5	106	102
Lead	mg/kg	1	Metals-020	<1	3	59	63	7	106	74
Mercury	mg/kg	0.1	Metals-021	<0.1	3	<0.1	<0.1	0	94	95
Nickel	mg/kg	1	Metals-020	<1	3	51	50	2	105	80
Zinc	mg/kg	1	Metals-020	<1	3	350	290	19	108	105

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	15	05/08/2019	05/08/2019		[NT]	[NT]
Date analysed	-			[NT]	15	05/08/2019	05/08/2019		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	15	9	7	25	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	15	0.9	1	11	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	15	17	19	11	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	15	63	37	52	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	15	110	77	35	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	15	11	11	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	15	2400	1400	53	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			05/08/2019	[NT]	[NT]	[NT]	[NT]	05/08/2019	[NT]
Date analysed	-			05/08/2019	[NT]	[NT]	[NT]	[NT]	05/08/2019	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			06/08/2019	16	06/08/2019	06/08/2019		06/08/2019	[NT]
Date analysed	-			06/08/2019	16	06/08/2019	06/08/2019		06/08/2019	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	16	6.4	6.4	0	103	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			07/08/2019	16	07/08/2019	07/08/2019		07/08/2019	[NT]
Date analysed	-			07/08/2019	16	07/08/2019	07/08/2019		07/08/2019	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	16	4.6	4.7	2	103	[NT]
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	16	0.7	0.7	0	101	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	16	4.9	5.2	6	101	[NT]
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	16	0.25	0.26	4	106	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Report Comments

Samples received in good order: No
Sample SS19 was received broken but retrieved, additionally sample BD1 also received broken but could not salvaged.

Asbestos: A portion of the supplied samples were sub-sampled for asbestos
analysis according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples requested for asbestos testing were sub-sampled from jars
provided by the client.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 222854-15 for Cu and Zn. Therefore a triplicate result has been issued as laboratory sample number 222854-32.

TRH Soil C10-C40 NEPM - # Percent recovery for the surrogate in samples 222854-5, 8, and 20.
matrix spike in sample 222854-7 is not possible to report as the high concentration of analytes have caused interference.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	KEMPS CREEK, Proposed Commercial/Industrial Subdivision			**To:**	Envirolab Services
Project No:	92364.00	**Sampler:**	Adad Barkho		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	Rod Gray/Cindy Murphy	**Mob. Phone:**	0437396499	**Attn:**	Tania Notaras
Email:	adad.barkho@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes									Notes/preservation
					Metals	PAH	TRH & BTEX	OCP	OPP & PCB	Asbestos	CEC		Hold	
TP2/0.1	1	30/07/19	S	P/G				x						
TP6/0.1	2	30/07/19	S	P/G									x	
BH7/0.1	3	30/07/19	S	P/G									x	Labelled 92364.01
TP8/0.1	4	31/07/19	S	P/G	x					x				
TP9/0.1	5	30/07/19	S	P/G	x		x			x				
TP10/0.1	6	31/07/19	S	P/G	x	x	x	x		x				
TP14/0.1	7	31/07/19	S	P/G	x			x		x				
TP15/0.1	8	31/07/19	S	P/G									x	
TP16/0.2	9	31/07/19	S	P/G									x	
TP17/0.1	10	31/07/19	S	P/G									x	
TP18/0.1	11	31/07/19	S	P/G									x	
TP26/0.1	12	31/07/19	S	P/G									x	
SS25/0.1	13	31/07/19	S	P/G	x	x	x			x				

Lab Report No:	222967				
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567		**Phone:** (02) 4647 0075	**Fax:** (02) 4646 1886
Relinquished by:	Adad Barkho		**Transported to laboratory by:**		
Signed:		**Date & Time:** 1/08/2019	**Received by:**		

Douglas Partners
Geotechnics I Environment I Groundwater

CHAIN OF CUSTODY

Project Name:	KEMPS CREEK, Proposed Commercial/Industrial Subdivision	**To:**	Envirolab Services
Project No:	92364.00		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	Rod Gray/Cindy Murphy	**Attn:**	Tania Notaras
Email:	adad.barkho@douglaspartners.com.au	**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard	**Email:**	tnotaras@envirolabservices.com.au
Sampler:	Adad Barkho		
Mob. Phone:	0437396499		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Metals	PAH	TRH & BTEX	OCP	OPP & PCB	Asbestos	CEC		Hold	Notes/preservation
SS27/0.1	14	31/07/19	S	P/G	x		x	x		x				
Count				14										

Lab Report No:	222967				
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567		**Phone:** (02) 4647 0075	**Fax:** (02) 4646 1886
Relinquished by:	Adad Barkho		**Transported to laboratory by:**		
Signed:		**Date & Time:** 1/08/2019	**Received by:**		

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY

Project Name:	KEMPS CREEK, Proposed Commercial/Industrial Subdivision			**To:**	Envirolab Services
Project No:	92364.00	**Sampler:**	Adad Barkho		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	Rod Gray/Cindy Murphy	**Mob. Phone:**	0437396499	**Attn:**	Tania Notaras
Email:	adad.barkho@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes									Notes/preservation
TP2/0.1	1	30/07/19	S	P/G										
TP6/0.1	2	30/07/19	S	P/G										
BH7/0.1	3	30/07/19	S	P/G										Labelled 92364.01
TP8/0.1	4	31/07/19	S	P/G										
TP9/0.1	5	30/07/19	S	P/G										
TP10/0.1	6	31/07/19	S	P/G										
TP14/0.1	7	31/07/19	S	P/G										
TP15/0.1	8	31/07/19	S	P/G										
TP16/0.2	9	31/07/19	S	P/G										
TP17/0.1	10	31/07/19	S	P/G										
TP18/0.1	11	31/07/19	S	P/G										
TP26/0.1	12	31/07/19	S	P/G										
SS25/0.1	13	31/07/19	S	P/G										

