DLA Environmental Services

# Supplementary Site Investigation

Ivanhoe Estate
Corner Herring Road and Epping Road
Macquarie Road NSW 2113

Frasers Property Australia

DL3953_S008115

February 2018

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This report is limited to the scope defined herein. Sampling and chemical analysis of environmental media are based on representative samples, the intensity of those samples being in accordance with the usual levels of testing carried out for this type of investigation and appropriate for the objectives of this report. Due to the inherent variability in environmental media, DLA cannot warrant that the whole overall condition of the Site is identical or substantially similar to the representative samples.

# ABBREVIATIONS

A list of the common abbreviations used throughout environmental reports is provided below:

| | |
|---|---|
| **ABC** | Ambient Background Concentration |
| **ACL** | Added Contaminant Limit |
| **AHD** | Australian Height Datum |
| **ANZECC** | Australian and New Zealand Environment and Conservation Council |
| **AS** | Australian Standard |
| **BGL** | Below Ground Level |
| **BTEX** | Benzene, Toluene, Ethyl Benzene, Xylene |
| **CEC** | Cation Exchange Capacity |
| **CRC CARE** | Cooperative Research Centre for Contamination Assessment and Remediation of the Environment |
| **DLA** | DLA Environmental Services |
| **DQI** | Data Quality Indicator |
| **DQO** | Data Quality Objective |
| **DSI** | Detailed Site Investigation |
| **EIL** | Ecological Investigation Level |
| **EPA** | Environment Protection Authority (NSW) |
| **ESL** | Ecological Screening Level |
| **HIL** | Health-Based Investigation Level |
| **HSL** | Health Screening Level |
| **LOR** | Limit of Reporting |
| **ML** | Management Limit |
| **NA** | Not Applicable |
| **NATA** | National Association of Testing Authorities |
| **NEPC** | National Environment Protection Council |
| **NEPM** | National Environment Protection Measure |
| **NL** | Not Limiting |
| **NSW** | New South Wales |
| **OC/OP** | Organochlorine / Organophosphorus Pesticides |
| **OEH** | Office of Environmental and Heritage |
| **PAH** | Polycyclic Aromatic Hydrocarbons |
| **PCB** | Polychlorinated Biphenyls |
| **QA/QC** | Quality Assurance and Quality Control |
| **RPD** | Relative Percentage Difference |
| **SEPP** | State Environmental Planning Policy |
| **TEQ** | Toxicity Equivalence Quotient |
| **TRH** | Total Recoverable Hydrocarbons |
| **UCL** | Upper Confidence Limit |

# EXECUTIVE SUMMARY

DLA Environmental Services was engaged by Frasers Property Australia to undertake a Supplementary Investigation of the area identified as 'Ivanhoe Estate', located on the corner of Herring Road and Epping Road, Macquarie Park NSW 2113 ('the Site').

A Detailed Site Investigation was previously carried out to assess the contamination status of the Site (JBS&G, 2016), however data gaps were identified in some areas of the Site. Consequently, this Supplementary Investigation report provides environmental characterisation of soil across the remaining areas of the Site that were identified as data gaps and assesses the suitability of these areas for proposed future residential land use.

The investigation included the collection of soil samples collected from nine targeted boreholes. The samples were submitted for laboratory analysis for a suite of typical contaminants of potential concern. Soil samples collected from borehole BH8 reported petroleum hydrocarbons at concentrations exceeding the health and ecological screening levels. All other soil samples reported contaminant concentrations below the adopted investigation and screening levels. In addition, asbestos was not detected in any of the samples submitted for analysis.

Based on the results of the current investigation data, DLA concludes that the area of the Site in the vicinity of borehole BH8 is not currently considered suitable for the proposed redevelopment from a contamination perspective due to the presence of hydrocarbons in soil.

Although the Site is not considered suitable for the proposed land use in its current condition, DLA considers that the Site can be made suitable with further assessment and the implementation of an appropriate remediation strategy.

Further investigation and remediation of the Site would include:

1. Delineation soil sampling and laboratory analysis;
2. Preparation of a Remediation Action Plan for the Site;
3. Remediation of the Site which would include the excavation and appropriate off-site disposal of TRH contaminated soils;
4. Validation sampling of the Site; and
5. Preparation of a Site Validation Report.

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# 1.0 INTRODUCTION

## 1.1 General

DLA Environmental Services (DLA) was engaged by Frasers Property Australia (the Client) to undertake a Supplementary Investigation of the following area:

**'Ivanhoe Estate'**
**Corner Herring Road and Epping Road, Macquarie Park NSW 2113 ('the Site')**

A Detailed Site Investigation (DSI) was previously carried out to assess the contamination status of the Site (JBS&G, 2016), however data gaps were identified in areas of the Site previously subject to earthworks (cut and fill activities). The results of the investigation were presented in the following report:

- *Detailed Site Investigation – Ivanhoe Estate, Herring Road, Macquarie Park NSW* (JBS&G, dated 30 September 2016, reference: 52047/104956 (Rev A)).

This Supplementary Investigation report provides environmental characterisation of soil via intrusive investigation across the remaining areas of the Site that were identified as data gaps within the DSI. In addition, this report considers the suitability of these areas of the Site for proposed future residential land use.

This report has been prepared utilising information from current investigation works, previous investigation reports, and from experience, knowledge, and current industry practice in the investigation of similar sites.

This Supplementary Investigation report should be read in conjunction with the DSI report (JBS&G, 2016).

## 1.2 Objectives

The objectives of this Supplementary Investigation are to supplement the results presented in the DSI report (JBS&G, 2016) and satisfy the general requirements of State Environmental Planning Policy No.55 (SEPP 55) in accordance with *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW OEH, 2011).

Specifically, this Supplementary Investigation will consider the potential for suspected historical activities to have caused contamination in areas of the Site not previously assessed, and provide conclusions regarding the suitability of the Site for future use consistent with 'Residential A' as described by the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) ('NEPM', NEPC, 2013).

### 1.3 Scope of Works

To achieve these objectives, DLA carried out the following works:

- Targeted intrusive investigations comprising the collection of soil samples from nine boreholes;
- Data assessment and reporting, including comparison with relevant New South Wales (NSW) Environment Protection Authority (EPA) made or endorsed investigation and screening levels;
- Assessment of whether the area of the Site subject to the current investigation is suitable for the proposed land use from a contamination perspective;
- Consideration of potential Site contamination management requirements, if any; and
- Preparation of this Supplementary Investigation report.

# 2.0 SITE DESCRIPTION

## 2.1 Site Identification

Based on the Site inspection carried out by DLA on the 24th May 2017, and a review of published records, the Site identification details are summarised in Table 1.

**Table 1: Site Identification Summary**

| ITEMS | DETAILS |
|---|---|
| **Site Name** | 'Ivanhoe Estate' |
| **Address** | Corner Herring Road and Epping Road, Macquarie Park, NSW 2113 |
| **Lot and Deposited Plan** | Lots 6 to 17 and 18 to 20 in Deposited Plan 861433<br>Lot 1 in DP 859537<br>Lot 100 in Deposited Plan 1223787<br>Part Lot 5 in Deposited Plan 740753 |
| **Local Government Authority** | City of Ryde |
| **Site Zoning** | B4 – Mixed Use under the Ryde Local Environmental Plan 2014 |
| **Current Use** | Residential (Department of Housing) |
| **Total Site Area (approx.)** | 8.2 hectares |
| **Locality Map** | Refer to **Figure 1** – Site Location |
| **Site Survey** | Refer to **Figure 2** – Site Layout and Supplementary Sample Locations |

## 2.2 Proposed Development

The proposed development scenario is expected to include a combination of low and high-density residential land use. For the purposes of this investigation, the most conservative land use scenario has been adopted, which is consistent with the definition of 'Residential with gardens and accessible soil' provided in Schedule B7 of the NEPM (NEPC, 2013).

## 2.3 Boundaries and Surrounding Land Use

The boundary and surrounding landscape features of the Site are summarised in Table 2.

**Table 2: Boundaries and Surrounding Land Use**

| DIRECTION | DETAILS |
|---|---|
| **North-west** | Herring Road with high-density residential premises and Macquarie University beyond |
| **North-east** | Medium to high-density residential premises |
| **South-west** | Epping Road with low-density residential premises beyond |
| **South-east** | Commercial (offices) premises |

## 2.4 Environmental Setting

The landscape and environmental setting of the Site is summarised in Table 3.

**Table 3: Environmental Setting**

| DIRECTION | DETAILS |
|---|---|
| **Topography** | The Site lies at gradients between approximately 47m Australian Height Datum (AHD) in the southern-most corner and 75m AHD along the north-western boundary. The Site exhibits an overall gradient from the north-western boundary down towards the south / south-east. |
| **Geology** | The 1:100,000 Sydney Geological Series Sheet (9130) indicates that the Site lies on the boundary of Triassic-aged Ashfield Shale of the Wianamatta Group and Hawkesbury Sandstone. Ashfield Shale comprises black and dark grey shale and laminite derived from lacustrine environments. Hawkesbury Sandstone comprises medium to coarse grained quartz sandstone with very minor shale and laminite lenses derived from braided alluvial channel fill. |
| **Acid Sulfate Soils** | The 1:25,000 Prospect / Parramatta River Acid Sulfate Soil Risk Map indicates that there are no known occurrences of acid sulfate soil in the vicinity of the Site. |
| **Hydrology** | Shrimpton Creek runs along the south-eastern boundary of the Site. Shrimpton Creek flows in a broadly northerly direction, ultimately discharging to the Lane Cove River which is located approximately 1.35 km to the north-east of the Site.<br><br>The surface of the Site comprises both sealed and unsealed surfaces. In areas of the Site where unsealed surfaces are present (i.e. lawns and garden beds), it is expected that surface water (rainfall) would infiltrate into the subsurface. In areas of the Site where impervious pavements are present (i.e. roadways), or where the subsurface becomes waterlogged following periods of prolonged or heavy rainfall, runoff water would form overland flow and follow the gradient of the land. |
| **Hydrogeology** | Review of the NSE Office of Water groundwater data indicates that there are no registered bores within a 500m radius of the Site. The closest registered bore to the Site is located approximately 650m to the north / north-east and is registered for use for monitoring purposes. No details regarding the depth to groundwater are available for the nearby registered bores, however it is expected that regional groundwater would be present at depth within the underlying bedrock. Based on the hydrology of the local area, it is expected that groundwater underlying the Site would flow in a north-easterly direction towards the Lane Cove River. |

# 3.0 SUMMARY OF PREVIOUS INVESTIGATIONS

## 3.1 Detailed Site Investigation

*Detailed Site Investigation – Ivanhoe Estate, Herring Road, Macquarie Park NSW* (JBS&G, dated 30 September 2016, reference: 52047/104956 (Rev A)).

The DSI comprised a review of previous investigations, historical information and intrusive sampling which included 26 grid-based and targeted borehole locations.

The results of the soil sampling and laboratory analysis reported contaminants of potential concern at concentrations less than the investigation criteria, with the exception of benzo(a)pyrene which exceeded the adopted ecological criteria at one sample location. This ecological exceedance was not considered to present an unacceptable ecological risk due to its limited effects on plant uptake.

The report concluded that the soils underlying the Site do not present an unacceptable risk to human health or the environment and do not preclude redevelopment of the Site for its intended land use.

## 3.2 Summary of In-Ground Contamination

*Summary of In-Ground Contamination – Ivanhoe Estate, Cnr Herring and Epping Roads, Macquarie Park NSW 2113* (DLA, dated 11 October 2016, reference: DL3951_S005491).

The document was prepared in response to a review of the DSI report (JBS&G, 2016) which indicated that historical cut and fill activities were undertaken on-site to facilitate the construction of larger developments in the estate.

Based on a review of the available historical and investigation data, DLA concluded that there was a low likelihood of unacceptable contamination to be present on the Site as a result of past and present land use activities, however data gaps existed for the cut and fill areas.

DLA recommended that additional visual inspections and limited sampling be performed across the cut and fill areas with the aim of addressing the identified data gaps with regards to the presence of subsurface contamination associated with fill material.

# 4.0 SAMPLING, ANALYSIS AND QUALITY PLAN

## 4.1 Data Quality Objectives

The NEPM (NEPC, 2013) and Australian Standard (AS) 4482.1-2005 recommend that data quality objectives (DQOs) be implemented during the investigation of potentially contaminated sites. The DQO process described in AS 4482.1-2005 *Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil Part 1: Non-Volatile and Semi-Volatile Compounds* outlines seven distinct steps to outline the project goals, decisions, constraints and an assessment of the project uncertainties and how to address these when they arise. The DQOs have been summarised in Table 4.

**Table 4: Summary of DQOs**

| | | |
|---|---|---|
| 1 | State the Problem | This Supplementary Investigations aims to address the question of whether previous land uses have affected the suitability of the Site for future land use consistent with 'Residential A' as defined by the NEPM (NEPC, 2013). |
| 2 | Identify the Decisions | Decisions include:<br>– Do contaminant concentrations in soil comply with the investigation criteria?<br>– Have the previous land uses affected the environmental quality of the land?<br>– Do residual soils pose an unacceptable risk to human health or the environment? |
| 3 | Identify Inputs to Decisions | Inputs to the decision include:<br>– Previous environmental data.<br>– Relevant NSW EPA produced or endorsed criteria.<br>– Field observations.<br>– The results of judgemental soil sampling and laboratory analysis. |
| 4 | Define Study Boundaries | – Spatial Boundaries – the physical study will focus on soil within the confines of the lot boundaries as defined in Table 1.<br>– Temporal Boundaries – as the data from the previous investigations will be relied upon for the purposes of the investigation then the temporal boundary of the Supplementary Investigation will be from 2016 to the date of the current investigation. |

| | | |
|---|---|---|
| 5 | Develop Decision Rule | The Site will be considered suitable for its intended land use if concentrations of soils comply with the investigation criteria, as determined by the following decision rules being applied to the data:<br>– The 95% Upper Confidence Limit (UCL) of the arithmetic mean for each contaminant of concern must comply with the respective investigation criteria;<br>– The individual contaminant concentration should not exceed the investigation criteria by more than 250%, and;<br>– The standard deviation of individual contaminants should not exceed 50% of the investigation criteria.<br><br>The Site will be deemed to contain contamination "hotspots" if any of the above criteria are unfulfilled. |
| 6 | Specify Limits on Decision Errors | Field and laboratory quality controls are implemented to avoid error and to ensure the action levels exceed the measurement detection limits. The performance of decision making inputs will be enhanced through the application of Data Quality Indicators (DQI), defined in Table 5.<br><br>A Site under investigation is assumed to be contaminated until statistically proven otherwise (eg: $H_o$= Analyte 95% UCL exceeds the Assessment Criteria), therefore two types of error are possible:<br>- Type 1 error (α or false negative), where the Site is assessed to be uncontaminated when it is actually is; and<br>- Type 2 error (β or false positive), when the Site is assessed to be contaminated though is actually not.<br><br>The more severe consequence is with Type 1 errors (α) since the risk of jeopardising human or environmental health outweighs the consequences of additional remediation costs. Therefore, to achieve appropriate confidence in the data, probabilities are set at 5% for Type 1 error, whilst Type 2 errors are set at a 20% probability limit. |
| 7 | Optimise Design for Obtaining Data | – Ensure access to all relevant and previous environmental data.<br>– Identify the most resource-effective sampling and analysis design for general data that are expected to satisfy the DQOs. |

