



Douglas Partners

Geotechnics | Environment | Groundwater

Report on
Preliminary Site Investigation for Contamination

Murwillumbah High School Proposed Works
Murwillumbah High School, Riverview Street,
Murwillumbah

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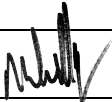
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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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Report on Preliminary Site Investigation for Contamination Murwillumbah High School Proposed Works Murwillumbah High School, Riverview Street, Murwillumbah

1. Introduction

Douglas Partners Pty Ltd ('DP') was commissioned by the NSW Department of Education ('DoE') to undertake a limited preliminary site investigation for contamination ('PSI') located at Murwillumbah High School, Riverview Street, Murwillumbah (hereinafter referred to as 'the site'). The site occupies Lot 5 on DP820602, Lot 6 on DP820602 and Lot 2 on DP578679 and covers an approximate total area of 11.75 ha.

It is understood that prior to the commencement of design for proposed works at the site, the DoE requires a PSI to establish the contamination status of soils at the site. At the time of this investigation, details on earthworks levels and proposed building footprints were unknown, however, it was anticipated that any earthworks at the site would be minimal.

The objectives of this investigation were to determine the contamination status of soils at the site and provide recommendations for future actions, if required. This was achieved by soil sampling from each of the geotechnical boreholes drilled at the site and selected laboratory analysis.

This investigation was conducted in general accordance with the scope of works outlined in DP's proposal GLD190291 dated 3 April 2020, however, the proposed works were not designed to meet the requirements of a *Preliminary Site Investigation or Detailed Site Investigation* as defined in the New South Wales ('NSW') Environment Protection Agency's ('EPA') *Guidelines for Reporting on Contaminated Land* (EPA 2020). The guidelines were developed by the NSW EPA under section 105 of the *Contaminated Land Management Act 1997* ('CLM Act') and are based on the guidelines outlined in the *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended in 2013 ('NEPM').

This report must be read in conjunction with the notes attached in Appendix A entitled *About this Report* and other explanatory notes provided. It should also be kept in its entirety without separation of individual pages or sections.

2. Site Description

Murwillumbah High School is located at Riverview Street, Murwillumbah and covers an approximate area of 11.7 ha. The site has an irregular rectangular shape and occupies Lot 5 on DP820602, Lot 6 on DP820602 and Lot 2 on DP578679. Site identification details are provided in Table 1 below.

Table 1: Site Identification Details

Item	Description
Address	86 Kyogle Road, Murwillumbah
Lot and Plan	Lot 5 on DP820602, Lot 6 on DP820602, Lot 2 on DP578679
Total Area (ha)	11.7
Local Government Area (LGA)	Tweed Shire Council
Current Use	Education – Secondary School
Current Occupier	NSW Department of Education

Site boundary and other features are provided on Drawing 1, Appendix B.

2.1 Site Topography

Surface levels were derived from digital elevation model ('DEM') data obtained from the Intergovernmental Committee on Surveying and Mapping ('ICSM') *Elevation and depth – Foundation Spatial Data* ('ELVIS') database (ICSM 2019). ICSM is a standing committee of the Australia and New Zealand Land Information Council ('ANZLIC').

The site is located on a hillside ridge that slopes in a west to east direction to a lower-lying floodplain. Relative Levels (RL) generally decrease from a high point of 21.5 m above Australian Height Datum (AHD) to a low point of 3.0 m AHD.

The ridgetop and hillslope areas of the site (generally > 5.0 m AHD) were occupied by the school's facilities, including classrooms, administration buildings and the library, while the lower-lying floodplain areas (generally < 5.0 m AHD) were occupied with sporting fields and open space.

3. Environmental Setting

3.1 Surface Water and Groundwater

There are no surface waterbodies at the site, however, a modified drainage/irrigation channel occupies the low-lying floodplain approximately 40 m to the south/south-west of the site. Additionally, the Tweed River is located approximately 500 m to the east of the site.

Surface topography indicated that surface runoff at the site would drain to the east and south to either the irrigation/drainage channel or Tweed River.

Groundwater data available on WaterNSW's "Real Time Data" database indicated that five groundwater monitoring wells were located within a 1.5 km radius of the site. Groundwater monitoring well details are provided in Table 2.