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

Job No: 222967
Date Received: 01/08/19
Time Received: 16:27
Received by: SB
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Lab Report No:			
Send Results to:	Douglas Partners Pty Ltd	**Address:** 18 Waler Crescent, Smeaton Grange 2567	**Phone:** (02) 4647 0075 **Fax:** (02) 4646 1886
Relinquished by:	Adad Barkho	**Transported to laboratory by:**	
Signed:		**Date & Time:** 1.2pm 1/08/2019	**Received by:** S Bolton

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	KEMPS CREEK, Proposed Commercial/Industrial Subdivision			**To:**	Envirolab Services
Project No:	92364.00	**Sampler:**	Adad Barkho		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	Rod Gray/Cindy Murphy	**Mob. Phone:**	0437396499	**Attn:**	Tania Notaras
Email:	adad.barkho@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes									Notes/preservation
SS27/0.1	14	31/07/19	S	P/G										
Count				14										

Lab Report No:					
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567		**Phone:** (02) 4647 0075	**Fax:** (02) 4646 1886
Relinquished by:	Adad Barkho		**Transported to laboratory by:**		
Signed:		**Date & Time:** 1:30pm 1/08/2019	**Received by:**		

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Adad Barkho, Rod Gray, Cindy Murphy

Sample Login Details

Your reference	92364.00
Envirolab Reference	222967
Date Sample Received	01/08/2019
Date Instructions Received	01/08/2019
Date Results Expected to be Reported	08/08/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	14 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	14.3
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticidesin soil	Acid Extractable metalsin soil	Asbestos ID - soils	On Hold
TP2/0.1				✓			
TP6/0.1							✓
TP7/0.1							✓
TP8/0.1					✓	✓	
TP9/0.1	✓	✓			✓	✓	
TP10/0.1	✓	✓	✓	✓	✓	✓	
TP14/0.1				✓	✓	✓	
TP15/0.1							✓
TP16/0.2							✓
TP17/0.1							✓
TP18/0.1							✓
TP26/0.1							✓
SS25/0.1	✓	✓	✓		✓	✓	
SS27/0.1	✓	✓		✓	✓	✓	

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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 222967

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Adad Barkho, Rod Gray, Cindy Murphy
Address	18 Waler Crescent, Smeaton Grange, NSW, 2567

Sample Details

Your Reference	**92364.00**
Number of Samples	14 Soil
Date samples received	01/08/2019
Date completed instructions received	01/08/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	08/08/2019
Date of Issue	07/08/2019

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

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

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Jaimie Loa-Kum-Cheung, Metals Supervisor
Lucy Zhu, Senior Asbestos Analyst
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		222967-5	222967-6	222967-13	222967-14
Your Reference	UNITS	TP9/0.1	TP10/0.1	SS25/0.1	SS27/0.1
Date Sampled		31/07/2019	31/07/2019	31/07/2019	31/07/2019
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	02/08/2019	02/08/2019	02/08/2019	02/08/2019
Date analysed	-	03/08/2019	03/08/2019	03/08/2019	03/08/2019
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	105	92	95	101

svTRH (C10-C40) in Soil					
Our Reference		222967-5	222967-6	222967-13	222967-14
Your Reference	UNITS	TP9/0.1	TP10/0.1	SS25/0.1	SS27/0.1
Date Sampled		31/07/2019	31/07/2019	31/07/2019	31/07/2019
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	02/08/2019	02/08/2019	02/08/2019	02/08/2019
Date analysed	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	80	86	85	76

PAHs in Soil			
Our Reference		222967-6	222967-13
Your Reference	UNITS	TP10/0.1	SS25/0.1
Date Sampled		31/07/2019	31/07/2019
Type of sample		Soil	Soil
Date extracted	-	02/08/2019	02/08/2019
Date analysed	-	03/08/2019	03/08/2019
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	97	96

Organochlorine Pesticides in soil					
Our Reference		222967-1	222967-6	222967-7	222967-14
Your Reference	UNITS	TP2/0.1	TP10/0.1	TP14/0.1	SS27/0.1
Date Sampled		30/07/2019	31/07/2019	31/07/2019	31/07/2019
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	02/08/2019	02/08/2019	02/08/2019	02/08/2019
Date analysed	-	03/08/2019	03/08/2019	03/08/2019	03/08/2019
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	90	87	90

Acid Extractable metals in soil						
Our Reference		222967-4	222967-5	222967-6	222967-7	222967-13
Your Reference	UNITS	TP8/0.1	TP9/0.1	TP10/0.1	TP14/0.1	SS25/0.1
Date Sampled		31/07/2019	31/07/2019	31/07/2019	31/07/2019	31/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	02/08/2019	02/08/2019	02/08/2019	02/08/2019	02/08/2019
Date analysed	-	02/08/2019	02/08/2019	02/08/2019	02/08/2019	02/08/2019
Arsenic	mg/kg	6	5	<4	9	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	16	4	7	17	18
Copper	mg/kg	25	59	24	48	26
Lead	mg/kg	24	7	54	18	56
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	12	2	9	11	15
Zinc	mg/kg	41	9	74	190	400

Acid Extractable metals in soil		
Our Reference		222967-14
Your Reference	UNITS	SS27/0.1
Date Sampled		31/07/2019
Type of sample		Soil
Date prepared	-	02/08/2019
Date analysed	-	02/08/2019
Arsenic	mg/kg	5
Cadmium	mg/kg	<0.4
Chromium	mg/kg	13
Copper	mg/kg	40
Lead	mg/kg	18
Mercury	mg/kg	0.2
Nickel	mg/kg	18
Zinc	mg/kg	450

Moisture						
Our Reference		222967-1	222967-4	222967-5	222967-6	222967-7
Your Reference	UNITS	TP2/0.1	TP8/0.1	TP9/0.1	TP10/0.1	TP14/0.1
Date Sampled		30/07/2019	31/07/2019	31/07/2019	31/07/2019	31/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	02/08/2019	02/08/2019	02/08/2019	02/08/2019	02/08/2019
Date analysed	-	05/08/2019	05/08/2019	05/08/2019	05/08/2019	05/08/2019
Moisture	%	11	14	13	9.2	21