**Table 5: Summary of DQIs**

| | |
|---|---|
| **DATA PRECISION AND ACCURACY** | |
| **Acceptable Relative Percentage Difference (RPD)** | >10 x Limit of Reporting (LOR): 30% inorganics; 50% organics (field)<br><10 x LOR: Assessed on individual basis (field)<br>>5 x LOR: 50% (laboratory)<br><5 x LOR: No Limit (laboratory) |
| **Adequate Laboratory Performance** | Based on acceptance criteria of laboratory as specified on certificate of analysis, includes: blank samples, control samples, and surrogate spike samples.<br>Use of analytical laboratories with adequately trained and experienced testing staff experienced in the analyses undertaken, with appropriate NATA certification. |
| **DATA REPRESENTATIVENESS** | |
| **Sample and Analysis Selection** | Representativeness of all contaminants of concern. |
| **Laboratory Selection** | Adequate laboratory internal quality control and quality assurance methods, complying with the NEPM (NEPC, 2013). |
| **DOCUMENTATION COMPLETENESS** | |
| **Chain of Custody Records** | Laboratory sample receipt information received confirming receipt of samples intact and appropriate chain of custody. |
| | NATA registered laboratory results certificates provided. |
| **DATA COMPLETENESS** | |
| | Analysis for all contaminants of concern. |
| | Field duplicate sample numbers complying with NEPM (NEPC, 2013) |
| **COMPARABILITY** | |
| | Use of NATA registered laboratories. |
| | Detailed logs of all sample locations recorded. |
| | Test methods comparable between primary and secondary laboratory |
| | Acceptable RPD's between original samples and field duplicates and inter-laboratory duplicate samples. |

## 4.2 Field Investigation Procedure

Field investigation carried out as part of the Supplementary Investigation comprised the collection of 14 primary soil samples from nine hand auger boreholes (BH1 to BH4, BH5/1, BH5/2, BH6 to BH8). Sampling was performed on a targeted basis in areas of the Site that were not previously subject to intrusive investigation.

For a site covering an area of approximately 8 hectares, the NSW EPA (1995) *Sampling Design Guidelines* recommend a minimum of 95 test locations be targeted for assessment. Given the fact that the comprises an existing residential subdivision and is occupied by multiple dwellings, it was not possible to achieve the recommended sampling density. However, based on the known current and historical use of the Site, and the results from the DSI (JBS&G, 2016), it is considered that widespread contamination of the subsurface is unlikely, therefore the reduced sampling density is considered adequate for the purposes of the combined investigations.

The justification of the sampling point regime for the investigation was based on the investigator's knowledge, operational requirements and experience.

Refer to **Figure 2** – Site Layout and Supplementary Sample Locations.

#### 4.2.1 Sample Collection

Boreholes were drilled using a hand auger to depths between 0.4m and 0.8m below ground level (bgl). Soil samples were obtained directly off the auger and immediately transferred to sample containers of appropriate composition (glass jars for chemical analysis, zip-lock plastic bags for asbestos). Job number; sample identification number; sampler's initials and date of sampling were recorded on sample labels affixed to the sample containers.

Chemical samples were immediately placed into a chilled cooler to minimise the potential for loss of volatile components during storage and transport. Chemical samples were stored and transported at temperatures below 4°C. Samples were transported under standard DLA chain-of-custody protocols to Envirolab Services Pty Ltd, a NATA accredited laboratory.

Soil samples were not screened in the field for the presence of volatile organic compounds using a Photoionization Detection as all samples collected were submitted for analysis for volatile contaminants of concern.

Samples were collected by DLA staff who are specifically trained in hazardous waste field investigation techniques and health and safety procedures. Field sampling techniques used are specified in DLA Field Manual for Contaminated Sites, which are based on methods specified in the NEPM (NEPC, 2013).

### 4.3 Analytical Strategy

Soil samples were analysed for the contaminants of potential concern COPC presented in Table 6.

**Table 6: Analytical Schedule**

| SOIL SAMPLES | NO. OF PRIMARY SAMPLES |
|---|---|
| Total Recoverable Hydrocarbons (TRH) | 14 |
| Benzene, Toluene, Ethylbenzene, Xylene (BTEX) | 14 |
| Polycyclic Aromatic Hydrocarbons (PAH) | 14 |
| Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn) | 14 |
| Organochlorine / Organophosphorus Pesticides (OC/OP) | 8 |
| Polychlorinated Biphenyls (PCBs) | 8 |
| Asbestos (presence / absence) | 8 |

## 4.4 Investigation Criteria

The investigation criteria have been derived from NEPM (NEPC, 2013) and are specific to the proposed development scenario for the Site.

The investigation criteria are not clean up criteria, but are indicative of a level of contamination above which there is a potentially unacceptable risk which may require further assessment, management or remediation.

### 4.4.1 Health Investigation Levels

The Health Investigation Levels (HILs) are scientifically based, generic assessment criteria designed to be used in the first stage (Tier 1) of an assessment of potential risks to human health from chronic exposure to contaminants. They are intentionally conservative and are based on a reasonable worst case scenario for four generic land use scenarios. Considering the proposed land use, the following HIL has been adopted:

- HIL A – Residential with gardens and accessible soil.

The adopted HILs from Table 1A(1) and Table 7, Schedule B1 of NEPM (NEPC, 2013) are shown in Table 7.

## Table 7: Health Investigation Levels for Soils

| ANALYTES | HIL-A |
|---|---|
| **Heavy Metals** | |
| Arsenic | 100 |
| Cadmium | 20 |
| Chromium | 100 |
| Copper | 6,000 |
| Lead | 300 |
| Mercury | 40 |
| Nickel | 400 |
| Zinc | 7,400 |
| **PAH** | |
| BaP TEQ | 3 |
| Total PAHs | 300 |
| **PCB** | |
| PCB | 1 |
| **Pesticides** | |
| DDT+DDE+DDD | 240 |
| Aldrin and Dieldrin | 6 |
| Chlordane | 50 |
| Endosulfan | 270 |
| Endrin | 10 |
| Heptachlor | 6 |
| HCB | 10 |
| Methoxychlor | 300 |
| Mirex | 10 |
| Toxaphene | 20 |
| **Asbestos** | |
| Asbestos | Not Detected |

Health Investigation Levels soured from NEPM (NEPC, 2013) Table 1A(1)
BaP (TEQ): Benzo(a)pyrene Toxic Equivalence Quotient. Toxic Equivalence Quotient (TEQ) expresses an aggregate measure of toxicity based on a number of contributing PAH compounds.

### 4.4.2 Health Screening Levels

Health Screening Levels (HSLs) are used to assess selected petroleum compounds and fractions to assess the risk to human health via inhalation and direct contact with affected soils. The HSLs were developed by the Co-operative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) and were derived through the consideration of health effects only, with particular emphasis on the vapour exposure pathway. Other considerations such as ecological risk, aesthetics, the presence of free phase product and explosive / fire risk are not addressed by the HSLs.

In order to determine whether the HSLs tabulated in Schedule B1 of NEPC (2013) are applicable or whether a site-specific determination is required, CRC CARE provide an application checklist which should be completed prior to using the HSLs. The following parameters were considered in completing the checklist:

- **Potential Contaminants –** Petroleum Hydrocarbons;
- **Land use –** HSL A;
- **Potential Pathways –** soil vapour intrusion, direct contact;
- **Media –** soil;
- **Soil Types –** clay is the dominant sub-surface profile; and
- **Depth to Contamination –** all data will be compared with the HSLs.

On the basis of these considerations, the following HSL has been adopted:

- HIL A & HSL B – Low – high density residential for ‘clay’ (or ‘fine’).

The adopted soil HSLs for vapour intrusion from Table 1A(3), Schedule B1 of NEPM (NEPC, 2013) are shown in Table 8.

**Table 8: Health Screening Levels for Soils (Clay)**

| ANALYTES | HSL-A (Clay) 0 to 1.0m | Direct Contact HSL-A |
|---|---|---|
| **Benzene** | 0.7 | 100 |
| **Toluene** | 480 | 14,000 |
| **Ethylbenzene** | NL | 4,500 |
| **Xylenes** | 110 | 12,000 |
| **Naphthalene** | 5 | 1,400 |
| **F1: $C_6$-$C_{10}$** | 50 | 4,400 |
| **F2: $C_{10}$-$C_{16}$** | 280 | 3,300 |
| **F3: $C_{16}$-$C_{34}$** | NA | 4,500 |
| **F4: $C_{34}$-$C_{40}$** | NA | 6,300 |

**NL =** Not Limiting (i.e. the soil vapour concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario).

**NA =** Not Applicable (i.e. NEPM (NEPC, 2013) does not provide HSLs for the F3 and F4 hydrocarbon fractions).

Vapour Intrusion Criteria sourced from NEPM (NEPC, 2013) *Table 1A(3).*

Direct Contact Criteria sourced from Friebel and Nadebaum 2011, Health Screening Levels for petroleum Hydrocarbons in Soil and Groundwater, Part 1: Technical Development Document, *Table A4 – Soil Health Screening Levels for Direct Contact.*

### 4.4.3 Management Limits

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

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

Management Limits (ML) to avoid or minimise these potential effects have been adopted in NEPM (NEPC, 2013) as interim Tier 1 guidance.

The adopted management limits from Table 1B(7), Schedule B1 of NEPM (NEPC, 2013) are shown in Table 9.

**Table 9: Management Limits for Soils (Fine)**

| ANALYTES | ML (Fine) Urban Residential and Public Open Space |
|---|---|
| **F1: $C_6$-$C_{10}$** | 800 |
| **F2: $C_{10}$-$C_{16}$** | 1,000 |
| **F3: $C_{16}$-$C_{34}$** | 3,500 |
| **F4: $C_{34}$-$C_{40}$** | 10,000 |

Management Limits sourced from NEPM (NEPC, 2013) *Table 1 B(7).*

### 4.4.4 Ecological Investigation Levels

According to NEPM (NEPC, 2013), Schedule B (5a) – *Guideline on Ecological Risk Assessment*, factors that may influence a Risk Management Decision (and therefore determine Ecological Risk Assessment outcomes) are generally based on economic, ecological or societal considerations.

Examples include:

- The size of the site, land value, cost of remediation (economic);
- The type of contaminants present, current and potential site land use, surrounding land use (societal); and
- The ecological significance (e.g. a rare and endangered species or a species that supports a valued ecological process or a sensitive introduced species of low ecological significance) of the values identified in the Receptor Identification component of Ecological Risk Assessment to be protected.

EILs have been implemented to environmentally manage the effect of contaminants on terrestrial ecosystems and species sensitivity. The EILs referenced in this report have been developed for the generic land use setting of urban residential areas and public open space. It is important to note that the contamination is assumed to be aged (>2 years), as fresh contamination associated with current industrial / agricultural activity and chemical spills are not likely present on-site. EILs have been derived for: Arsenic (As), Copper (Cu), Chromium (CrIII), DDT, naphthalene, Nickel (Ni), Lead (Pb) and Zinc (Zn).

**Ambient Background Concentration (ABC)**

For Ni, CrIII, Zn and Pb (aged contamination), the EILs are the sum of Added Contaminant Limits (ACLs) and Ambient Background Concentrations (ABCs). To establish the ABC of a contaminant, the recommended method is to measure the ABC at an appropriate unpolluted reference site. Sample

BH5/2 was determined to be the most appropriate unpolluted reference location for the purposes of ABCs. The sample was collected from reworked natural sandy clay at a depth of 0.5-0.8m bgl and the soils at this location are therefore considered characteristic of natural clays in the region.

For As, DDT and Naphthalene (aged contamination), the EILs are generically obtained (i.e. not dependent on soil type).

**Added Contaminant Limit (ACL)**

The Added Contaminant Limit (ACL) is the added contamination (in excess of the ABC). ACLs are applicable to Cr III, Cu, Ni and Zn and are based on soils properties of pH, Cation Exchange Capacity (CEC) and the clay content.

The soil type at BH5/2 was identified to be reworked natural sandy clay, allowing for a clay content percentage in excess of 90%. The pH for the soils was analysed by the laboratory to be 6.1 (rounded down to 6.0 for the purposes of deriving the ACLs). A conservative CEC of 25cmol$_c$/kg has been adopted in the determination of the ACLs below.

The respective soil EILs are provided in Table 10.

**Table 10: Ecological Investigation Levels**

| ANALYTES | ABC | ACL | EIL |
|---|---|---|---|
| **Arsenic** | -- | -- | 100 [1] |
| **Chromium (III)** | 10 | 400 [2] | 410 |
| **Copper** | 2 | 215 [3] | 217 |
| **Lead** | 9 | 1,100 [4] | 1,109 |
| **Nickel** | 2 | 310 [5] | 312 |
| **Zinc** | 7 | 400 [6] | 407 |
| **DDT** | -- | -- | 180 [7] |
| **Naphthalene** | -- | -- | 170 [8] |

**1.** NEPM (NEPC, 2013) Schedule B1 Table 1B(5).
**2.** NEPM (NEPC, 2013) Schedule B1 Table 1B(3).
**3.** NEPM (NEPC, 2013) Schedule B1 Table 1B(2). CEC has been used for this calculation.
**4.** NEPM (NEPC, 2013) Schedule B1 Table 1B(4).
**5.** NEPM (NEPC, 2013) Schedule B1 Table 1B(3).
**6.** NEPM (NEPC, 2013) Schedule B1 Table 1B(1).
**7.** NEPM (NEPC, 2013) Schedule B1 Table 1B(5).
**8.** NEPM (NEPC, 2013) Schedule B1 Table 1B(5).

### 4.4.5 Ecological Screening Levels

Ecological screening levels (ESLs) have been developed for selected petroleum hydrocarbon compounds and are applicable for assessing risk to terrestrial ecosystems. ESLs broadly apply to coarse and fine-grained soils and various land uses. They are generally applicable to the top 2 m of soil.

The adopted ESLs from Table 1B(6), Schedule B1 of NEPM (NEPC, 2013) are shown in Table 11.

**Table 11: Ecological Screening Levels (Fine)**

| ANALYTES | ESL (Fine) Urban Residential and Public Open Space |
|---|---|
| **Benzene** | 65 |
| **Toluene** | 105 |
| **Ethylbenzene** | 125 |
| **Xylenes** | 45 |
| **Benzo(a)Pyrene** | 0.7 |
| **F1: $C_6$-$C_{10}$** | 180 |
| **F2: $C_{10}$-$C_{16}$** | 120 |
| **F3: $C_{16}$-$C_{34}$** | 1,300 |
| **F4: $C_{34}$-$C_{40}$** | 5,600 |

Ecological Screening Levels sourced from NEPM (NEPC, 2013) *Table 1 B(6).*

# 5.0 QUALITY ASSURANCE AND QUALITY CONTROL

## 5.1 Field Quality Assurance / Quality Control

### 5.1.1 Sampling Team

Soil sampling was undertaken by Matthew Junghans, an experienced environmental consultant from DLA.