Table 2: Groundwater Monitoring Well Details

Well ID	Date Installed	Coordinates	SWL (m)
064147	1986	537380E 6866204N	25.9
305006	2002	539529E 6866254N	5.0
307330	2011	539227E 6866671N	8.0
307331	2011	539223E 6866663N	8.0
307332	2011	539229E 6866665N	8.0

Notes

SWL Standing water level

The date SWL was recorded at each monitoring well was not available. It was assumed that record date was at the time of installation.

3.2 Geology

Reference to the NSW Department of Planning, Industry and Environment's (DPIE 2019¹) *Seamless Geology Dataset* indicated that surface geology differs according to elevation at the site. The ridgetop and hillslope parts of the site are underlain by the Devonian-aged *Neranleigh-Fernvale beds* that are dominated by feldspathic and lithic sandstone.

Lower lying floodplains are underlain by Quaternary-aged unconsolidated alluvial deposits.

3.3 Listing on the NSW EPA Contaminated Land Record (CLR)

The NSW EPA publishes information on its record of notices when a site has been declared 'significantly contaminated' under the CLM Act. Other matters relating to the site are also published including:

- Preliminary investigation orders;
- Approved voluntary management proposals;
- Management orders;
- Ongoing maintenance orders; and
- Site audit statements.

There are no listings on the CLR related to the site.

¹ The NSW Department of Planning and Environment ('DPE') at the time of publication.

3.4 NSW EPA Listings

The NSW EPA publishes and maintains a list of contaminated land notified under section 60 of the CLM Act. These sites have been assessed by the EPA as being contaminated but may not require regulation under the Act.

A review of the available information indicated that the site is not listed on the notified sites database.

4. Conceptual Site Model

A limited conceptual site model (CSM) was developed based on available information. The CSM identifies contaminants of potential concern (CoPC), sensitive receptors, and potential transport mechanisms that could expose sensitive receptors to unacceptable ecological and/or health risks. The objective of the CSM is to highlight actual or potential exposure pathways that may exist and identify any data gaps that may need to be addressed during this investigation.

For potential ecological and/or health risks to be present, all of the following elements of an exposure pathway are required:

1. Contaminant source (e.g. fuel tank or fill);
2. Receptor (e.g. site worker or aquatic ecosystem); and
3. Transport mechanism/exposure route between the source and receptor (e.g. vapour/ groundwater migration, inhalation).

If all three elements are present, it is considered that a complete exposure pathway exists. Partial or incomplete exposure pathways may also be present. A qualitative assessment of the presence, or otherwise, of the above elements at the site and the CSM is discussed in the following subsections.

4.1 Potential Contamination and Contaminant Sources

Potential sources of contamination in soil and/or groundwater at the site include:

- Fill material of unknown origin placed at the site during the construction of school's facilities.

4.2 CoPC

CoPC are likely to be:

- Metals/metalloids (arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), nickel (Ni), zinc (Zn) and mercury (Hg));
- Total recoverable hydrocarbons (TRH);
- Benzene, toluene, ethylbenzene and xylene (BTEX);
- Polycyclic aromatic hydrocarbons (PAH);
- Organochlorine and/or organophosphorus (OC/OP) pesticides;

- Polychlorinated biphenyls (PCBs);
- Phenols; and
- Asbestos (presence/absence).

4.3 Potential Sensitive Receptors

Several sensitive receptors have been identified as having the potential to be influenced by contamination at the site, if present:

- Current and future site users;
- Construction workers during construction works for any proposed works;
- Future site workers (such as utility/construction workers) conducting excavations and/or maintenance at the site;
- Sensitive waterbodies within 500 m of the site (ie. the adjacent irrigation/drainage channel and Tweed River); and
- Sensitive flora or fauna in the surrounding area.

4.4 Potential Exposure Routes

Primary transport mechanisms/exposure routes for migration of potential contaminants at the site to the sensitive receptors have been identified as follows:

- Lateral migration of contaminants through soil, through preferential pathways (ie. through areas of filling), or soil features (ie. filling/natural soil interface);
- Soil to human exposure routes, i.e. direct contact with soil, dermal contact, or ingestion;
- Soil to dust to human exposure routes, i.e. inhalation of dust; and
- Vapour migration from soil and/or groundwater.

4.1 Conceptual Site Model

The CSM is summarised in Table 3 below.