Moisture			
Our Reference		222967-13	222967-14
Your Reference	UNITS	SS25/0.1	SS27/0.1
Date Sampled		31/07/2019	31/07/2019
Type of sample		Soil	Soil
Date prepared	-	02/08/2019	02/08/2019
Date analysed	-	05/08/2019	05/08/2019
Moisture	%	17	17

Asbestos ID - soils						
Our Reference		222967-4	222967-5	222967-6	222967-7	222967-13
Your Reference	UNITS	TP8/0.1	TP9/0.1	TP10/0.1	TP14/0.1	SS25/0.1
Date Sampled		31/07/2019	31/07/2019	31/07/2019	31/07/2019	31/07/2019
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	06/08/2019	06/08/2019	06/08/2019	06/08/2019	06/08/2019
Sample mass tested	g	Approx. 35g	Approx. 35g	Approx. 30g	Approx. 25g	Approx. 20g
Sample Description	-	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils		
Our Reference		222967-14
Your Reference	UNITS	SS27/0.1
Date Sampled		31/07/2019
Type of sample		Soil
Date analysed	-	06/08/2019
Sample mass tested	g	Approx. 50g
Sample Description	-	Brown clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.

Method ID	Methodology Summary
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			02/08/2019	[NT]	[NT]	[NT]	[NT]	02/08/2019	[NT]
Date analysed	-			03/08/2019	[NT]	[NT]	[NT]	[NT]	03/08/2019	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	96	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	96	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	80	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	98	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	100	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	114	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			02/08/2019	[NT]	[NT]	[NT]	[NT]	02/08/2019	[NT]
Date analysed	-			05/08/2019	[NT]	[NT]	[NT]	[NT]	05/08/2019	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	113	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	113	[NT]
Surrogate o-Terphenyl	%		Org-003	80	[NT]	[NT]	[NT]	[NT]	120	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			02/08/2019	[NT]	[NT]	[NT]	[NT]	02/08/2019	[NT]
Date analysed	-			03/08/2019	[NT]	[NT]	[NT]	[NT]	03/08/2019	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	110	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	98	[NT]	[NT]	[NT]	[NT]	96	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			02/08/2019	[NT]	[NT]	[NT]	[NT]	02/08/2019	[NT]
Date analysed	-			03/08/2019	[NT]	[NT]	[NT]	[NT]	03/08/2019	[NT]
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	124	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	130	[NT]
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	70	[NT]
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-005	93	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date prepared	-			02/08/2019	[NT]	[NT]	[NT]	[NT]	02/08/2019	[NT]
Date analysed	-			02/08/2019	[NT]	[NT]	[NT]	[NT]	02/08/2019	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	106	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Report Comments

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

Ellen Wandala Gamage

From: Cindy Murphy <Cindy.Murphy@douglaspartners.com.au>
Sent: Tuesday, 6 August 2019 2:00 PM
To: Ellen Wandala Gamage
Subject: RE: Sample Receipt for 222967 92364.00

Ref: 222967-A
TAT: Std
Due: 13/8/19

Hi Ellen,

Thanks for that. Can I please also get the additional analysis done on the following samples:

- Sample 1 (TP2-0.1) – metals, CEC and pH
- Sample 6 (TP10/0.1) – CEC and pH

Many thanks!

Cindy Murphy | Environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
18 Waler Crescent Smeaton Grange NSW 2567
P: 02 4647 0075 | F: 02 4646 1886 | M: 0407 630 549 | E: Cindy.Murphy@douglaspartners.com.au

From: Ellen Wandala Gamage [mailto:EWandalaGamage@envirolab.com.au]
Sent: Monday, 5 August 2019 3:06 PM
To: Adad Barkho; Rod Gray; Cindy Murphy
Subject: Sample Receipt for 222967 92364.00

Please refer to attached for:
a copy of the COC/paperwork received from you
a copy of our Sample Receipt Advice (SRA)
Please open and read the SRA as it contains important information.
Please let the lab know immediately if there are any issues.

Results will be available by 6.30pm on the date indicated.

PLEASE NOTE COMBO PRICES WILL ONLY APPLY IF COMBOS ARE SELECTED ON COC.

We have a new reporting format and would welcome your feedback. Sydney@envirolab.com.au

Please note that subcontracted testing or non routine testing may take significantly longer than just the standard 5 day TAT, contact the lab to get an approximate due date.

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

Regards

Envirolab Services
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Cindy Murphy

Sample Login Details

Your reference	92364.00
Envirolab Reference	222967-A
Date Sample Received	01/08/2019
Date Instructions Received	06/08/2019
Date Results Expected to be Reported	13/08/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	14 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	14.3
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	Acid Extractable metalsin soil	CEC	Misc Inorg - Soil	On Hold
TP2/0.1	✓	✓	✓	
TP6/0.1				✓
TP7/0.1				✓
TP8/0.1				✓
TP9/0.1				✓
TP10/0.1		✓	✓	
TP14/0.1				✓
TP15/0.1				✓
TP16/0.2				✓
TP17/0.1				✓
TP18/0.1				✓
TP26/0.1				✓
SS25/0.1				✓
SS27/0.1				✓

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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 222967-A

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Cindy Murphy
Address	18 Waler Crescent, Smeaton Grange, NSW, 2567

Sample Details

Your Reference	**92364.00**
Number of Samples	14 Soil
Date samples received	01/08/2019
Date completed instructions received	06/08/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

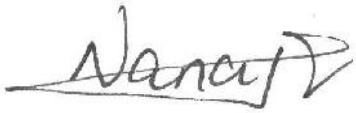
Date results requested by	13/08/2019
Date of Issue	12/08/2019

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

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

Results Approved By
Jaimie Loa-Kum-Cheung, Metals Supervisor
Loren Bardwell, Senior Chemist
Nick Sarlamis, Inorganics Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

Acid Extractable metals in soil		
Our Reference		222967-A-1
Your Reference	UNITS	TP2/0.1
Date Sampled		30/07/2019
Type of sample		Soil
Date prepared	-	07/08/2019
Date analysed	-	07/08/2019
Arsenic	mg/kg	7
Cadmium	mg/kg	<0.4
Chromium	mg/kg	17
Copper	mg/kg	8
Lead	mg/kg	16
Mercury	mg/kg	<0.1
Nickel	mg/kg	3
Zinc	mg/kg	10