### 5.1.2 Field Procedures

The following field procedures were implemented as part of field quality assurance / quality control (QA/QC):

- **Sample Containers:** soil samples collected during the investigation were placed immediately into laboratory prepared glass jars with Teflon lid inserts, and zip-lock plastic bags. Standard identification labels were adhered to each individual container and labelled according to depth, date, sampling team and media collected;
- **Decontamination:** all equipment used in the sampling program was decontaminated prior to use and between samples to minimise the potential for cross contamination. Decontamination of equipment involved:
    - Cleaning equipment in potable water to remove gross contamination;
    - Cleaning in a solution of Decon 90; and
    - Rinsing in clean demineralised water.
- **Chain of Custody**: samples were recorded on a chain of custody form. The chain of custody form accompanied samples upon dispatch to the NATA registered laboratories for analysis. Copies of the chain of custody forms, signed by laboratory, that acknowledged sample receipt date and time, samples received in good condition and properly chilled and documentation received in proper order, are provided in **Appendix B**;
- **Photoionisation Detector:** given that volatile contaminants were not considered a primary contaminant of concern as part of either the DSI or supplementary investigation, screening of the samples using a photoionisation detector was not considered necessary. Regardless, all soil samples collected as part of the supplementary investigations were submitted for laboratory analysis for TRH and BTEX.
- **Trip Spike / Trip Blank:** Trip spikes are used to assess whether volatile contaminants in samples may have been lost during transport. Trip blanks are used to assess whether volatile contamination may have been introduced to a sample during shipping and handling. Given the absence of potential sources of hydrocarbon-based contamination identified on-site at

the time of fieldwork, hydrocarbons were not considered a primary contaminant of concern. Consequently, the collection of trip spikes and trip blanks was not considered necessary. The absence of detectable volatile hydrocarbon concentrations in soil samples suggests that the loss or transfer of volatile contamination from and between soil samples is unlikely. The absence of trip spike and trip blank sample data is not considered to affect the precision or accuracy of the laboratory data, or the conclusions of the overall assessment.

- **Rinsate Blanks**: Rinsate blanks are used to assess the effectiveness of field decontamination techniques in minimising cross-contamination of samples. Rinsate blanks were not collected during fieldwork. All care was taken to remove soil adhered to the hand auger between each sampling interval, and sampling equipment was decontaminated between each borehole location. As such, the potential for cross contamination was considered minimal. The absence of rinsate blank sample data is not considered to affect the precision or accuracy of the laboratory data, or the conclusions of the overall assessment.

### 5.1.3 Field QA/QC Duplicate Analysis

Field duplicate samples for soil were prepared in the field through the following process:

- A larger than normal quantity of soil is recovered from the sample location selected for duplication;
- The sample is placed in a decontaminated stainless bowl and mixed as thoroughly as practicable before being divided into equal parts;
- Two portions of the sub-sample are immediately transferred, one for an intra-laboratory duplicate and another as a sample; and
- Samples are placed into a labelled, laboratory supplied 250ml glass jar and sealed with an airtight, Teflon screw top lid. The fully filled jars are labelled as the sample and duplicate and immediately placed in a chilled cooler.

Duplicate samples were prepared on the basis of sample numbers recovered during the field work. The duplicate sample frequency was computed using the total number of samples analysed as part of this assessment. The duplicate sample frequencies are shown below:

| | | | |
|---|---|---|---|
| **SOIL SAMPLES** | **14 Samples** | 2 intra-laboratory duplicate | 14% |

An intra-laboratory duplicate rate of 14% was achieved which is greater than that recommended by the Field Quality Plan. No inter-laboratory duplicate samples were collected for analysis. Given the limited number of primary samples collected overall, the field duplicate sampling ratio is considered sufficient for the purposes of this investigation to assess the precision of the project laboratory.

Comparisons were made of the laboratory test results for the duplicate samples with the original samples and the Relative Percentage Difference (RPD) calculated as difference/average in order to assess the accuracy of the sampling and laboratory test procedures. The comparisons between the duplicates and original samples indicate acceptable RPDs when they comply with criteria which are commonly set at:

- Less than 30% for inorganics and 50% for organics;
- Less than five times the laboratory LOR; and
- The difference between concentrations is less than 5% of the relevant HIL concentration.

Field duplicates provide an indication of the whole validation process, including the sampling process, sample preparation and analysis.

Two intra-laboratory duplicate exceeded the DQO of 30% for two heavy metal concentrations. The differences in concentrations of the following intra-laboratory duplicate pair reported concentrations of less than five times the LOR:

- BH7_0.2-0.7 / BH7_0.2-0.7A for nickel (100%).

The differences in concentrations of the following intra-laboratory duplicate pairs were for reported concentrations of less than 5% of the relevant HIL concentration:

- BH7_0.2-0.7 / BH7_0.2-0.7A for nickel (100%); and
- BH7_0.2-0.7 / BH7_0.2-0.7A for zinc (44%).

It is to be noted that for samples with concentrations of less than the LOR, the concentration has been modified to half the LOR value to assist in statistical RPD calculations and data quality assessment.

RPD results are tabulated in **Appendix A** – Data Summary Tables.

## 5.2 Laboratory QA/QC

### 5.2.1 Selected Laboratory

The laboratory for used for the analysis of primary soil samples and intra-laboratory duplicate samples was Envirolab Services Pty Ltd located at Chatswood in Sydney. The analytical methods and procedures used by the laboratory are NATA certified and meet requirements of NEPM (NEPC, 2013).

### 5.2.2 Laboratory Control Measures

The project laboratory adopted a quality program that comprises of reagent/method blanks, matrix spikes, surrogate spikes, laboratory duplicates and laboratory control samples at or in excess of current NEPM and Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines.

### 5.2.3 Laboratory QA/QC Results

Soil samples were received at the laboratory in good order, with the correct documentation and were adequately chilled. All samples were analysed within the recommended holding times. The signed sample receipt advice is included on the chain of custody forms.

A laboratory quality control summary and full laboratory QA/QC checklist is included on the laboratory reports presented in **Appendix B**. Laboratory QA/QC procedures to determine the accuracy and precision of the analyses comprised the following:

- No target analytes were detected in any of the method blanks, indicating that the analytical method was satisfactory and no contamination occurred;
- Matrix spike samples were within the accepted range indicating low matrix interference;
- Surrogate spikes were within the accepted range indicating no gross errors have occurred in the analysis procedure leading to significant analyte loss;
- Laboratory control samples were within the accepted range confirming primary calibration; and
- RPDs for the duplicate control samples were found to be within the acceptable limit.

## 5.3 QA/QC Assessment

Based on the QA/QC results, DLA considers the field measurement data and laboratory analytical results obtained are valid and meet the data quality objectives set for this Supplementary Investigation. DLA concludes that the field and laboratory data presented herein is representative of the overall Site condition at the time of fieldwork.

# 6.0 RESULTS

## 6.1 Fieldwork Observations

Subsurface conditions are presented in detail in the borehole logs presented in **Appendix C**. The subsurface typically consisted of sandy loam topsoil to depths between 0.1m and 0.5m bgl, overlying reworked excavated siltstone / claystone bedrock.

No visual or olfactory evidence of contamination (i.e. staining or odours) was recorded during fieldwork. No anthropogenic material, including fragments of fibre cement sheeting, was observed.

## 6.2 Analytical Results

The results of the soil sampling are summarised below.

Refer to **Appendix A –** Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

### 6.2.1 Total Recoverable Hydrocarbons and Monocyclic Aromatic Hydrocarbons

The results of the laboratory analysis reported TRH and BTEX in soil at concentrations less than the adopted investigation criteria with the exception of the following:

- Sample BH8_0.0-0.4 reported TRH F2 (>$C_{10}$-$C_{16}$) at a concentration of 250mg/kg which exceeds the adopted HSL and the ESL; and
- Sample BH8_0.1-0.4 reported TRH F2 (>$C_{10}$-$C_{16}$) at a concentration of 120mg/kg which exceeds the adopted ESL.

### 6.2.2 Polycyclic Aromatic Hydrocarbons

The results of the laboratory analysis reported PAHs in soil at concentrations less than the laboratory LOR and the adopted investigation criteria.

### 6.2.3 Pesticides and Polychlorinated Biphenyls

The results of the laboratory analysis reported pesticides and PCBs in soil at concentrations less than the laboratory LOR and the adopted investigation criteria.

### 6.2.4 Heavy Metals

The results of the laboratory analysis reported heavy metals in soil at concentrations less than the adopted investigation criteria.

### 6.2.5 Asbestos

Asbestos was not detected in any of the soil samples submitted for laboratory analysis.

# 7.0 DISCUSSION

## 7.1 Soil Contamination

The objective of this Supplementary Investigation was to assess the suitability of the areas of the Site no previously subject to investigation for future residential land use from a contamination perspective.

Intrusive investigations indicated that the subsurface of the Site comprises sandy loam topsoil overlying reworked excavated siltstone / claystone bedrock.

Soil samples were collected from nine boreholes and comprised both topsoil material and reworked natural soils and bedrock. The samples were submitted for laboratory analysis for a suite of typical contaminants of potential concern.

Soil samples from borehole BH8 reported TRH F2 (>$C_{10}$-$C_{16}$) at concentrations exceeding the HSL and ESL. Hydrocarbon concentrations exceeding the HSL have the potential to pose a risk to human health through ingestion of soil, dermal contact with soil, and inhalation of vapours due to the volatile nature of the identified contamination. Vegetation in the vicinity of the impacted soil may also be affected. The vertical extent of the TRH impact was not delineated as part of the current investigation. No visual source of petroleum hydrocarbon contamination was observed during fieldwork, therefore it is considered likely that this impact is a result of a localised spillage or leakage of fuel.

Given that borehole BH8 was drilled in an area of the Site separate from the other boreholes, application of statistical analysis to further assess the risk to human health was not considered appropriate.

All other soil samples reported contaminant concentrations below the adopted investigation and screening levels. In addition, asbestos was not detected in any of the samples submitted for analysis.

## 7.2 Preliminary Waste Classification

A preliminary waste classification has been carried out using existing analytical data to provide an indicative classification to facilitate off-site disposal of excavated soil, if required. Analytical results were compared against the contaminant thresholds presented in Table 1 of the NSW EPA (2014) *Waste Classification Guidelines, Part 1: Classifying Waste*. The data indicates that both the topsoil and underlying reworked natural material are classified as General Solid Waste, non-putrescible.

A more detailed assessment of the fill material underlying the Site would be required to more thoroughly classify this material to facilitate appropriate off-site disposal.

# 8.0 CONCLUSIONS AND RECOMMENDIATIONS

The sampling regime and subsequent assessment undertaken as part of this Supplementary Investigation are considered to be adequate for providing supplementary data pertaining to the Site, which is to be considered in conjunction with the previously prepared DSI report (JBS&G, 2016).

The combined data presented in the DSI and this Supplementary Investigation report is considered sufficient to allow assessment of the suitability of the Site for future land use in accordance with the general requirements of SEPP 55. Reporting has been undertaken in accordance with the *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW OEH, 2011) and the *Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 2nd ed., 2006).

Based on the results of the current investigation data, DLA concludes that the area of the Site in the vicinity of borehole BH8 is not currently considered suitable for the proposed redevelopment from a contamination perspective due to the presence of TRH in soil.

Although the Site is not considered suitable for the proposed land use in its current condition, DLA considers that the Site can be made suitable with further assessment and the implementation of an appropriate remediation strategy.

Further investigation and remediation of the Site would include:

1. Delineation soil sampling and laboratory analysis;
2. Preparation of a Remediation Action Plan for the Site;
3. Remediation of the Site which would include the excavation and appropriate off-site disposal of TRH contaminated soils;
4. Validation sampling of the Site; and
5. Preparation of a Site Validation Report.

## 9.0 REFERENCES

AS 4482.1-2005 *Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil Part 1: Non-Volatile and Semi-Volatile Compounds*.

DLA (2016). *Summary of In-Ground Contamination – Ivanhoe Estate, Cnr Herring and Epping Roads, Macquarie Park NSW 2113*. DLA Environmental Services.

Friebel, E and Nadebaum, P (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater, Part 2: Application document, CRC CARE Technical Report no. 10.* CRC for Contamination Assessment and Remediation of the Environment.

JBS&G (2016). *Detailed Site Investigation – Ivanhoe Estate, Herring Road, Macquarie Park NSW.* JBS&G Pty Ltd.

NEPC (1999). *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1).* National Environment Protection Council.

NSW DEC (2006). *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme 2nd edition.* New South Wales Department of Environment and Conservation.

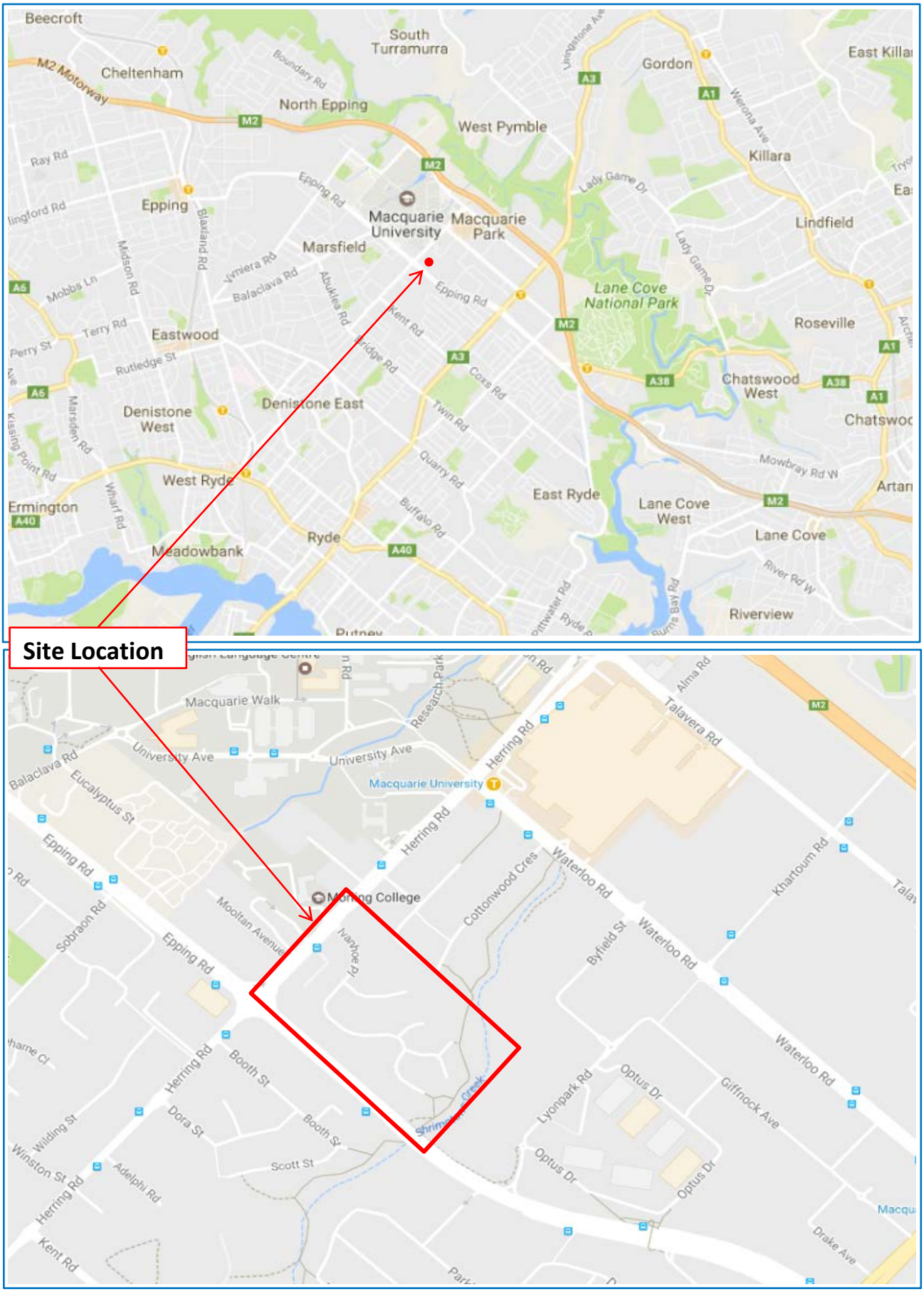
NSW EPA (1995). *Contaminated Sites: Sampling Design Guidelines.* New South Wales Environment Protection Authority.