Table 3: CSM

Source Media	Potential Receptor	Potential Exposure Route	Potential Contaminants
S ₁ : Fill material of unknown origin	R ₁ : Site users R ₂ : Construction staff R ₃ : Utility maintenance workers	P ₁ : Direct dermal contact with soil P ₂ : Inadvertent ingestion P ₃ : Dust inhalation	Metals/metalloids, TRH, BTEXN, PAH, OC/OP, PCBs, Phenols and Asbestos
	R ₄ : Sensitive waterbodies (ie. the adjacent irrigation/drainage channel and Tweed River) R ₅ : Sensitive flora and fauna	P ₄ : Lateral migration of contaminants through soil, through preferential pathways or soil features.	

5. Sampling Analysis Plan and Methodology

5.1 Summary of Field Work Methodologies

A DP Environmental Scientist conducted field investigations at the site on 16 and 17 April 2020. These consisted of the following activities:

- Drilling of 12 boreholes to a maximum depth of 6.5 m below ground level (bGL) using a solid flight auger mounted on a 4WD drill rig;
- Collection of representative soil samples at depths of approximately 0.2 m, 0.5 m and every 0.5 m bGL thereafter to approximately 0.5 m into natural soils;
- Collection of additional soil samples for quality control (QC) purposes.

5.2 Sampling Strategy

The sampling locations selected were based on the concurrent geotechnical investigation conducted at the site (DP project 98119.00). The sampling density selected was below the recommended minimum amount of sampling points for a 12.0 ha site presented in Table E1 of AS4482.1-2005.

Test locations are shown on Drawing 1 attached in Appendix B.

5.3 Sampling Methods

Sampling methods were undertaken with reference to AS4482.1 and AS4482.2 and standard operating procedures described in DP's Field Procedures Manual. All samples were recorded on DP borehole logs with the general sampling procedure comprising:

- Manual sampling by a sampler who was wearing disposable gloves that were changed prior to the collection of each sample;
- Collection of soil directly from the auger bit immediately after retraction from the borehole;
- Transfer of soil into laboratory-prepared glass jars with Teflon-lined lids and immediate capping;
- Various sampling for QA/QC purposes;
- Labelling of sample containers with individual and unique identification details including project number and sample location; and
- Temporary storage of sample jars in an ice-cooled, insulated and sealed container for transport to the laboratory.

The soil profile encountered in each borehole was logged on DP borehole logs, copies of which are provided in Appendix C.

5.4 Sample Handling

Sample integrity was maintained by keeping all samples in sealed jars that were placed in ice-cooled, insulated containers immediately after sampling. Samples were stored on ice and sent to the laboratory the following day.

All samples were received by the laboratory in good condition, in the correct containers without headspace and within recommended holding times outlined in the NEPM (1999).

5.5 Rationale for Selection of Laboratory Analyses

A total of 45 primary soil samples were collected during field investigations and sent to Australian Laboratory Services Pty Ltd ('ALS') at 2 Byth Street, Stafford, QLD. Of these, 18 were selected for analysis.

In addition, one blind replicate sample ('R1') and one trip blank sample was analysed by ALS for QC purposes.

Soil samples were analysed for the CoPC identified in the CSM and included:

- Metals/metalloids;
- TRH;
- BTEX;
- PAH;

- OC and OP pesticides; and
- Asbestos.

One additional sample was analysed for soil background conditions (pH, electrical conductivity, iron concentration, carbon concentration and cation exchange capacity) to allow for the calculation of some site-specific ecological investigation levels.

6. Quality Assurance and Quality Control

QA/QC measures were implemented during the investigation. This was achieved by defining the data quality objectives for the project prior to the commencement of field investigations.

All QA/QC information was evaluated against the DQOs that are summarised in Section 6.1 and Appendix F.

6.1 Data Quality Objectives

Data qualitative objectives (DQOs) are qualitative and quantitative statements that specify the quality of the data required for the assessment. The DQO process is a seven-step iterative planning approach that is used to define the type, quantity and quality of data needed to inform decisions relating to the environmental condition of a site.

DQOs for this assessment were developed in accordance with the seven-step DQO process specified in Schedule B2, Appendix B of the *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended in 2013 (NEPM).

DQOs are also summarised in Appendix F.