CEC			
Our Reference		222967-A-1	222967-A-6
Your Reference	UNITS	TP2/0.1	TP10/0.1
Date Sampled		30/07/2019	31/07/2019
Type of sample		Soil	Soil
Date prepared	-	09/08/2019	09/08/2019
Date analysed	-	09/08/2019	09/08/2019
Exchangeable Ca	meq/100g	1.4	3.3
Exchangeable K	meq/100g	0.2	0.2
Exchangeable Mg	meq/100g	2.1	3.3
Exchangeable Na	meq/100g	0.48	0.88
Cation Exchange Capacity	meq/100g	4.1	7.6

Misc Inorg - Soil			
Our Reference		222967-A-1	222967-A-6
Your Reference	UNITS	TP2/0.1	TP10/0.1
Date Sampled		30/07/2019	31/07/2019
Type of sample		Soil	Soil
Date prepared	-	09/08/2019	09/08/2019
Date analysed	-	09/08/2019	09/08/2019
pH 1:5 soil:water	pH Units	5.2	7.0

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			07/08/2019	[NT]	[NT]	[NT]	[NT]	07/08/2019	[NT]
Date analysed	-			07/08/2019	[NT]	[NT]	[NT]	[NT]	07/08/2019	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	102	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	98	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			09/08/2019	[NT]	[NT]	[NT]	[NT]	09/08/2019	[NT]
Date analysed	-			09/08/2019	[NT]	[NT]	[NT]	[NT]	09/08/2019	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	117	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			09/08/2019	1	09/08/2019	09/08/2019		09/08/2019	[NT]
Date analysed	-			09/08/2019	1	09/08/2019	09/08/2019		09/08/2019	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	1	5.2	5.2	0	102	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY

Project Name:	KEMPS CREEK, Proposed Commercial/Industrial Subdivision			**To:**	Envirolab Services
Project No:	92364.00	**Sampler:**	Adad Barkho		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	Rod Gray/Cindy Murphy	**Mob. Phone:**	0437396499	**Attn:**	Tania Notaras
Email:	cindy.murphy@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	3 day TA			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Metals	PAH	TRH & BTEX	OCP	OPP & PCB	Asbestos	CEC		Hold	Notes/preservation
TP6/0.5	1	30/07/19	S	P/G	x									
BD4	2	30/07/19	S	P/G	x									
BD5	3	30/07/19	S	P/G	x									

ENVIROLAB

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

Job No: 223274.
Date Received: 6/08/19.
Time Received: 1455.
Received by: EW
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Lab Report No:					
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567		**Phone:** (02) 4647 0075	**Fax:** (02) 4646 1886
Relinquished by:	~~Adad Barkho~~ Cindy Murphy		**Transported to laboratory by:**		
Signed:		**Date & Time:** 5/08/2019	**Received by:**		

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Rod Gray

Sample Login Details

Your reference	92364.00, Kemps Creek
Envirolab Reference	223274
Date Sample Received	06/08/2019
Date Instructions Received	06/08/2019
Date Results Expected to be Reported	09/08/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	3 SOIL
Turnaround Time Requested	3 days
Temperature on Receipt (°C)	13.7
Cooling Method	None
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	Acid Extractable metalsin soil
TP6-0.5	✓
BD4	✓
BD5	✓

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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 223274

Client Details

Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Rod Gray
Address	18 Waler Crescent, Smeaton Grange, NSW, 2567

Sample Details

Your Reference	**92364.00, Kemps Creek**
Number of Samples	3 SOIL
Date samples received	06/08/2019
Date completed instructions received	06/08/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	09/08/2019
Date of Issue	08/08/2019

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

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

Results Approved By
Loren Bardwell, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

Acid Extractable metals in soil				
Our Reference		223274-1	223274-2	223274-3
Your Reference	UNITS	TP6	BD4	BD5
Depth		0.5	-	-
Date Sampled		30/07/2019	30/07/2019	30/07/2019
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	07/08/2019	07/08/2019	07/08/2019
Date analysed	-	07/08/2019	07/08/2019	07/08/2019
Arsenic	mg/kg	4	5	6
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	15	14	15
Copper	mg/kg	31	29	8
Lead	mg/kg	15	15	13
Mercury	mg/kg	0.1	<0.1	<0.1
Nickel	mg/kg	16	14	4
Zinc	mg/kg	40	35	11

Moisture				
Our Reference		223274-1	223274-2	223274-3
Your Reference	UNITS	TP6	BD4	BD5
Depth		0.5	-	-
Date Sampled		30/07/2019	30/07/2019	30/07/2019
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	07/08/2019	07/08/2019	07/08/2019
Date analysed	-	08/08/2019	08/08/2019	08/08/2019
Moisture	%	14	11	11

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			07/08/2019	1	07/08/2019	07/08/2019		07/08/2019	[NT]
Date analysed	-			07/08/2019	1	07/08/2019	07/08/2019		07/08/2019	[NT]
Arsenic	mg/kg	4	Metals-020	<4	1	4	5	22	102	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	98	[NT]
Chromium	mg/kg	1	Metals-020	<1	1	15	14	7	102	[NT]
Copper	mg/kg	1	Metals-020	<1	1	31	32	3	105	[NT]
Lead	mg/kg	1	Metals-020	<1	1	15	16	6	102	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.1	<0.1	0	95	[NT]
Nickel	mg/kg	1	Metals-020	<1	1	16	14	13	98	[NT]
Zinc	mg/kg	1	Metals-020	<1	1	40	41	2	98	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Appendix G

Quality Assurance and Quality Control

Appendix G
Data Quality Assurance and Quality Control Assessment

G1 Data Quality Indicators

Field and laboratory procedures were assessed against the following data quality indicators (DQIs):