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

NSW OEH (2011). *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*. New South Wales Office of Environment and Heritage.

# FIGURE 1

SITE LOCATION




| | | | | |
|---|---|---|---|---|
| DLA Environmental Services<br>Unit 3, 38 Leighton Place<br>Hornsby NSW 2077 | **DESIGNED:** DLA<br>**COMPILED:** SK<br>**PROJ. No.** DL3953 | **FIGURE TITLE:** | SITE LOCATION | |
| | | **PROJECT TITLE:** | Ivanhoe Estate, Macquarie Park NSW | **DATE:** 02/06/2017 |
| | | **CLIENT:** | Frasers Property Australia | **FIGURE:** 1 |

# FIGURE 2

SITE LAYOUT AND SUPPLEMENTARY SAMPLE LOCATIONS

DLA Environmental Services
A Pacific Environment company

Compiled
AR


**Legend**

- Site Boundary
- Sample Locactions (approximate)
- Altered Topography Areas

N

Approximate Scale

0m 75m 130m

Figure Title
Additional Investigation Locations

Project Title
Ivanhoe Estate, Macquarie Park

Client
Frasers Property Australia

| Project No. | Date | Scale | Figure No. | Revision |
|---|---|---|---|---|
| DL 3953 | 15/02/2018 | As Shown | 1 | Version 1.1 |

# APPENDIX A

DATA SUMMARY TABLES

**Table 1 - Soil Analytical Results**
**Supplementary Investigation**
**'Ivanhoe Estate'**
**Macquarie Park NSW**

DLA Environmental Services
A Pacific Environment Company

| Sample ID | Depth (m) | Date | Chemical Report | Asbestos | BTEX | | | | Naphthalene | TRH | | | | PAH | | Pesticides | | PCB | Heavy Metals | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Benzene | Toluene | Ethylbenzene | Xylene | | F1 | F2 | F3 | F4 | BaP TEQ | Total PAH | OCP | OPP | | As | Cd | Cr VI | Cu | Pb | Hg | Ni | Zn |
| **SITE ASSESSMENT CRITERIA** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HIL A Residential (NEPC, 2013) | | | | ND | - | - | - | - | - | - | - | - | - | 3 | 300 | - | - | - | 100 | 20 | 100 | 6000 | 300 | 40 | 400 | 7400 |
| HSL A Residential, 0-<1m, sand (NEPM, 2013) | | | | - | 0.5 | 160 | 55 | 40 | 3 | 45 | 110 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| HSL A Direct Contact (Friebel, et al, 2011) | | | | - | 400 | 14000 | 4500 | 12000 | 1400 | 4400 | 3300 | 4500 | 6300 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Management Limits, Urban Residential, fine (NEPC, 2013) | | | | - | - | - | - | - | - | 700 | 1000 | 2500 | 10000 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| EIL Urban Residential / Public Open Space (NEPC, 2013) | | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 100 | - | 410 | 217 | 1109 | - | 312 | 407 |
| ESL Urban Residential / Public Open Space, coarse (NEPM, 2013) | | | | - | 50 | 85 | 70 | 45 | - | 180 | 120 | 300 | 2800 | 0.7 | - | - | - | - | - | - | - | - | - | - | - | - |
| **PRIMARY SAMPLES** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BH1 | 0.1-0.2 | 24-May-17 | 167858 | ND | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 | <0.1 | <0.1 | <0.1 | 7 | <0.4 | 20 | 21 | 25 | <0.1 | 8 | 31 |
| BH1 | 0.2-0.5 | 24-May-17 | 167858 | - | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 | - | - | - | 7 | <0.4 | 17 | 18 | 32 | <0.1 | 7 | 29 |
| BH2 | 0.1-0.4 | 24-May-17 | 167858 | ND | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 | <0.1 | <0.1 | <0.1 | 5 | <0.4 | 45 | 17 | 11 | <0.1 | 36 | 25 |
| BH2 | 0.5-0.6 | 24-May-17 | 167858 | - | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 | - | - | - | 7 | <0.4 | 14 | 12 | 16 | <0.1 | 3 | 7 |
| BH3 | 0.0-0.1 | 24-May-17 | 167858 | ND | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | 140 | <100 | <0.5 | <0.05 | <0.1 | <0.1 | <0.1 | 8 | <0.4 | 23 | 8 | 22 | <0.1 | 4 | 16 |
| BH3 | 0.1-0.8 | 24-May-17 | 167858 | - | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 | - | - | - | 7 | <0.4 | 14 | 17 | 22 | <0.1 | 2 | 16 |
| BH4 | 0.1-0.2 | 24-May-17 | 167858 | ND | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 | <0.1 | <0.1 | <0.1 | 8 | <0.4 | 9 | 5 | 6 | <0.1 | 7 | 17 |
| BH4 | 0.2-0.4 | 24-May-17 | 167858 | - | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 | - | - | - | 5 | <0.4 | 18 | 18 | 14 | <0.1 | 14 | 33 |
| BH5/1 | 0.1-0.5 | 24-May-17 | 167858 | ND | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 | <0.1 | <0.1 | <0.1 | <4 | <0.4 | 6 | 8 | 8 | <0.1 | 5 | 32 |
| BH5/2 | 0.5-0.8 | 24-May-17 | 167858 | - | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 | - | - | - | <4 | <0.4 | 10 | 2 | 9 | <0.1 | 2 | 7 |
| BH6 | 0.1-0.5 | 24-May-17 | 167858 | ND | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 | <0.1 | <0.1 | <0.1 | <4 | <0.4 | 8 | 2 | 8 | <0.1 | 1 | 4 |
| BH7 | 0.2-0.7 | 24-May-17 | 167858 | ND | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 | <0.1 | <0.1 | <0.1 | <4 | <0.4 | 10 | 3 | 8 | <0.1 | 1 | 7 |
| BH8 | 0.0-0.1 | 24-May-17 | 167858 | ND | <0.2 | <0.5 | <1 | <1 | <1 | <25 | 250 | 650 | 170 | <0.5 | <0.05 | <0.1 | <0.1 | <0.1 | <4 | <0.4 | 14 | 8 | 14 | <0.1 | 3 | 22 |
| BH8 | 0.1-0.4 | 24-May-17 | 167858 | - | <0.2 | <0.5 | <1 | <1 | <1 | <25 | 120 | 180 | <100 | <0.5 | <0.05 | - | - | - | <4 | <0.4 | 12 | 5 | 12 | <0.1 | 2 | 13 |
| **INTRA-LABORATORY DUPLICATE** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BH2 | 0.1-0.4A | 24-May-17 | 167858 | ND | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | 140 | <100 | <0.5 | <0.05 | <0.1 | <0.1 | <0.1 | 4 | <0.4 | 44 | 20 | 11 | <0.1 | 42 | 29 |
| BH7 | 0.2-0.7A | 24-May-17 | 167858 | ND | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | 140 | <100 | <0.5 | <0.05 | <0.1 | <0.1 | <0.1 | <4 | <0.4 | 10 | 4 | 8 | <0.1 | 3 | 11 |
| **STATISTICAL ANALYSIS** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Min | MiMin | | | | 0 | 0 | 0 | 0 | 0 | 0 | 120 | 140 | 170 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 6 | 2 | 6 | 0 | 1 | 4 |
| Max | MaMax | | | | 0 | 0 | 0 | 0 | 0 | 0 | 250 | 650 | 170 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 45 | 21 | 32 | 0 | 36 | 33 |
| Avg | AvAvg | | | | - | - | - | - | - | - | 185 | 323 | 170 | - | - | - | - | - | 7 | - | 16 | 10 | 15 | - | 7 | 19 |
| Stdev | | | | | - | - | - | - | - | - | 92 | 284 | - | - | - | - | - | - | 1 | - | 10 | 7 | 8 | - | 9 | 10 |

Reported in mg/kg unless stated otherwise

* Depth relates to Depth Below Surface Level

nd = not detected above laboratory LOR

NL = Not Limiting

RED = Exceeds HIL Criteria

YELLOW = Exceeds EIL Criteria

**Table 2 - RPD Results**
**Supplementary Investigation**
**'Ivanhoe Estate'**
**Macquarie Park NSW**

| Sample ID | Date | Report | BTEX | | | | | TRH | | | | PAH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Benzene | Toluene | EthylBenzene | Xylene | Naphthalene | F1 | F2 | F3 | F4 | B(a)P TEQ | Total |
| **INTRA-LABORATORY** | | | | | | | | | | | | | |
| BH2_0.1-0.4 | 24-May-17 | 167858 | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 |
| BH2_0.1-0.4A | 24-May-17 | 167858 | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | 140 | <100 | <0.5 | <0.05 |
| **RPD** | | | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |
| BH7_0.2-0.7 | 24-May-17 | 167858 | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | <100 | <100 | <0.5 | <0.05 |
| BH7_0.2-0.7A | 24-May-17 | 167858.0 | <0.2 | <0.5 | <1 | <1 | <1 | <25 | <50 | 140 | <100 | <0.5 | <0.05 |
| **RPD** | | | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** | **NA** |

| Sample ID | Date | Report | Heavy Metals | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | As | Cd | Cr | Cu | Pb | Hg | Ni | Zn |
| **INTRA-LABORATORY** | | | | | | | | | | |
| BH2_0.1-0.4 | 24-May-17 | 167858 | 5 | <0.4 | 45 | 17 | 11 | <0.1 | 36 | 25 |
| BH2_0.1-0.4A | 24-May-17 | 167858 | 4 | <0.4 | 44 | 20 | 11 | <0.1 | 42 | 29 |
| **RPD** | | | **22%** | **NA** | **2%** | **16%** | **0%** | **NA** | **15%** | **15%** |
| BH7_0.2-0.7 | 24-May-17 | 167858 | <4 | <0.4 | 10 | 3 | 8 | <0.1 | 1 | 7 |
| BH7_0.2-0.7A | 24-May-17 | 167858 | <4 | <0.4 | 10 | 4 | 8 | <0.1 | 3 | 11 |
| **RPD** | | | **NA** | **NA** | **0%** | **29%** | **0%** | **NA** | ***100%*** | ***44%*** |

# APPENDIX B

NATA CERTIFIED ANALYTICAL DATA

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Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

# CERTIFICATE OF ANALYSIS 167858

**Client:**

**DLA Environmental Services Pty Ltd**
Unit 3, 38 Leighton Pl
Hornsby
NSW 2077

**Attention:** Matthew Junghans

**Sample log in details:**

| | | | |
|---|---|---|---|
| Your Reference: | **DL3953 - Maq Parts** | | |
| No. of samples: | 16 soils | | |
| Date samples received / completed instructions received | 25/05/17 | / | 25/05/17 |

**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: / Issue Date: | 1/06/17 | / | 30/05/17 |
| Date of Preliminary Report: | Not Issued | | |

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

**Results Approved By:**

David Springer
General Manager

| vTRH(C6-C10)/BTEXN in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-1 | 167858-2 | 167858-3 | 167858-4 | 167858-5 |
| Your Reference | ---------- - | BH1 | BH1 | BH2 | BH2 | BH2 |
| Depth | ---------- | 0.1-0.2 | 0.2-0.5 | 0.1-0.4 | 0.1-0.4A | 0.6 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| TRHC6 - C9 | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRHC6 - C10 | mg/kg | <25 | <25 | <25 | <25 | <25 |
| vTPHC6 - C10 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 |
| Total +ve Xylenes | mg/kg | <1 | <1 | <1 | <1 | <1 |
| naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 90 | 101 | 106 | 94 | 93 |

| vTRH(C6-C10)/BTEXN in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-6 | 167858-7 | 167858-8 | 167858-9 | 167858-10 |
| Your Reference | ---------- - | BH3 | BH3 | BH4 | BH4 | BH5/1 |
| Depth | ---------- | 0.1-0.1 | 0.1-0.8 | 0.1-0.2 | 0.2-0.4 | 0.1-0.5 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| TRHC6 - C9 | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRHC6 - C10 | mg/kg | <25 | <25 | <25 | <25 | <25 |
| vTPHC6 - C10 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 |
| Total +ve Xylenes | mg/kg | <1 | <1 | <1 | <1 | <1 |
| naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 105 | 94 | 89 | 106 | 93 |

| vTRH(C6-C10)/BTEXN in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-11 | 167858-12 | 167858-13 | 167858-14 | 167858-15 |
| Your Reference | ---------- - | BH5/2 | BH6 | BH7 | BH7 | BH8 |
| Depth | ---------- | 0.5-0.8 | 0.1-0.5 | 0.2-0.7 | 0.2-0.7A | 0.1-0.1 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 27/05/2017 | 27/05/2017 | 27/05/2017 | 27/05/2017 | 27/05/2017 |
| TRHC$_6$ - C$_9$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| TRHC$_6$ - C$_{10}$ | mg/kg | <25 | <25 | <25 | <25 | <25 |
| vTPHC$_6$ - 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 |
| Total +ve Xylenes | mg/kg | <1 | <1 | <1 | <1 | <1 |
| naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 101 | 97 | 103 | 98 | 94 |

| vTRH(C6-C10)/BTEXN in Soil | | |
|---|---|---|
| Our Reference: | UNITS | 167858-16 |
| Your Reference | ---------- - | BH8 |
| Depth | ---------- | 0.1-0.4 |
| Date Sampled | | 24/05/2017 |
| Type of sample | | Soil |
| Date extracted | - | 26/05/2017 |
| Date analysed | - | 27/05/2017 |
| TRHC$_6$ - C$_9$ | mg/kg | <25 |
| TRHC$_6$ - C$_{10}$ | mg/kg | <25 |
| vTPHC$_6$ - C$_{10}$ less BTEX (F1) | mg/kg | <25 |
| Benzene | mg/kg | <0.2 |
| Toluene | mg/kg | <0.5 |
| Ethylbenzene | mg/kg | <1 |
| m+p-xylene | mg/kg | <2 |
| o-Xylene | mg/kg | <1 |
| Total +ve Xylenes | mg/kg | <1 |
| naphthalene | mg/kg | <1 |
| *Surrogate* aaa-Trifluorotoluene | % | 88 |

| svTRH (C10-C40) in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-1 | 167858-2 | 167858-3 | 167858-4 | 167858-5 |
| Your Reference | ---------- - | BH1 | BH1 | BH2 | BH2 | BH2 |
| Depth | ---------- | 0.1-0.2 | 0.2-0.5 | 0.1-0.4 | 0.1-0.4A | 0.6 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| TRHC$_{10}$ - C$_{14}$ | mg/kg | <50 | <50 | <50 | <50 | <50 |
| TRHC$_{15}$ - C$_{28}$ | mg/kg | <100 | <100 | <100 | <100 | <100 |
| TRHC$_{29}$ - C$_{36}$ | mg/kg | <100 | <100 | <100 | <100 | <100 |
| TRH>C$_{10}$-C$_{16}$ | mg/kg | <50 | <50 | <50 | <50 | <50 |
| TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2) | mg/kg | <50 | <50 | <50 | <50 | <50 |
| TRH>C$_{16}$-C$_{34}$ | mg/kg | <100 | <100 | <100 | <100 | <100 |
| TRH>C$_{34}$-C$_{40}$ | mg/kg | <100 | <100 | <100 | <100 | <100 |
| Total +ve TRH (>C10-C40) | mg/kg | <50 | <50 | <50 | <50 | <50 |
| *Surrogate* o-Terphenyl | % | 89 | 87 | 89 | 89 | 87 |

| svTRH (C10-C40) in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-6 | 167858-7 | 167858-8 | 167858-9 | 167858-10 |
| Your Reference | ---------- - | BH3 | BH3 | BH4 | BH4 | BH5/1 |
| Depth | ---------- | 0.1-0.1 | 0.1-0.8 | 0.1-0.2 | 0.2-0.4 | 0.1-0.5 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| TRHC$_{10}$ - C$_{14}$ | mg/kg | <50 | <50 | <50 | <50 | <50 |
| TRHC$_{15}$ - C$_{28}$ | mg/kg | <100 | <100 | <100 | <100 | <100 |
| TRHC$_{29}$ - C$_{36}$ | mg/kg | 110 | <100 | <100 | <100 | <100 |
| TRH>C$_{10}$-C$_{16}$ | mg/kg | <50 | <50 | <50 | <50 | <50 |
| TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2) | mg/kg | <50 | <50 | <50 | <50 | <50 |
| TRH>C$_{16}$-C$_{34}$ | mg/kg | 140 | <100 | <100 | <100 | <100 |
| TRH>C$_{34}$-C$_{40}$ | mg/kg | <100 | <100 | <100 | <100 | <100 |
| Total +ve TRH (>C10-C40) | mg/kg | 140 | <50 | <50 | <50 | <50 |
| *Surrogate* o-Terphenyl | % | 94 | 90 | 88 | 89 | 87 |

| svTRH (C10-C40) in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-11 | 167858-12 | 167858-13 | 167858-14 | 167858-15 |
| Your Reference | ---------- - | BH5/2 | BH6 | BH7 | BH7 | BH8 |
| Depth | ---------- | 0.5-0.8 | 0.1-0.5 | 0.2-0.7 | 0.2-0.7A | 0.1-0.1 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| TRHC$_{10}$ - C$_{14}$ | mg/kg | <50 | <50 | <50 | <50 | <50 |
| TRHC$_{15}$ - C$_{28}$ | mg/kg | <100 | <100 | <100 | <100 | 470 |
| TRHC$_{29}$ - C$_{36}$ | mg/kg | <100 | <100 | <100 | <100 | 440 |
| TRH>C$_{10}$-C$_{16}$ | mg/kg | <50 | <50 | <50 | <50 | 250 |
| TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2) | mg/kg | <50 | <50 | <50 | <50 | 250 |
| TRH>C$_{16}$-C$_{34}$ | mg/kg | <100 | <100 | <100 | <100 | 650 |
| TRH>C$_{34}$-C$_{40}$ | mg/kg | <100 | <100 | <100 | <100 | 170 |
| Total +ve TRH (>C10-C40) | mg/kg | <50 | <50 | <50 | <50 | 1,100 |
| *Surrogate* o-Terphenyl | % | 88 | 90 | 88 | 89 | 105 |

| svTRH (C10-C40) in Soil | | |
|---|---|---|
| Our Reference: | UNITS | 167858-16 |
| Your Reference | ---------- - | BH8 |
| Depth | ---------- | 0.1-0.4 |
| Date Sampled | | 24/05/2017 |
| Type of sample | | Soil |
| Date extracted | - | 26/05/2017 |
| Date analysed | - | 26/05/2017 |
| TRHC$_{10}$ - C$_{14}$ | mg/kg | <50 |
| TRHC$_{15}$ - C$_{28}$ | mg/kg | 170 |
| TRHC$_{29}$ - C$_{36}$ | mg/kg | 140 |
| TRH>C$_{10}$-C$_{16}$ | mg/kg | 120 |
| TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2) | mg/kg | 120 |
| TRH>C$_{16}$-C$_{34}$ | mg/kg | 180 |
| TRH>C$_{34}$-C$_{40}$ | mg/kg | <100 |
| Total +ve TRH (>C10-C40) | mg/kg | 300 |
| *Surrogate* o-Terphenyl | % | 103 |

| PAHs in Soil<br>Our Reference:<br>Your Reference<br><br>Depth<br>Date Sampled<br>Type of sample | UNITS<br>----------<br>-<br>----------<br><br><br> | 167858-1<br>BH1<br><br>0.1-0.2<br>24/05/2017<br>Soil | 167858-2<br>BH1<br><br>0.2-0.5<br>24/05/2017<br>Soil | 167858-3<br>BH2<br><br>0.1-0.4<br>24/05/2017<br>Soil | 167858-4<br>BH2<br><br>0.1-0.4A<br>24/05/2017<br>Soil | 167858-5<br>BH2<br><br>0.6<br>24/05/2017<br>Soil |
|---|---|---|---|---|---|---|
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 |
| Naphthalene | mg/kg | <0.1 | <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 | <0.1 | <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 |
| 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 |
| Total +ve PAH's | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| *Surrogate p*-Terphenyl-d14 | % | 117 | 118 | 113 | 115 | 114 |

| PAHs in Soil<br>Our Reference:<br>Your Reference<br><br>Depth<br>Date Sampled<br>Type of sample | UNITS<br>----------<br>-<br>----------<br><br><br> | 167858-6<br>BH3<br><br>0.1-0.1<br>24/05/2017<br>Soil | 167858-7<br>BH3<br><br>0.1-0.8<br>24/05/2017<br>Soil | 167858-8<br>BH4<br><br>0.1-0.2<br>24/05/2017<br>Soil | 167858-9<br>BH4<br><br>0.2-0.4<br>24/05/2017<br>Soil | 167858-10<br>BH5/1<br><br>0.1-0.5<br>24/05/2017<br>Soil |
|---|---|---|---|---|---|---|
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 |
| Naphthalene | mg/kg | <0.1 | <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 | <0.1 | <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 |
| 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 |
| Total +ve PAH's | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| *Surrogate p*-Terphenyl-d14 | % | 122 | 117 | 115 | 117 | 115 |

| PAHs in Soil<br>Our Reference:<br>Your Reference<br><br>Depth<br>Date Sampled<br>Type of sample | UNITS<br>----------<br>-<br>----------<br><br><br> | 167858-11<br>BH5/2<br><br>0.5-0.8<br>24/05/2017<br>Soil | 167858-12<br>BH6<br><br>0.1-0.5<br>24/05/2017<br>Soil | 167858-13<br>BH7<br><br>0.2-0.7<br>24/05/2017<br>Soil | 167858-14<br>BH7<br><br>0.2-0.7A<br>24/05/2017<br>Soil | 167858-15<br>BH8<br><br>0.1-0.1<br>24/05/2017<br>Soil |
|---|---|---|---|---|---|---|
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 |
| Naphthalene | mg/kg | <0.1 | <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 | <0.1 | <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 |
| 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 |
| Total +ve PAH's | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| *Surrogate p*-Terphenyl-d14 | % | 114 | 115 | 118 | 115 | 122 |

| PAHs in Soil | | |
|---|---|---|
| Our Reference: | UNITS | 167858-16 |
| Your Reference | ---------- | BH8 |
| | - | |
| Depth | ---------- | 0.1-0.4 |
| Date Sampled | | 24/05/2017 |
| Type of sample | | Soil |
| Date extracted | - | 26/05/2017 |
| Date analysed | - | 29/05/2017 |
| 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 |
| 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 |
| Total +ve PAH's | mg/kg | <0.05 |
| *Surrogate p*-Terphenyl-d14 | % | 128 |

| Organochlorine Pesticides in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-1 | 167858-3 | 167858-4 | 167858-6 | 167858-8 |
| Your Reference | ---------- | BH1 | BH2 | BH2 | BH3 | BH4 |
| | - | | | | | |
| Depth | ---------- | 0.1-0.2 | 0.1-0.4 | 0.1-0.4A | 0.1-0.1 | 0.1-0.2 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| 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 | % | 89 | 97 | 91 | 88 | 90 |

| Organochlorine Pesticides in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-10 | 167858-12 | 167858-13 | 167858-14 | 167858-15 |
| Your Reference | ---------- | BH5/1 | BH6 | BH7 | BH7 | BH8 |
| | - | | | | | |
| Depth | ---------- | 0.1-0.5 | 0.1-0.5 | 0.2-0.7 | 0.2-0.7A | 0.1-0.1 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| 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 | % | 91 | 89 | 90 | 90 | 88 |

| Organophosphorus Pesticides | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-1 | 167858-3 | 167858-4 | 167858-6 | 167858-8 |
| Your Reference | ---------- - | BH1 | BH2 | BH2 | BH3 | BH4 |
| Depth | ---------- | 0.1-0.2 | 0.1-0.4 | 0.1-0.4A | 0.1-0.1 | 0.1-0.2 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| 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 | % | 89 | 97 | 91 | 88 | 90 |

| Organophosphorus Pesticides | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-10 | 167858-12 | 167858-13 | 167858-14 | 167858-15 |
| Your Reference | ---------- - | BH5/1 | BH6 | BH7 | BH7 | BH8 |
| Depth | ---------- | 0.1-0.5 | 0.1-0.5 | 0.2-0.7 | 0.2-0.7A | 0.1-0.1 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| 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 | % | 91 | 89 | 90 | 90 | 88 |

| PCBs in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-1 | 167858-3 | 167858-4 | 167858-6 | 167858-8 |
| Your Reference | ---------- | BH1 | BH2 | BH2 | BH3 | BH4 |
| Depth | - ---------- | 0.1-0.2 | 0.1-0.4 | 0.1-0.4A | 0.1-0.1 | 0.1-0.2 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| 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* TCLMX | % | 89 | 97 | 91 | 88 | 90 |

| PCBs in Soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-10 | 167858-12 | 167858-13 | 167858-14 | 167858-15 |
| Your Reference | ---------- | BH5/1 | BH6 | BH7 | BH7 | BH8 |
| Depth | - ---------- | 0.1-0.5 | 0.1-0.5 | 0.2-0.7 | 0.2-0.7A | 0.1-0.1 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date extracted | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| 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* TCLMX | % | 91 | 89 | 90 | 90 | 88 |

| Acid Extractable metals in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-1 | 167858-2 | 167858-3 | 167858-4 | 167858-5 |
| Your Reference | ---------- | BH1 | BH1 | BH2 | BH2 | BH2 |
| | - | | | | | |
| Depth | ---------- | 0.1-0.2 | 0.2-0.5 | 0.1-0.4 | 0.1-0.4A | 0.6 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date prepared | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Arsenic | mg/kg | 7 | 7 | 5 | 4 | 7 |
| Cadmium | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Chromium | mg/kg | 20 | 17 | 45 | 44 | 14 |
| Copper | mg/kg | 21 | 18 | 17 | 20 | 12 |
| Lead | mg/kg | 25 | 32 | 11 | 11 | 16 |
| Mercury | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Nickel | mg/kg | 8 | 7 | 36 | 42 | 3 |
| Zinc | mg/kg | 31 | 29 | 25 | 29 | 7 |

| Acid Extractable metals in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-6 | 167858-7 | 167858-8 | 167858-9 | 167858-10 |
| Your Reference | ---------- | BH3 | BH3 | BH4 | BH4 | BH5/1 |
| | - | | | | | |
| Depth | ---------- | 0.1-0.1 | 0.1-0.8 | 0.1-0.2 | 0.2-0.4 | 0.1-0.5 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date prepared | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Arsenic | mg/kg | 8 | 7 | 8 | 5 | <4 |
| Cadmium | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Chromium | mg/kg | 23 | 14 | 9 | 18 | 6 |
| Copper | mg/kg | 8 | 17 | 5 | 18 | 8 |
| Lead | mg/kg | 22 | 22 | 6 | 14 | 8 |
| Mercury | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Nickel | mg/kg | 4 | 2 | 7 | 14 | 5 |
| Zinc | mg/kg | 16 | 16 | 17 | 33 | 32 |

| Acid Extractable metals in soil | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-11 | 167858-12 | 167858-13 | 167858-14 | 167858-15 |
| Your Reference | ---------- | BH5/2 | BH6 | BH7 | BH7 | BH8 |
| Depth | - ---------- | 0.5-0.8 | 0.1-0.5 | 0.2-0.7 | 0.2-0.7A | 0.1-0.1 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date prepared | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Arsenic | mg/kg | <4 | <4 | <4 | <4 | <4 |
| Cadmium | mg/kg | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Chromium | mg/kg | 10 | 8 | 10 | 10 | 14 |
| Copper | mg/kg | 2 | 2 | 3 | 4 | 8 |
| Lead | mg/kg | 9 | 8 | 8 | 8 | 14 |
| Mercury | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Nickel | mg/kg | 2 | 1 | 1 | 3 | 3 |
| Zinc | mg/kg | 7 | 4 | 7 | 11 | 22 |