Table G1: Data Quality Indicators

DQI	Performance Indicator	Acceptable Range
Precision		
Field considerations	SOPs appropriate and complied with	Field staff follow SOPs in the DP *Field Procedures Manual*
	field replicates	Precision average relative percent difference (RPD) result <5 times PQL, no limit; results >5 times PQL, 0% - 30%
Laboratory considerations	laboratory duplicates	Precision average RPD result <5 times PQL, no limit; results >5 times PQL, 0% - 50%
Accuracy (bias)		
Field considerations	SOPs appropriate and complied with	Field staff to follow SOPs in the DP *Field Procedures Manual*
Laboratory considerations	Analysis of:	
	method blanks (laboratory blanks)	Recovery of 60-140%
	matrix spikes	Recovery of 70-130% (inorganics); 60 - 140% (organics)
	matrix spike duplicates	Recovery of 70-130% (inorganics); 60 - 140% (organics); Recovery 70 “low” to 130% “high” indicates interference
	surrogate spikes	Recovery of 70 - 130% (inorganics); 60 - 140% (organics)
	laboratory control samples	Recovery of 70-130% (inorganics); 60 - 140% (organics)
Completeness		
Field considerations	All critical locations sampled	All critical locations sampled in accordance with the DQO’s (Appendix C)
	SOPs appropriate and complied with	Field staff to follow SOPs in the DP *Field Procedures Manual*
	Experienced sampler	Experienced DP Environmental Engineer to conduct field work and sampling
	Documentation correct	Maintain COC documentation at all times
	Sample holding times complied with	Sample holding times complied with

DQI	Performance Indicator	Acceptable Range
Laboratory considerations	All critical samples analysed according to DQO's	All critical locations analysed in accordance with the DQO's
	Appropriate methods and PQLs	Appropriate methods and PQLs have been used by the contract laboratory
	Sample documentation complete	Maintain COC documentation at all times
Comparability		
Field considerations	Same SOPs used on each occasion	Field staff to follow SOPs in the DP *Field Procedures Manual*
	Experienced sampler	Experienced DP Environmental Scientist/Engineer to conduct field work and sampling
	Same types of samples collected	Same types of samples collected
Laboratory considerations	Sample analytical methods used (including clean-up)	Methods to be NATA accredited
	Sample PQLs (justify/quantify if different)	Consistent PQLs to be used
	Same laboratories (justify/quantify if different)	Same analytical laboratory for primary samples to be used
Representativeness		
Field considerations	Appropriate media sampled according to DQO's	Appropriate media sampled according to DQO's
	All media identified in DQO's sampled	All media identified in DQO's sampled
Laboratory considerations	All samples analysed according to DQO's	All samples analysed according to DQO's

Notes to Table 1: SOP – Standard Operating Procedure
DQO – Data Quality Objectives (Appendix C)

G2 Field Quality Assurance and Quality Control

The field QC procedures for sampling as prescribed in the standard operating procedures (SOPs) in the Douglas Partners *Field Procedures Manual* were followed at all times during the assessment. All sample locations and media were in accordance with the DQO (i.e. as per scope of work in DP's proposal).

G2.1 Sampling Team

Sampling was undertaken by an experienced DP Environmental Scientist and DP Environmental Engineer.

G2.2 Sample Collection and Weather Conditions

Sample collection procedures and dispatch are reported in body of the report. Sampling was undertaken during sunny and mild conditions.

G2.3 Logs

Logs for each test pit soil sampling location were recorded in the field with surface samples recorded on field sheets. The individual samples were recorded on the field logs and field sheets along with the sample identity, location, depth, duplicate locations, duplicate type and site observations. Logs are presented in Appendix D. A summary of surface samples collected along with the conditions encountered at each location is provided in Section 7.2 of the Report.

G2.4 Chain-of-Custody

Chain-of-Custody information was recorded on the Chain-of-Custody (COC) sheets and accompanied samples to the analytical laboratory. Signed copies of COCs are presented in Appendix F, prior to the laboratory certificates.

G2.5 Sample Splitting Techniques

Duplicate samples were collected in the field as a measure of precision of the results. Field duplicates samples for soil were collected from the same location and an identical depth to the primary sample. Equal portions of the primary sample were placed into the sampling jars and sealed. The sample was not homogenised in a bowl to prevent the loss of volatiles from the soil. Duplicate samples were labelled with a DP identification number, recorded on DP logs, so as to conceal their relationship to their primary sample from the analysing laboratory.

G2.6 Duplicate Frequency

Field sampling comprised intra-laboratory duplicate sampling, at a rate of approximately one duplicate sample for every ten primary samples.

G2.7 Relative Percentage Difference

A measure of the consistency of results for field samples is derived by the calculation of relative percentage differences (RPDs) for duplicate samples. RPDs have only been considered where a concentration is greater than five times the practical quantitation limit (PQL).

G2.7.1 Intra-Laboratory Duplicate Analysis

Duplicates were tested to assess data 'precision' and the reproducibility within the primary laboratory (Envirolab Pty Ltd) as a measure of consistency of sampling techniques. Three replicate samples were analysed. The Relative Percent Difference (RPD) between replicate results is used as a measure of laboratory reproducibility and is given by the following:

$$\text{RPD} = \frac{(\text{Replicate result 1} - \text{Replicate result 2})}{(\text{Replicate result 1} + \text{Replicate result 2})/2} \text{ x } 100$$

The RPD can have a value between 0% and 200%. An RPD data quality objective of up to 30% for inorganics and 50% for organics is considered to be within the acceptable range.

The comparative results of analysis between primary and duplicate samples are summarised in Table G4 (attached). Where one or both results were below the PQL, an RPD was not calculated.

All RPD values were within the acceptable range of ± 30% or 50% with the exception of BD3 which reported a RPD of 67% for PAH. This is not considered to be a matter of concern given the low concentrations reported, and considering that the sample was collected in heterogeneous material (i.e. fill), therefore some variation is expected.

The intra-laboratory and inter-laboratory comparisons indicate that the sampling technique was consistent and repeatable and therefore acceptable precision was achieved.

G3 Laboratory Quality Assurance and Quality Control

Envirolab Services was used as the primary laboratory. Appropriate methods and PQLs were used by the laboratory. Sample methods were NATA accredited (noting the exception for fibrous asbestos (FA) and asbestos fines (AF) quantification to 0.001% w/w).

G3.1 Surrogate Spike

This sample is prepared by adding a known amount of surrogate, which behaves similarly to the analyte, prior to analysis to each sample. The recovery result indicates the proportion of the known concentration of the surrogate that is detected during analysis and is used to assess data 'accuracy'. Results were within acceptance limits and indicate that the extraction technique was effective.

G3.2 Reference and Daily Check Sample Results – Laboratory Control Sample (LCS)

This sample comprises spiking either a standard reference material or a control matrix (such as a blank of sand or water) with a known concentration of specific analytes. The LCS is then analysed and results compared against each other to determine how the laboratory has performed with regard to sample preparation and analytical procedure and is used to assess data 'accuracy'. LCSs are analysed at a frequency of one in 20, with a minimum of one analysed per batch.

G3.3 Laboratory Duplicate Results

These are additional portions of a sample which are analysed in exactly the same manner as all other samples and is used to assess data 'precision'. The laboratory acceptance criteria for duplicate samples is: in cases where the level is <5xpql - any RPD is acceptable; and in cases where the level is >5xPQL - 0-50% RPD is acceptable.

G3.4 Laboratory Blank Results

The laboratory blank, sometimes referred to as the method blank or reagent blank is the sample prepared and analysed at the beginning of every analytical run, following calibration of the analytical apparatus and is used to assess data 'accuracy'. This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, it can be determined by processing solvents and reagents in exactly the same manner as for samples. Laboratory blanks are analysed at a frequency of 1 in 20, with a minimum of one per batch.

G3.5 Matrix Spike

This is a sample duplicate prepared by adding a known amount of analyte prior to analysis, and then treated exactly the same as all other samples. The recovery result indicates the proportion of the known concentration of the analyte that is detected during analysis and is used to assess data 'accuracy'. The laboratory acceptance criteria for matrix spike samples are generally 70 - 130% for inorganic/metals; and 60 - 140% for organics; and 10 - 140% for SVOC and speciated phenols.

G3.6 Results of Laboratory QC

The laboratory QC for surrogate spikes, LCS, laboratory duplicate results, laboratory blanks and matrix spikes results are reported in the laboratory certificate of analysis.

The laboratory quality control samples were within the laboratory acceptance criteria. Laboratory QAQC results reported at the conclusion of the laboratory certificate of analysis 217182 reported the following:

Percent recovery for the matrix spike for TRH Soil C10 was not possible to report as the high concentration of hydrocarbons in sample SS125 has caused interference.

The PQL was raised due to interferences from hydrocarbons in sample SS105.

The laboratory RPD acceptance criteria was exceeded for sample 222854-15 (SS15) for Cr and Zn. Therefore a triplicate result was been issued as laboratory sample number 222854-32. Results indicated that all results reported are below the SAC.

Percent recovery for TRH (C_{10}-C_{40}) for samples 222854-5, 8 and 20 (SS5, SS8 and SS20 respectively) was not possible to report as the high concentration of analytes caused interference.

Overall, it is considered that an acceptable level of laboratory precision and accuracy was achieved and that surrogate spikes, LCS, laboratory duplicate results, laboratory blanks and matrix spike results were of an overall acceptable level overall. On the basis of this assessment, the laboratory data set is considered to have complied with the DQIs.

G3.7 Overall Assessment of QA/QC

Specific limits associated with sample handling and laboratory QA/QC was assessed against the DQIs and a summary of compliance is presented in the following table.

Table G3: Data Quality Indicators

DQI	Performance Indicator	Acceptable Range	Compliance
Precision			
Field considerations	SOPs appropriate and complied with	Field staff follow SOPs in the DP *Field Procedures Manual*	C
	field replicates	Precision average relative percent difference (RPD) result <5 times PQL, no limit; results >5 times PQL, 0% - 30%	C
Laboratory considerations	laboratory duplicates	Precision average RPD result <5 times PQL, no limit; results >5 times PQL, 0 - 50%	C
Accuracy (bias)			
Field considerations	SOPs appropriate and complied with	Field staff to follow SOPs in the DP *Field Procedures Manual*	C
Laboratory considerations	Analysis of:		
	method blanks (laboratory blanks)	Recovery of 60 - 140%	C
	matrix spikes	Recovery of 70 - 130% (inorganics); 60 - 140% (organics)	C
	matrix spike duplicates	Recovery of 70 - 130% (inorganics); 60 - 140% (organics); Recovery 70 “low” to 130% “high” indicates interference	C
	surrogate spikes	Recovery of 70 - 30% (inorganics); 60 - 40% (organics)	PC
	laboratory control samples	Recovery of 70 - 130% (inorganics); 60 - 140% (organics)	C
Completeness			
Field considerations	All critical locations sampled	All critical locations sampled in accordance with the SAQP	C
	SOPs appropriate and complied with	Field staff to follow SOPs in the DP *Field Procedures Manual*	C
	Experienced sampler	Experienced DP Environmental Scientist/Engineer to conduct field work and sampling	C
	Documentation correct	Maintain COC documentation at all times	C
	Sample holding times complied with	Sample holding times complied with	C
Laboratory considerations	All critical samples analysed according to SAQP	All critical locations analysed in accordance with the SAQP	C
	Appropriate methods and PQLs	Appropriate methods and PQLs have been used by the contract laboratory	C
	Sample documentation complete	Maintain COC documentation at all times	C

DQI	Performance Indicator	Acceptable Range	Compliance
Comparability			
Field considerations	Same SOPs used on each occasion	Field staff to follow SOPs in the DP *Field Procedures Manual*	C
	Experienced sampler	Experienced DP Environmental Scientist/Engineer to conduct field work and sampling	C
Laboratory considerations	Sample analytical methods used (including clean-up)	Methods to be NATA accredited	C
	Sample PQLs (justify/quantify if different)	Consistent PQLs to be used	C
	Same laboratories (justify/quantify if different)	Same analytical laboratory for primary samples to be used	C
Representativeness			
Field considerations	Appropriate media sampled according to DQOs	Appropriate media sampled according to DQOs	C
	All media identified in DQOs sampled	All media identified in DQOs sampled	C
Laboratory considerations	All samples analysed according to DQOs	All samples analysed according to DQOs	C

Notes to Table G3:
C – Compliance
PC – Partial Compliance
NC – Non-Compliance
NA – Not Applicable
SOP – Standard Operating Procedure
DQO – Data Quality Objectives

A review of the adopted QA/QC procedures and results indicates that the DQIs have generally been met with compliance and a minor partial-compliance. On this basis, the sampling and laboratory methods used during the investigation were found to meet DQOs for this project.