| Acid Extractable metals in soil | | |
|---|---|---|
| Our Reference: | UNITS | 167858-16 |
| Your Reference | ---------- | BH8 |
| Depth | - ---------- | 0.1-0.4 |
| Date Sampled | | 24/05/2017 |
| Type of sample | | Soil |
| Date prepared | - | 26/05/2017 |
| Date analysed | - | 26/05/2017 |
| Arsenic | mg/kg | <4 |
| Cadmium | mg/kg | <0.4 |
| Chromium | mg/kg | 12 |
| Copper | mg/kg | 5 |
| Lead | mg/kg | 12 |
| Mercury | mg/kg | <0.1 |
| Nickel | mg/kg | 2 |
| Zinc | mg/kg | 13 |

| Misc Inorg - Soil | | |
|---|---|---|
| Our Reference: | UNITS | 167858-12 |
| Your Reference | ---------- - | BH6 |
| Depth | ---------- | 0.1-0.5 |
| Date Sampled | | 24/05/2017 |
| Type of sample | | Soil |
| Date prepared | - | 29/05/2017 |
| Date analysed | - | 29/05/2017 |
| pH 1:5 soil:water | pH Units | 6.1 |
| Electrical Conductivity 1:5 soil:water | µS/cm | 48 |

| Moisture | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-1 | 167858-2 | 167858-3 | 167858-4 | 167858-5 |
| Your Reference | ---------- - | BH1 | BH1 | BH2 | BH2 | BH2 |
| Depth | ---------- | 0.1-0.2 | 0.2-0.5 | 0.1-0.4 | 0.1-0.4A | 0.6 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date prepared | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 |
| Moisture | % | 10 | 8.5 | 7.9 | 9.9 | 11 |

| Moisture | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-6 | 167858-7 | 167858-8 | 167858-9 | 167858-10 |
| Your Reference | ---------- - | BH3 | BH3 | BH4 | BH4 | BH5/1 |
| Depth | ---------- | 0.1-0.1 | 0.1-0.8 | 0.1-0.2 | 0.2-0.4 | 0.1-0.5 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date prepared | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 |
| Moisture | % | 14 | 9.7 | 7.9 | 9.0 | 8.6 |

| Moisture | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-11 | 167858-12 | 167858-13 | 167858-14 | 167858-15 |
| Your Reference | ---------- - | BH5/2 | BH6 | BH7 | BH7 | BH8 |
| Depth | ---------- | 0.5-0.8 | 0.1-0.5 | 0.2-0.7 | 0.2-0.7A | 0.1-0.1 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date prepared | - | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 | 26/05/2017 |
| Date analysed | - | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 | 29/05/2017 |
| Moisture | % | 9.5 | 6.3 | 8.9 | 8.6 | 15 |

| Moisture | | |
|---|---|---|
| Our Reference: | UNITS | 167858-16 |
| Your Reference | ---------- - | BH8 |
| Depth | ---------- | 0.1-0.4 |
| Date Sampled | | 24/05/2017 |
| Type of sample | | Soil |
| Date prepared | - | 26/05/2017 |
| Date analysed | - | 29/05/2017 |
| Moisture | % | 7.0 |

| Asbestos ID - soils | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference: | UNITS | 167858-1 | 167858-3 | 167858-4 | 167858-6 | 167858-8 |
| Your Reference | ---------- - | BH1 | BH2 | BH2 | BH3 | BH4 |
| Depth | ---------- | 0.1-0.2 | 0.1-0.4 | 0.1-0.4A | 0.1-0.1 | 0.1-0.2 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date analysed | - | 30/05/2017 | 30/05/2017 | 30/05/2017 | 30/05/2017 | 30/05/2017 |
| Sample mass tested | g | Approx. 35g | Approx. 35g | Approx. 35g | Approx. 35g | Approx. 45g |
| Sample Description | - | Brown coarse-grained soil & rocks | Brown coarse-grained soil & rocks | Brown coarse-grained soil & rocks | Brown coarse-grained soil & rocks | Brown sandy soil |
| 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: | UNITS | 167858-10 | 167858-12 | 167858-13 | 167858-14 | 167858-15 |
| Your Reference | ---------- - | BH5/1 | BH6 | BH7 | BH7 | BH8 |
| Depth | ---------- | 0.1-0.5 | 0.1-0.5 | 0.2-0.7 | 0.2-0.7A | 0.1-0.1 |
| Date Sampled | | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 | 24/05/2017 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date analysed | - | 30/05/2017 | 30/05/2017 | 30/05/2017 | 30/05/2017 | 30/05/2017 |
| Sample mass tested | g | Approx. 40g | Approx. 45g | Approx. 35g | Approx. 35g | Approx. 35g |
| Sample Description | - | Brown sandy soil | Brown sandy soil | Brown sandy soil | Brown sandy soil | Brown coarse-grained 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 |

| Method ID | Methodology Summary |
|---|---|
| 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.<br>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. |
| Org-014 | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. |
| Org-003 | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.<br>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.<br><br>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.<br><br>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-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.<br>For soil results:-<br>1. 'TEQ 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.<br>2. 'TEQ 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.<br>3. 'TEQ 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.<br>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-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.<br>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-008 | Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. |
| 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.<br>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. |

| Method ID | Methodology Summary |
|---|---|
| Metals-020 | Determination of various metals by ICP-AES. |
| Metals-021 | Determination of Mercury by Cold Vapour AAS. |
| 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-002 | Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons. |
| Inorg-008 | Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours. |
| 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. |

| QUALITY CONTROL<br>vTRH(C6-C10)/BTEXN in Soil | UNITS | PQL | METHOD | Blank | Duplicate Sm# | Duplicate results<br>Base ll Duplicate ll %RPD | Spike Sm# | Spike % Recovery |
|---|---|---|---|---|---|---|---|---|
| Date extracted | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| Date analysed | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| TRHC$_{6}$ - C$_{9}$ | mg/kg | 25 | Org-016 | <25 | 167858-1 | <25 \|\| <25 | LCS-9 | 102% |
| TRHC$_{6}$ - C$_{10}$ | mg/kg | 25 | Org-016 | <25 | 167858-1 | <25 \|\| <25 | LCS-9 | 102% |
| Benzene | mg/kg | 0.2 | Org-016 | <0.2 | 167858-1 | <0.2 \|\| <0.2 | LCS-9 | 107% |
| Toluene | mg/kg | 0.5 | Org-016 | <0.5 | 167858-1 | <0.5 \|\| <0.5 | LCS-9 | 101% |
| Ethylbenzene | mg/kg | 1 | Org-016 | <1 | 167858-1 | <1 \|\| <1 | LCS-9 | 96% |
| m+p-xylene | mg/kg | 2 | Org-016 | <2 | 167858-1 | <2 \|\| <2 | LCS-9 | 103% |
| o-Xylene | mg/kg | 1 | Org-016 | <1 | 167858-1 | <1 \|\| <1 | LCS-9 | 98% |
| naphthalene | mg/kg | 1 | Org-014 | <1 | 167858-1 | <1 \|\| <1 | [NR] | [NR] |
| *Surrogate* aaa-Trifluorotoluene | % | | Org-016 | 101 | 167858-1 | 90 \|\| 96 \|\| RPD: 6 | LCS-9 | 104% |

| QUALITY CONTROL<br>svTRH (C10-C40) in Soil | UNITS | PQL | METHOD | Blank | Duplicate Sm# | Duplicate results<br>Base ll Duplicate ll %RPD | Spike Sm# | Spike % Recovery |
|---|---|---|---|---|---|---|---|---|
| Date extracted | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| Date analysed | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| TRHC$_{10}$ - C$_{14}$ | mg/kg | 50 | Org-003 | <50 | 167858-1 | <50 \|\| <50 | LCS-9 | 96% |
| TRHC$_{15}$ - C$_{28}$ | mg/kg | 100 | Org-003 | <100 | 167858-1 | <100 \|\| <100 | LCS-9 | 98% |
| TRHC$_{29}$ - C$_{36}$ | mg/kg | 100 | Org-003 | <100 | 167858-1 | <100 \|\| <100 | LCS-9 | 87% |
| TRH>C$_{10}$-C$_{16}$ | mg/kg | 50 | Org-003 | <50 | 167858-1 | <50 \|\| <50 | LCS-9 | 96% |
| TRH>C$_{16}$-C$_{34}$ | mg/kg | 100 | Org-003 | <100 | 167858-1 | <100 \|\| <100 | LCS-9 | 98% |
| TRH>C$_{34}$-C$_{40}$ | mg/kg | 100 | Org-003 | <100 | 167858-1 | <100 \|\| <100 | LCS-9 | 87% |
| *Surrogate* o-Terphenyl | % | | Org-003 | 103 | 167858-1 | 89 \|\| 91 \|\| RPD: 2 | LCS-9 | 119% |

| QUALITY CONTROL<br>PAHs in Soil | UNITS | PQL | METHOD | Blank | Duplicate Sm# | Duplicate results<br>Base ll Duplicate ll %RPD | Spike Sm# | Spike % Recovery |
|---|---|---|---|---|---|---|---|---|
| Date extracted | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| Date analysed | - | | | 29/05/2017 | 167858-1 | 29/05/2017 \|\| 29/05/2017 | LCS-9 | 29/05/2017 |
| Naphthalene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 107% |
| Acenaphthylene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Acenaphthene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Fluorene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 92% |
| Phenanthrene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 114% |
| Anthracene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Fluoranthene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 116% |
| Pyrene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 121% |
| Benzo(a)anthracene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Chrysene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 110% |
| Benzo(b,j+k) fluoranthene | mg/kg | 0.2 | Org-012 | <0.2 | 167858-1 | <0.2 \|\| <0.2 | [NR] | [NR] |

| QUALITY CONTROL<br><br>PAHs in Soil | UNITS | PQL | METHOD | Blank | Duplicate Sm# | Duplicate results<br><br>Base ll Duplicate ll %RPD | Spike Sm# | Spike % Recovery |
|---|---|---|---|---|---|---|---|---|
| Benzo(a)pyrene | mg/kg | 0.05 | Org-012 | <0.05 | 167858-1 | <0.05 \|\| <0.05 | LCS-9 | 117% |
| Indeno(1,2,3-c,d)pyrene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Dibenzo(a,h)anthracene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Benzo(g,h,i)perylene | mg/kg | 0.1 | Org-012 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| *Surrogate p*-Terphenyl-d14 | % | | Org-012 | 123 | 167858-1 | 117 \|\| 122 \|\| RPD: 4 | LCS-9 | 112% |
| QUALITY CONTROL<br><br>Organochlorine Pesticides in soil | UNITS | PQL | METHOD | Blank | Duplicate Sm# | Duplicate results<br><br>Base ll Duplicate ll %RPD | Spike Sm# | Spike % Recovery |
| Date extracted | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| Date analysed | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| HCB | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| alpha-BHC | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 108% |
| gamma-BHC | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| beta-BHC | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 99% |
| Heptachlor | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 109% |
| delta-BHC | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aldrin | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 95% |
| Heptachlor Epoxide | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 107% |
| gamma-Chlordane | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| alpha-chlordane | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Endosulfan I | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| pp-DDE | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 120% |
| Dieldrin | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 111% |
| Endrin | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 110% |
| pp-DDD | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 114% |
| Endosulfan II | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| pp-DDT | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Endrin Aldehyde | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Endosulfan Sulphate | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 109% |
| Methoxychlor | mg/kg | 0.1 | Org-005 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| *Surrogate* TCMX | % | | Org-005 | 98 | 167858-1 | 89 \|\| 90 \|\| RPD: 1 | LCS-9 | 116% |

| QUALITY CONTROL<br><br>Organophosphorus Pesticides | UNITS | PQL | METHOD | Blank | Duplicate Sm# | Duplicate results<br><br>Base ll Duplicate ll %RPD | Spike Sm# | Spike % Recovery |
|---|---|---|---|---|---|---|---|---|
| Date extracted | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| Date analysed | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| Azinphos-methyl (Guthion) | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Bromophos-ethyl | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Chlorpyriphos | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 81% |
| Chlorpyriphos-methyl | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Diazinon | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Dichlorvos | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 84% |
| Dimethoate | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Ethion | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 88% |
| Fenitrothion | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 82% |
| Malathion | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 77% |
| Parathion | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 83% |
| Ronnel | mg/kg | 0.1 | Org-008 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 87% |
| *Surrogate* TCMX | % | | Org-008 | 98 | 167858-1 | 89 \|\| 90 \|\| RPD: 1 | LCS-9 | 91% |
| QUALITY CONTROL<br><br>PCBs in Soil | UNITS | PQL | METHOD | Blank | Duplicate Sm# | Duplicate results<br><br>Base ll Duplicate ll %RPD | Spike Sm# | Spike % Recovery |
| Date extracted | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| Date analysed | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| Aroclor 1016 | mg/kg | 0.1 | Org-006 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aroclor 1221 | mg/kg | 0.1 | Org-006 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aroclor 1232 | mg/kg | 0.1 | Org-006 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aroclor 1242 | mg/kg | 0.1 | Org-006 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aroclor 1248 | mg/kg | 0.1 | Org-006 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aroclor 1254 | mg/kg | 0.1 | Org-006 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 100% |
| Aroclor 1260 | mg/kg | 0.1 | Org-006 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | [NR] | [NR] |
| *Surrogate* TCLMX | % | | Org-006 | 98 | 167858-1 | 89 \|\| 90 \|\| RPD: 1 | LCS-9 | 91% |

| QUALITY CONTROL<br><br>Acid Extractable metals in soil | UNITS | PQL | METHOD | Blank | Duplicate Sm# | Duplicate results<br><br>Base II Duplicate II %RPD | Spike Sm# | Spike % Recovery |
|---|---|---|---|---|---|---|---|---|
| Date prepared | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| Date analysed | - | | | 26/05/2017 | 167858-1 | 26/05/2017 \|\| 26/05/2017 | LCS-9 | 26/05/2017 |
| Arsenic | mg/kg | 4 | Metals-020 | <4 | 167858-1 | 7 \|\| 7 \|\| RPD: 0 | LCS-9 | 115% |
| Cadmium | mg/kg | 0.4 | Metals-020 | <0.4 | 167858-1 | <0.4 \|\| <0.4 | LCS-9 | 98% |
| Chromium | mg/kg | 1 | Metals-020 | <1 | 167858-1 | 20 \|\| 19 \|\| RPD: 5 | LCS-9 | 107% |
| Copper | mg/kg | 1 | Metals-020 | <1 | 167858-1 | 21 \|\| 17 \|\| RPD: 21 | LCS-9 | 110% |
| Lead | mg/kg | 1 | Metals-020 | <1 | 167858-1 | 25 \|\| 28 \|\| RPD: 11 | LCS-9 | 102% |
| Mercury | mg/kg | 0.1 | Metals-021 | <0.1 | 167858-1 | <0.1 \|\| <0.1 | LCS-9 | 97% |
| Nickel | mg/kg | 1 | Metals-020 | <1 | 167858-1 | 8 \|\| 6 \|\| RPD: 29 | LCS-9 | 98% |
| Zinc | mg/kg | 1 | Metals-020 | <1 | 167858-1 | 31 \|\| 32 \|\| RPD: 3 | LCS-9 | 101% |