Table G4: Relative Percentage Difference Results – Intra-laboratory Replicates

			Metals								TRH						BTEX				PAH				Phenol	OCP									OPP	PCB	Asbestos		
			Arsenic	Cadmium	Chromium (VI)	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	Phenol	DDT+DDE+DDD [c]	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	HCB	Methoxychlor	Chlorpyriphos	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (50 g)
Sample ID	Depth	Sampled Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
BD2	0 - 0.1m	30/07/2019	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.1	0.5	0.6	1.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SS19	0 - 0.1m	30/07/2019	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.1	0.4	<0.5	1.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
		Difference	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0.09	0.1	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		RPD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	22%	18%	31%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD3	0 - 0.1m	30/07/2019	6	<0.4	11	24	14	<0.1	9	130	<25	<50	<25	<50	400	120	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
SS21	0 - 0.1m	30/07/2019	5	<0.4	11	23	15	<0.1	8	130	<25	<50	<25	<50	320	120	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	0.2	NT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
		Difference	1	0	0	1	1	0	1	0	0	0	0	0	80	0	0	0	0	0	0	0	0	0.1	-	0	0	0	0	0	0	0	0	0	-	-	-
		RPD	18%	0%	0%	4%	7%	0%	12%	0%	0%	0%	0%	0%	22%	0%	0%	0%	0%	0%	0%	0%	0%	**67%**	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-
BD5	0 - 0.1m	30/07/2019	6	<0.4	15	8	13	<0.1	4	11	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
TP2/0.1	0 - 0.1m	30/07/2019	7	<0.4	17	8	16	<0.1	3	10	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
		Difference	1	0	2	0	3	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		RPD	15%	0%	13%	0%	21%	0%	29%	10%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD4	0 - 0.1m	30/07/2019	5	<0.4	14	29	15	<0.1	14	35	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
TP6	0 - 0.1m	30/07/2019	4	<0.4	15	31	15	0.1	16	40	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
		Difference	1	0	1	2	0	0	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		RPD	22%	0%	7%	7%	0%	0%	13%	13%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix H

About this Report

About this Report

Douglas Partners

Introduction

□□□□□ □o□□ □□□□ □□□□ pro□d□d □o □□ p□ff□ D□□□ r□por□ □□ r□□□rd □o □□□□□ f□□□□o□ □ □□□od□□ f□□d pro□□d□r□□□ □□d □□□□ □o□ □ □□□□ □□□□□o□□ □o□□□□□r□ □□□□□□□□□r□□□r□□□□□□□o □□□r□por□□□

D□□□□r□por□□ □r□ □□□□□d o□ □□for□ □□□o□ □□□□□□d fro□ □□□□ □□□d □□□□□□rf□□□ □□□□□□□□□o□□ □□d □□□□ p□□□□□ □□pp□□□ □□□□□d □□□ □□o□□d□□□ of □o□□□□□□o□o□□ □□d □□p□r□□□□□□ □or □□□□ r□□□o□□ □□□□□ □ □□□□ □□□ r□□□□rd□d □□□ □□□□□rpr□□□□□ r□□□□r □□□□□ f□□□□□□□□ do□□□ □□□□□□□□□ □□□d □o □o□ □ □□□□□□□□□□□ □□□□ □□op□ of □□for□ □□□o□o□ □□□□□ □□□□r□□□□

Copyright

□□□□ r□por□□□ □□□□ prop□r□□ of Do□□□□□□ □□r□□□r□ □□□□ □□d□ □□□□ r□por□□ □□□ o□□□□ □□□ □□□d for □□□□ p□rpo□□ for □□□□□ □□□□ □□□ □o□ □ □□□□□o□□d □□□d □□□ □□□□ord□□□□ □□□□ □□□□ Co□d□□o□□ of □□□□□□□□□□ □□□□ for □□□□ □o□ □ □□□□□o□ □□pp□□□d □□□ □□□□ □□□□ of propo□□□□ □□□□□□□□or□□d □□□□ of □□□□□ r□por□ □□□ □□□□ for □□□□□□o□□□r □□□ pro□□□□□□□d□

Borehole and Test Pit Logs

□□□□ □or□□o□□ □□d □□□□□p□□□o□□ pr□□□□□□□d □□□ □□□□□ r□por□ □r□ □□□ □□□□□□□□□r□□□□ □□□d□or □□□o□o□□□□□ □□□□rpr□□□□□o□ of □□□□ □□□□□□□rf□□□ □o□d□□o□□□ □□□d □□□□r r□□□□□□□□□□ □□□□ d□p□□d□d □o □o□ □ □□□□□□□□ o□ fr□□□□□□□□□ of □□□□ p□□□□ □□d □□□□ □ □□□od of dr□□□□□ or □□□□□□□□□□□□ □□□ d□□□□□□□ □o□□□□o□□ □□d□□□□r□□d □□□□ p□□□□ or □or□ dr□□□□□ □□□□ pro□d□□ □□□□ □o□□ r□□□□□□□□ □□□□□□□□□ □□□□ □□□□ □□□□ □□ □o□ □□□□□□□□ pr□□□□□□□□□□□ or po□□□□□□□ □o □□□□f□ o□ □□□o□o□ □□ □ro□□d□□ □□ □□□□ □□□□□ □□□□ □or□o□□□□ □□d □□□□□ p□□□ r□pr□□□□□□ o□□□ □ □□r□ □□□ □□□□ □□□□ p□□ of □□□□ □o□□□□ □□□□□□rf□□□ prof□□□□□