| QUALITY CONTROL<br><br>Misc Inorg - Soil | UNITS | PQL | METHOD | Blank | Duplicate Sm# | Duplicate results<br><br>Base II Duplicate II %RPD | Spike Sm# | Spike % Recovery |
|---|---|---|---|---|---|---|---|---|
| Date prepared | - | | | 29/05/2017 | [NT] | [NT] | LCS-9 | 29/05/2017 |
| Date analysed | - | | | 29/05/2017 | [NT] | [NT] | LCS-9 | 29/05/2017 |
| pH 1:5 soil:water | pH Units | | Inorg-001 | [NT] | [NT] | [NT] | LCS-9 | 102% |
| Electrical Conductivity 1:5 soil:water | µS/cm | 1 | Inorg-002 | <1 | [NT] | [NT] | LCS-9 | 100% |

| QUALITY CONTROL<br>vTRH(C6-C10)/BTEXN in Soil | UNITS | Dup. Sm# | Duplicate<br>Base + Duplicate + %RPD | Spike Sm# | Spike % Recovery |
|---|---|---|---|---|---|
| Date extracted | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| Date analysed | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| $TRHC_6$ - $C_9$ | mg/kg | 167858-10 | <25 \|\| <25 | 167858-3 | 81% |
| $TRHC_6$ - $C_{10}$ | mg/kg | 167858-10 | <25 \|\| <25 | 167858-3 | 81% |
| Benzene | mg/kg | 167858-10 | <0.2 \|\| <0.2 | 167858-3 | 82% |
| Toluene | mg/kg | 167858-10 | <0.5 \|\| <0.5 | 167858-3 | 81% |
| Ethylbenzene | mg/kg | 167858-10 | <1 \|\| <1 | 167858-3 | 74% |
| m+p-xylene | mg/kg | 167858-10 | <2 \|\| <2 | 167858-3 | 83% |
| o-Xylene | mg/kg | 167858-10 | <1 \|\| <1 | 167858-3 | 75% |
| naphthalene | mg/kg | 167858-10 | <1 \|\| <1 | [NR] | [NR] |
| *Surrogate* aaa-Trifluorotoluene | % | 167858-10 | 93 \|\| 101 \|\| RPD: 8 | 167858-3 | 107% |

| QUALITY CONTROL svTRH (C10-C40) in Soil | UNITS | Dup. Sm# | Duplicate Base + Duplicate + %RPD | Spike Sm# | Spike % Recovery |
|---|---|---|---|---|---|
| Date extracted | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| Date analysed | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| TRHC$_{10}$ - C$_{14}$ | mg/kg | 167858-10 | <50 \|\| <50 | 167858-3 | 103% |
| TRHC$_{15}$ - C$_{28}$ | mg/kg | 167858-10 | <100 \|\| <100 | 167858-3 | 107% |
| TRHC$_{29}$ - C$_{36}$ | mg/kg | 167858-10 | <100 \|\| <100 | 167858-3 | 113% |
| TRH>C$_{10}$-C$_{16}$ | mg/kg | 167858-10 | <50 \|\| <50 | 167858-3 | 103% |
| TRH>C$_{16}$-C$_{34}$ | mg/kg | 167858-10 | <100 \|\| <100 | 167858-3 | 107% |
| TRH>C$_{34}$-C$_{40}$ | mg/kg | 167858-10 | <100 \|\| <100 | 167858-3 | 113% |
| *Surrogate* o-Terphenyl | % | 167858-10 | 87 \|\| 89 \|\| RPD: 2 | 167858-3 | 89% |
| QUALITY CONTROL PAHs in Soil | UNITS | Dup. Sm# | Duplicate Base + Duplicate + %RPD | Spike Sm# | Spike % Recovery |
| Date extracted | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| Date analysed | - | 167858-10 | 29/05/2017 \|\| 29/05/2017 | 167858-3 | 29/05/2017 |
| Naphthalene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 107% |
| Acenaphthylene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Acenaphthene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Fluorene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 89% |
| Phenanthrene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 103% |
| Anthracene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Fluoranthene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 110% |
| Pyrene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 121% |
| Benzo(a)anthracene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Chrysene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 102% |
| Benzo(b,j+k)fluoranthene | mg/kg | 167858-10 | <0.2 \|\| <0.2 | [NR] | [NR] |
| Benzo(a)pyrene | mg/kg | 167858-10 | <0.05 \|\| <0.05 | 167858-3 | 114% |
| Indeno(1,2,3-c,d)pyrene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Dibenzo(a,h)anthracene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Benzo(g,h,i)perylene | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| *Surrogate p*-Terphenyl-d14 | % | 167858-10 | 115 \|\| 118 \|\| RPD: 3 | 167858-3 | 116% |

| QUALITY CONTROL Organochlorine Pesticides in soil | UNITS | Dup. Sm# | Duplicate Base + Duplicate + %RPD | Spike Sm# | Spike % Recovery |
|---|---|---|---|---|---|
| Date extracted | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| Date analysed | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| HCB | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| alpha-BHC | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 105% |
| gamma-BHC | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| beta-BHC | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 98% |
| Heptachlor | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 106% |
| delta-BHC | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aldrin | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 92% |
| Heptachlor Epoxide | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 103% |
| gamma-Chlordane | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| alpha-chlordane | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Endosulfan I | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| pp-DDE | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 117% |
| Dieldrin | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 108% |
| Endrin | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 106% |
| pp-DDD | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 111% |
| Endosulfan II | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| pp-DDT | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Endrin Aldehyde | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Endosulfan Sulphate | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 104% |
| Methoxychlor | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| *Surrogate* TCMX | % | 167858-10 | 91 \|\| 90 \|\| RPD: 1 | 167858-3 | 114% |

| QUALITY CONTROL Organophosphorus Pesticides | UNITS | Dup. Sm# | Duplicate Base + Duplicate + %RPD | Spike Sm# | Spike % Recovery |
|---|---|---|---|---|---|
| Date extracted | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| Date analysed | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| Azinphos-methyl (Guthion) | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Bromophos-ethyl | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Chlorpyriphos | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 83% |
| Chlorpyriphos-methyl | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Diazinon | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Dichlorvos | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 89% |
| Dimethoate | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Ethion | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 92% |
| Fenitrothion | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 104% |
| Malathion | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 78% |
| Parathion | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 83% |
| Ronnel | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 88% |
| *Surrogate* TCMX | % | 167858-10 | 91 \|\| 90 \|\| RPD: 1 | 167858-3 | 91% |
| QUALITY CONTROL PCBs in Soil | UNITS | Dup. Sm# | Duplicate Base + Duplicate + %RPD | Spike Sm# | Spike % Recovery |
| Date extracted | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| Date analysed | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| Aroclor 1016 | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aroclor 1221 | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aroclor 1232 | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aroclor 1242 | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aroclor 1248 | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| Aroclor 1254 | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 100% |
| Aroclor 1260 | mg/kg | 167858-10 | <0.1 \|\| <0.1 | [NR] | [NR] |
| *Surrogate* TCLMX | % | 167858-10 | 91 \|\| 90 \|\| RPD: 1 | 167858-3 | 91% |
| QUALITY CONTROL Acid Extractable metals in soil | UNITS | Dup. Sm# | Duplicate Base + Duplicate + %RPD | Spike Sm# | Spike % Recovery |
| Date prepared | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| Date analysed | - | 167858-10 | 26/05/2017 \|\| 26/05/2017 | 167858-3 | 26/05/2017 |
| Arsenic | mg/kg | 167858-10 | <4 \|\| <4 | 167858-3 | 91% |
| Cadmium | mg/kg | 167858-10 | <0.4 \|\| <0.4 | 167858-3 | 80% |
| Chromium | mg/kg | 167858-10 | 6 \|\| 6 \|\| RPD: 0 | 167858-3 | 123% |
| Copper | mg/kg | 167858-10 | 8 \|\| 10 \|\| RPD: 22 | 167858-3 | 121% |
| Lead | mg/kg | 167858-10 | 8 \|\| 9 \|\| RPD: 12 | 167858-3 | 81% |
| Mercury | mg/kg | 167858-10 | <0.1 \|\| <0.1 | 167858-3 | 98% |
| Nickel | mg/kg | 167858-10 | 5 \|\| 5 \|\| RPD: 0 | 167858-3 | 119% |
| Zinc | mg/kg | 167858-10 | 32 \|\| 38 \|\| RPD: 17 | 167858-3 | 93% |

**Report Comments:**

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Note: Samples 167858-1, 3, 4, 6, 8, 10, 12 to 15 were sub-sampled from jars provided by the client.

| | |
|---|---|
| Asbestos ID was analysed by Approved Identifier: | Lucy Zhu |
| Asbestos ID was authorised by Approved Signatory: | Lulu Scott |

| | | |
|---|---|---|
| INS: Insufficient sample for this test | PQL: Practical Quantitation Limit | NT: Not tested |
| NR: Test not required | RPD: Relative Percent Difference | NA: Test not required |
| <: Less than | >: Greater than | LCS: Laboratory Control Sample |

## 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.

## 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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
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.

# CHAIN OF CUSTODY - Client

## ENVIROLAB GROUP - National phone number 1300 42 43 44


Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au


Combo1=TRH/BTEX/Pb
Combo2=TRH/BTEX/PAH/Pb
Combo3=TRH/BTEX/PAH/Met
Combo4=TRH/BTEX/PAH/Met/Phen
Combo5=TRH/BTEX/PAH/OC/PCB/Met
Combo6=TRH/BTEX/PAH/OC/OP/PCB/Met
Combo7=TRH/BTEX/PAH/OC/PCB/Met/Phen
Combo8=TRH/BTEX/PAH/OC/OP/PCB/Met/Phen
Combo9=TRH/BTEX/PAH/OC/PCB/Met/Phen/CN
Combo10=TRH/BTEX/PAH/OC/OP/PCB/Met/Phen/CN
Combo11=TRH/BTEX/PAH/OC/PCB/12met/Phen/CN
Combo12=TRH/BTEX/PAH/OC/PCB/Met/TCLP-PAH ,6 Met
Combo13=TRH/BTEX/PAH/OC/OP/PCB/Met/TCLP-PAH ,6Met

**Client:** DLA
**Contact Person:** Matthew Jungfurs
**Project Mgr:** "
**Sampler:** "
**Address:** Unit 3/38 Leighton Place, Hornsby
**Phone:** **Mob:**
**Email:** Sydney@dlaenvironmental.com.au

**Client Project Name / Number / Site etc (ie report title):** DL30153 - May Park
**PO No.:**
**Envirolab Quote No. :**
**Date results required:**
**Or choose:** standard / same day / 1 day / 2 day / 3 day
*Note: Inform lab in advance if urgent turnaround is required -*
**Report format:** esdat / equis /
**Lab Comments:**

| Sample information | | | | | Tests Required | | | | | | | | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Envirolab Sample ID | Client Sample ID or information | Depth | Date sampled | Type of sample | Combo 6A | Combo 3 | PH/EC | | | | | | | | | | | | | Provide as much information about the sample as you can |
| 1 | BH1 - 0.1-0.2 | | 24.5.17 | Soil | X | | | | | | | | | | | | | | | |
| 2 | " - 0.2-0.5 | | | | | X | | | | | | | | | | | | | | |
| 3 | BH2 - 0.1-0.4 | | | | X | | | | | | | | | | | | | | | |
| 4 | " " " A | | | | X | | | | | | | | | | | | | | | |
| 5 | " - 0.6 | | | | | X | | | | | | | | | | | | | | |
| 6 | BH3 - 0.1-0.1 | | | | X | | | | | | | | | | | | | | | |
| 7 | " - 0.1-0.8 | | | | | X | | | | | | | | | | | | | | |
| 8 | BH4 - 0.1-0.2 | | | | X | | | | | | | | | | | | | | | |
| 9 | " - 0.2-0.4 | | | | | X | | | | | | | | | | | | | | |
| 10 | BH5/1 - 0.1-0.5 | | | | X | | | | | | | | | | | | | | | |
| 11 | 11/2 - 0.5-0.8 | | | | | X | | | | | | | | | | | | | | |
| 12 | BH6 - 0.1-0.5 | | | | X | | X | | | | | | | | | | | | | |
| 13 | BH7 - 0.2-0.7 | | | | X | | | | | | | | | | | | | | | |
| 14 | " - " " A | | | | X | X | | | | | | | | | | | | | | |
| 15 | BH8 - 0.1-0.1 | | | | X | | | | | | | | | | | | | | | |
| 16 | " - 0.1-0.4 | | | | | X | | | | | | | | | | | | | | |

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

Job No: 167858
Date Received: 25/5
Time Received: 14:15
Received by: DW
Temp: Cool/Ambient 6.5
Cooling: Ice/Icepack
Security: Intact/Broken/None

**Relinquished by (Company):** DLA
**Print Name:** Matthew Jungfurs
**Date & Time:** 25.5.17
**Signature:**

**Received by (Company):** ELS
**Print Name:** DW
**Date & Time:** 25/5/17
**Signature:**

***Lab use only:***
**Samples Received:** Cool or Ambient (circle one)
**Temperature Received at:** 6.5 (if applicable)
**Transported by:** Hand delivered / courier

*White - Lab copy / Blue - Client copy / Pink - Retain in Book*

# APPENDIX C

BOREHOLE LOGS

DLA Environmental Services
A Pacific Environment company

# Borelog

**Location** **BH1**

| | | | |
|---|---|---|---|
| Client: | Frasers Property Australia | Job Type: | Supplementary Investigation |
| Project No: | DL3953 | Address: | Ivanhoe Estate, Macquarie Park NSW |
| Date: | 24/05/2017 | Logged By: | MJ |
| Contractor: | - | Method: | Hand auger |
| Hole Size | 100mm diameter | Co-ordinates: | Not surveyed |

| Method | Depth (m) | Graphic Log | USCS Classification | Material Description | Moisture | Density / Stiffness | Sampling | Comments |
|---|---|---|---|---|---|---|---|---|
| HA | 0.1 | | | TOPSOIL: sandy loam, pale brown, sandstone fragments and siltstone / claystone fragments | | | BH1_0.1-0.2 | |
| | 0.2 | | | Reworked natural: siltstone / claystone, weathered, with sandstone fragments | | | BH1_0.2-0.5 | |
| | 0.3 | | | | | | | |
| | 0.4 | | | | | | | |
| | 0.5 | | | | | | | |
| | 0.6 | | | Borehole BH1 terminated at 0.5m depth on extremely compacted material | | | | |
| | 0.7 | | | | | | | |
| | 0.8 | | | | | | | |
| | 0.9 | | | | | | | |
| | 1.0 | | | | | | | |



**Notes:**

| **Method:** | **Consistency** | **Plasticity** | **Moisture** | **Density** |
|---|---|---|---|---|
| SS - Solid Flight Auger | VS - Very Soft | HP - HighlyPlastic | D - Dry | VL - Very Loose |
| HS - Hollow Flight Auger | S - Soft | MP - Medium Plasticity | M - Moist | L - Loose |
| CC - Concrete Core | F - Firm | LP - Low Plasticity | W - Wet | MD - Medium Density |
| PT - Push Tube | VS - Very Stiff | | | D - Dense |
| RC - Rock Coring | H - Hard | | | VD - Very Dense |
| HA - Hand Auger | Friable - Fb | | | |

# Borelog

**Location** **BH2**

| | | | |
|---|---|---|---|
| Client: | Frasers Property Australia | Job Type: | Supplementary Investigation |
| Project No: | DL3953 | Address: | Ivanhoe Estate, Macquarie Park NSW |
| Date: | 24/05/2017 | Logged By: | MJ |
| Contractor: | - | Method: | Hand auger |
| Hole Size | 100mm diameter | Co-ordinates: | Not surveyed |

| Method | Depth (m) | Graphic Log | USCS Classification | Material Description | Moisture | Density / Stiffness | Sampling | Comments |
|---|---|---|---|---|---|---|---|---|
| HA | 0.1 | | | TOPSOIL: sandy loam, brown to pale brown, with roadbase and fine to coarse gravel | | | BH2_0.1-0.4 (BH2_0.1-0.4A) | |
| | 0.2 | | | | | | | |
| | 0.3 | | | | | | | |
| | 0.4 | | | | | | | |
| | 0.5 | | | Reworked natural: sandy clay, pale brown, fine to coarse sandstone gravel and crushed sandstone | | | BH2_0.5-0.6 | |
| | 0.6 | | | | | | | |
| | 0.7 | | | Borehole BH2 terminated at 0.6m depth on sandstone interface | | | | |
| | 0.8 | | | | | | | |
| | 0.9 | | | | | | | |
| | 1.0 | | | | | | | |



**Notes:**

**Method:**
SS - Solid Flight Auger
HS - Hollow Flight Auger
CC - Concrete Core
PT - Push Tube
RC - Rock Coring

**Consistency**
VS - Very Soft
S - Soft
F - Firm
VS - Very Stiff
H - Hard
Friable - Fb

**Plasticity**
HP - HighlyPlastic
MP - Medium Plasticity
LP - Low Plasticity

**Moisture**
D - Dry
M - Moist
W - Wet

**Density**
VL - Very Loose
L - Loose
MD - Medium Density
D - Dense
VD - Very Dense

DLA Environmental Services
A Pacific Environment company

# Borelog

**Location** **BH3**

| | | | |
|---|---|---|---|
| Client: | Frasers Property Australia | Job Type: | Supplementary Investigation |
| Project No: | DL3953 | Address: | Ivanhoe Estate, Macquarie Park NSW |
| Date: | 24/05/2017 | Logged By: | MJ |
| Contractor: | - | Method: | Hand auger |
| Hole Size | 100mm diameter | Co-ordinates: | Not surveyed |

| Method | Depth (m) | Graphic Log | USCS Classification | Material Description | Moisture | Density / Stiffness | Sampling | Comments |
|---|---|---|---|---|---|---|---|---|
| HA | 0.1 | | | TOPSOIL: sandy loam, brown to pale brown, with roadbase and fine to coarse gravel | | | BH3_0.0-0.1 | |
| | 0.2<br>0.3<br>0.4<br>0.5<br>0.6<br>0.7<br>0.8 | | | Reworked natural: sandy clay, pale brown, fine to coarse sandstone gravel and crushed sandstone | | | BH3_0.1-0.8 | |
| | 0.9<br>1.0 | | | Borehole BH3 terminated at 0.8m depth on extremely compacted material | | | | |



**Notes:**

**Method:**
SS - Solid Flight Auger
HS - Hollow Flight Auger
CC - Concrete Core
PT - Push Tube
RC - Rock Coring

**Consistency**
VS - Very Soft
S - Soft
F - Firm
VS - Very Stiff
H - Hard
Friable - Fb

**Plasticity**
HP - HighlyPlastic
MP - Medium Plasticity
LP - Low Plasticity

**Moisture**
D - Dry
M - Moist
W - Wet

**Density**
VL - Very Loose
L - Loose
MD - Medium Density
D - Dense
VD - Very Dense

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A Pacific Environment company

# Borelog

**Location** **BH4**

| | | | |
|---|---|---|---|
| Client: | Frasers Property Australia | Job Type: | Supplementary Investigation |
| Project No: | DL3953 | Address: | Ivanhoe Estate, Macquarie Park NSW |
| Date: | 24/05/2017 | Logged By: | MJ |
| Contractor: | - | Method: | Hand auger |
| Hole Size | 100mm diameter | Co-ordinates: | Not surveyed |

| Method | Depth (m) | Graphic Log | USCS Classification | Material Description | Moisture | Density / Stiffness | Sampling | Comments |
|---|---|---|---|---|---|---|---|---|
| HA | 0.1 | | | TOPSOIL: sandy loam, brown to pale brown, with roadbase and fine to coarse gravel | | | | |
| | 0.2 | | | FILL: sand, yellow | | | BH4_0.1-0.2 | |
| | 0.3 | | | Reworked natural: sandy silty clay, fine to coarse grained, brown to pale brown, with grey orange siltstone / claystone fragments | | | BH4_0.2-0.4 | |
| | 0.4 | | | | | | | |
| | 0.5 | | | Reworked natural: sandy clay, pale brown, fine to coarse sandstone gravel and crushed sandstone | | | | |
| | 0.6 | | | | | | | |
| | 0.7 | | | Borehole BH4 terminated at 0.6m depth on extremely compacted material | | | | |
| | 0.8 | | | | | | | |
| | 0.9 | | | | | | | |
| | 1.0 | | | | | | | |



**Notes:**

**Method:**
SS - Solid Flight Auger
HS - Hollow Flight Auger
CC - Concrete Core
PT - Push Tube
RC - Rock Coring

**Consistency**
VS - Very Soft
S - Soft
F - Firm
VS - Very Stiff
H - Hard
Friable - Fb

**Plasticity**
HP - HighlyPlastic
MP - Medium Plasticity
LP - Low Plasticity

**Moisture**
D - Dry
M - Moist
W - Wet

**Density**
VL - Very Loose
L - Loose
MD - Medium Density
D - Dense
VD - Very Dense

DLA Environmental Services
A Pacific Environment company

# Borelog

**Location** **BH5 / 1**

| | | | |
|---|---|---|---|
| Client: | Frasers Property Australia | Job Type: | Supplementary Investigation |
| Project No: | DL3953 | Address: | Ivanhoe Estate, Macquarie Park NSW |
| Date: | 24/05/2017 | Logged By: | MJ |
| Contractor: | - | Method: | Hand auger |
| Hole Size | 100mm diameter | Co-ordinates: | Not surveyed |

| Method | Depth (m) | Graphic Log | USCS Classification | Material Description | Moisture | Density / Stiffness | Sampling | Comments |
|---|---|---|---|---|---|---|---|---|
| HA | 0.1 | | | TOPSOIL: sandy loam, brown to pale brown, with roadbase and fine to coarse gravel | | | BH5/1_0.1-0.5 | |
| | 0.2 | | | | | | | |
| | 0.3 | | | | | | | |
| | 0.4 | | | | | | | |
| | 0.5 | | | | | | | |
| | 0.6 | | | Reworked natural: sandy clay, pale brown, fine to coarse sandstone gravel and crushed sandstone | | | | |
| | 0.7 | | | | | | | |
| | 0.8 | | | | | | | |
| | 0.9 | | | Borehole BH5/1 terminated at 0.8m depth on extremely compacted material | | | | |
| | 1.0 | | | | | | | |



**Notes:**

**Method:**
SS - Solid Flight Auger
HS - Hollow Flight Auger
CC - Concrete Core
PT - Push Tube
RC - Rock Coring

**Consistency**
VS - Very Soft
S - Soft
F - Firm
VS - Very Stiff
H - Hard
Friable - Fb

**Plasticity**
HP - HighlyPlastic
MP - Medium Plasticity
LP - Low Plasticity

**Moisture**
D - Dry
M - Moist
W - Wet

**Density**
VL - Very Loose
L - Loose
MD - Medium Density
D - Dense
VD - Very Dense

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# Borelog

**Location** **BH5 / 2**

| | | | |
|---|---|---|---|
| Client: | Frasers Property Australia | Job Type: | Supplementary Investigation |
| Project No: | DL3953 | Address: | Ivanhoe Estate, Macquarie Park NSW |
| Date: | 24/05/2017 | Logged By: | MJ |
| Contractor: | - | Method: | Hand auger |
| Hole Size | 100mm diameter | Co-ordinates: | Not surveyed |

| Method | Depth (m) | Graphic Log | USCS Classification | Material Description | Moisture | Density / Stiffness | Sampling | Comments |
|---|---|---|---|---|---|---|---|---|
| HA | 0.1 | | | TOPSOIL: sandy loam, brown to pale brown, with roadbase and fine to coarse gravel | | | | |
| | 0.2 | | | | | | | |
| | 0.3 | | | | | | | |
| | 0.4 | | | | | | | |
| | 0.5 | | | | | | | |
| | 0.6 | | | Reworked natural: sandy clay, pale brown, fine to coarse sandstone gravel and crushed sandstone | | | BH5/2_0.5-0.8 | |
| | 0.7 | | | | | | | |
| | 0.8 | | | | | | | |
| | 0.9 | | | Borehole BH5/2 terminated at 0.8m depth on extremely compacted material | | | | |
| | 1.0 | | | | | | | |



**Notes:**

**Method:**
SS - Solid Flight Auger
HS - Hollow Flight Auger
CC - Concrete Core
PT - Push Tube
RC - Rock Coring

**Consistency**
VS - Very Soft
S - Soft
F - Firm
VS - Very Stiff
H - Hard
Friable - Fb

**Plasticity**
HP - HighlyPlastic
MP - Medium Plasticity
LP - Low Plasticity

**Moisture**
D - Dry
M - Moist
W - Wet

**Density**
VL - Very Loose
L - Loose
MD - Medium Density
D - Dense
VD - Very Dense

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# Borelog

**Location** **BH6**

| | | | |
|---|---|---|---|
| Client: | Frasers Property Australia | Job Type: | Supplementary Investigation |
| Project No: | DL3953 | Address: | Ivanhoe Estate, Macquarie Park NSW |
| Date: | 24/05/2017 | Logged By: | MJ |
| Contractor: | - | Method: | Hand auger |
| Hole Size | 100mm diameter | Co-ordinates: | Not surveyed |

| Method | Depth (m) | Graphic Log | USCS Classification | Material Description | Moisture | Density / Stiffness | Sampling | Comments |
|---|---|---|---|---|---|---|---|---|
| HA | 0.1<br>0.2<br>0.3<br>0.4<br>0.5 | | | TOPSOIL: sandy loam, brown to pale brown, with roadbase and fine to coarse gravel | | | BH6_0.1-0.5 | |
| | 0.6<br>0.7<br>0.8<br>0.9<br>1.0 | | | Borehole BH6 terminated at 0.5m depth on underground services | | | | |



**Notes:**

**Method:**
SS - Solid Flight Auger
HS - Hollow Flight Auger
CC - Concrete Core
PT - Push Tube
RC - Rock Coring

**Consistency**
VS - Very Soft
S - Soft
F - Firm
VS - Very Stiff
H - Hard
Friable - Fb

**Plasticity**
HP - HighlyPlastic
MP - Medium Plasticity
LP - Low Plasticity

**Moisture**
D - Dry
M - Moist
W - Wet

**Density**
VL - Very Loose
L - Loose
MD - Medium Density
D - Dense
VD - Very Dense

DLA Environmental Services
A Pacific Environment company

# Borelog

**Location** **BH7**

| | | | |
|---|---|---|---|
| Client: | Frasers Property Australia | Job Type: | Supplementary Investigation |
| Project No: | DL3953 | Address: | Ivanhoe Estate, Macquarie Park NSW |
| Date: | 24/05/2017 | Logged By: | MJ |
| Contractor: | - | Method: | Hand auger |
| Hole Size | 100mm diameter | Co-ordinates: | Not surveyed |

| Method | Depth (m) | Graphic Log | USCS Classification | Material Description | Moisture | Density / Stiffness | Sampling | Comments |
|---|---|---|---|---|---|---|---|---|
| HA | 0.1 | | | TOPSOIL: sandy loam, brown to pale brown, with roadbase and fine to coarse gravel | | | | |
| | 0.2 | | | Reworked natural: sandy clay, pale brown, fine to coarse sandstone gravel and crushed sandstone | | | BH7_0.2-0.7 (BH7_0.2-0.7A) | |
| | 0.3 | | | | | | | |
| | 0.4 | | | | | | | |
| | 0.5 | | | | | | | |
| | 0.6 | | | | | | | |
| | 0.7 | | | | | | | |
| | 0.8 | | | Borehole BH7 terminated at 0.7m depth on extremely compacted material | | | | |
| | 0.9 | | | | | | | |
| | 1.0 | | | | | | | |



**Notes:**

**Method:**
SS - Solid Flight Auger
HS - Hollow Flight Auger
CC - Concrete Core
PT - Push Tube
RC - Rock Coring

**Consistency**
VS - Very Soft
S - Soft
F - Firm
VS - Very Stiff
H - Hard
Friable - Fb

**Plasticity**
HP - HighlyPlastic
MP - Medium Plasticity
LP - Low Plasticity

**Moisture**
D - Dry
M - Moist
W - Wet

**Density**
VL - Very Loose
L - Loose
MD - Medium Density
D - Dense
VD - Very Dense

DLA Environmental Services
A Pacific Environment company

# Borelog

**Location** **BH8**

| | | | |
|---|---|---|---|
| Client: | Frasers Property Australia | Job Type: | Supplementary Investigation |
| Project No: | DL3953 | Address: | Ivanhoe Estate, Macquarie Park NSW |
| Date: | 24/05/2017 | Logged By: | MJ |
| Contractor: | - | Method: | Hand auger |
| Hole Size | 100mm diameter | Co-ordinates: | Not surveyed |

| Method | Depth (m) | Graphic Log | USCS Classification | Material Description | Moisture | Density / Stiffness | Sampling | Comments |
|---|---|---|---|---|---|---|---|---|
| HA | 0.1 | | | TOPSOIL: sandy loam, brown to pale brown, with roadbase and fine to coarse gravel | | | BH8_0.0-0.1 | |
| | 0.2<br>0.3<br>0.4 | | | Reworked natural: siltstone / claystone, weathered, with sandstone fragments | | | BH8_0.1-0.4 | |
| | 0.5<br>0.6<br>0.7<br>0.8<br>0.9<br>1.0 | | | Borehole BH8 terminated at 0.4m depth on extremely compacted material | | | | |



**Notes:**

**Method:**
SS - Solid Flight Auger
HS - Hollow Flight Auger
CC - Concrete Core
PT - Push Tube
RC - Rock Coring

**Consistency**
VS - Very Soft
S - Soft
F - Firm
VS - Very Stiff
H - Hard
Friable - Fb

**Plasticity**
HP - HighlyPlastic
MP - Medium Plasticity
LP - Low Plasticity

**Moisture**
D - Dry
M - Moist
W - Wet

**Density**
VL - Very Loose
L - Loose
MD - Medium Density
D - Dense
VD - Very Dense