□□□□rpr□□□□□o□ of □□□□ □□for□ □□□o□ □□d □□□ □pp□□□□□o□ □o d□□□□□ □□d □o□□r□□□o□ □□□o□d □□□□r□for □□□□□ □□□□o □□□□o□□□□□ □p□□□□□ of □or□□o□□□ or p□□□□□□□ fr□□□□□□□□□ of □□□□ p□□□□□□□□□d □□□□ po□□□□□□□□□ of o□□□r □□□□□ □□r□□□□□ □□□□□□□ □r□□□o□□ □□□□□□□□ □□□□ □□□□□ □o□□□o□□□□

Groundwater

W□□r□ □ro□□d□□□r □□□□□□□ □r□ □□□□□□r□d □□ □or□□o□□□ □□□□r □r□ □□□□□r□□ po□□□□□□□□ pro□□□□ □□□ □□□□ □□□□□

- □□□ □o□ p□r□ □□□□□□□□□ □o□□□ □ro□d□□□□r □ □□□ □□□□□r □□□□ □o□□ □□r□ □o□□□□□ or p□r□□p□ □o□□□□□□□□ d□r□□□ □□□□ □□□□ □ □□□□ □o□□ □□□ □□f□op□□□
- □ o□□□□□□d □p□r□□□d □□□□r □□□□□□ □ □□□ □□□d □o □□□ □rro□□o□□ □□d□□□□□□o□ of □□□□ r□□□ □□□□r □□□□□□□□
- W□□□r □□□□□□ □□□□□□□□ □□□□□□r□ fro□ □□□□ □ □o □□□□ □ □□□□ □□□□□o□□ or r□□□□□□ □□□□□□□□r □□□□□□□□□□ □□□□□ □ □□□ □o□ □□□ □□□□ □□□□ □ □□□ □□□□ □□□□ □ of □o□□r□□□□o□ □□□ □r□ □d□□□□□□d □□ □□□□ r□por□ □□d
- □□□□ □□□□ of □□□□r or □ □d □□□ □ dr□□□□□□ f□□d □□□□ □ □□□□ □□□□ □ro□d□□□□r □f□o□□ W□□r □□□□ □o □□□ □o□□ o□ of □□□□ □o□□ □□□d dr□□□□□□ □ □d □ □□□□ f□□□ □□□ □ □□□□□d o□□□ of □□□□ □o□□ f□ □□□□r □ □□□□□r□□ □□□□□ r□□ □o □□□ □ □d□□

M□r□ r□□□□□□□□ □ □□□□□r□□ □□□□□ □□□□ □□□ □ □d□ □□□ □□□□□□□□□□ □□□□dpp□□□ □□□□□ □r□ r□□d □□□ □□□□r□□□□ o□□r □□□□r□□ d□□□□ or p□r□□p□ □□□□□□ for □□ p□r□ □□□□□□□□□ □o□□□ □□□□□o□ □□□r□□ □□□□□d □□ □ p□r□□□□□□r □r□□□□ □ □□□ □□□ □d□□□□□□□□ □□ □o□ p□r□ □□□□□□□□□ □o□□□ or □□□r□ □□□□r □□□ □□□ □□□□rf□r□□□□ fro□ □p□r□□□d □□□□r □□□□□□□□

Reports

□□□□ r□por□ □□□□ □□□□□ pr□p□r□d □□□ □□□□□f□d p□r□o□□□□□□ □□□□□d o□ □□□□ □□for□□□o□ o□□□□□□d fro□ f□□d □□d □□□or□or□ □□□□□□□□□ □□d □□□□ □□□□ □□d r□□□□□□ □o □□rr□□□ □□□□□□□□r□□□ □□□□d□rd□ of □□□□rpr□□□□o□ □□d □□□□□□□□□□□ W□□r□ □□□□ r□por□ □□□□□ pr□p□r□d for □ □p□□if□d □□□□□□ propo□□□□□□□□ □for□ □□□o□ □□d □□□□rpr□□□□o□ □ □□□ □o□□□ r□□□□□□□□ f□□□ d□□□□□ propo□□□□□ □□□□□□d□ f□□□□ □□pp□□□ D□ □□□□□□□ p□□□□□d □o r□□□□□ □□□□ r□por□ □□d □□□□ □ff□□□□□□□□ of □□□□ □□□□□□□□□□□o□ □or□□

□□□r□ □□r□ □□ □□□□□□ □□□□ □□□□ r□por□□□ □r□□□□□□□ □o □□□□rpr□□□□o□ of □□□□□□rf□□□ □o□d□□o□□d□□□□□□o□ of □□o□□□□□□□□□□ □□d □□□□ro□□ □□□□□□ □□p□□□□ □□d r□□o□ □ □□d□□□o□□ or □□□□□□□□□o□□ for d□□□□□ □□d □o□□r□□□o□□ □o□□□□□r□ D□ □□□□□o□ □□□□□□□□ □□□□□□p□□□ or □□□□□□ □r□po□□□□□□□□ for□

- □□□□ p□□□□d □□r□□o□□ □□ □ro□d□ □o□d□□o□□□ □□□□ po□□□□□□□ for □□□□ □□□□d□p□d p□r□□ o□ □or□□o□□ or p□□ □p□□□□□ □□d □□□□ p□□□□ fr□□□□□□□□□
- C□□□□□□□□ □□ po□□□□ or □□□□rpr□□□□o□□ of po□□□□ □□ □□□□□□□or□ □□□□□or□□□□□or
- □□□□ □□□□o□□ of □o□r□□□or□ r□po□d□□□ □o □o□ □ r□□□□□pr□□□□r□□□

f□ □□□□□□ o□□□r□D□ □□□□□□□ p□□□□□d □o □□□□□□□ □□□□ □□□□□□□□□□□o□□or □d□□□□ □o r□□o□□ □□□□ □ □□□□r□

About this Report

Site Anomalies

[illegible]

Information for Contractual Purposes

[illegible]

Site Inspection

[illegible]