Table 4: DQOs for the project

Problem	Uncertainty exists as to whether contamination exists at the site.
Identify the Decision	Does soil contamination exist from current and/or previous site uses? Are there any signs of elevated soil contamination within the site? Does the site, or is the site likely to, present a risk of harm to human health or the environment? Are there any significant contamination issues that could restrict the proposed development? Does the site require further investigation, remediation and/or validation to render the site suitable for the proposed use? Is there any contamination at the site requiring NSW EPA notification?

Information Inputs	Site operations and observation details. Soil profile information obtained through the sampling phase. Chemical analysis data for soil and groundwater samples analysed. Assessment of analytical data against applicable site assessment criteria.
Study Boundaries	The physical site boundary is shown on Drawing 1, Appendix B and forms the boundary of this investigation. The temporal boundary of this assessment is limited to the time at which the assessment was conducted.
Decision Rules	Information obtained in this investigation was used to make an assessment of contamination issues likely to impact on the proposed development. In assessing analytical data against screening levels for ecological and/or human health risk, site conditions can be stated to be acceptable if either: • All results are below the relevant screening level; OR • Individual concentrations of analytes are less than 250% of the relevant screening level; and • The 95% upper confidence limit (UCL) of mean concentrations of a data set for samples of like material is below the relevant screening level; and • The standard deviation of the population is <50% of the relevant screening level. Statistical analysis needs only be conducted where analytical results for a contaminant of concern are recorded above, but less than 250% of the relevant screening level. Laboratory results are accepted and considered suitable for this assessment under the following conditions: • All laboratories are accredited by National Association of Testing Authorities (NATA) for all analyses to be performed; • All practical quantitation limits (PQLs), or laboratory limits of reporting (LORs) set by the laboratories fall below the adopted assessment criteria; • Reported concentrations of analytes in the replicate and/or split sample pairs are within accepted limits; and • Quality assurance/quality control (QA/QC) protocols and results reported by the laboratories comply with the requirements of NEPM (Schedule B3).

Performance Criteria	Analyte selection is based on observed site activities, site features and field observations during sampling. The potential for contaminants to be present other than those analysed was considered to be low. Assessment criteria adopted from the guidelines stated in Section 6.1 incorporate risk probabilities. Acceptable limits for replicate comparisons are described in the Data Quality Objectives, Appendix F. Acceptable limits for laboratory QA/QC parameters are based on those stated by the laboratory and those stated in the NEPM (Schedule B3).
Optimise design	Locate sampling points to target potential sources of contamination as described in Section 5.2. Procedures for collection of environmental samples, as described in Section 5.3, were developed prior to undertaking the assessment phase of works with reference to NEPM, AS4482.1, AS4482.2 and current good industry practice. Use of a NATA accredited analytical laboratory to conduct sample analyses.

7. Site Assessment Criteria

The site assessment criteria (SAC) applied in this investigation comprised the investigation levels, screening levels and management limits outlined in the *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended in 2013 (the NEPM). The NEPM guidelines are endorsed by the NSW EPA under the CLM Act (1997).

The NEPM guidelines are applicable to generic land use settings and include consideration of the soil type and depth parameters for some analytes. They are broadly divided into two groups that comprise:

- Health-based investigation or screening levels (HIL/HSLs) representing risks to human receptors; and
- Ecological investigation or screening levels (EIL/ESLs) representing risks to ecological and/or environmental receptors.

Guidelines are not intended to be used as clean-up levels, rather, they establish concentrations above which further investigation (ie. a Tier 2 or detailed site investigation) should be conducted. They are intentionally conservative and are based on a reasonable worst-case scenario.

Based on the current site land use, a conservative assessment criterion was adopted for this investigation that comprised:

- HIL/HSL-A: Residential premises with garden/accessible soil, including children's day care centres, preschools and primary schools.
- EIL/ESL-B: Urban residential areas and public open space. Broadly corresponding with the HIL/HSL selected above.

8. Ground Conditions

Ground conditions encountered at the site generally comprised of the following:

FILL	Encountered from the surface at all boreholes except BH1 and BH4. Depths were variable depending on test location and ranged from 0.1 m bGL at BH7 to 1.8 m bGL at BH9. Fill texture was also variable and included silty CLAY, sandy CLAY, silty SAND and gravelly SAND.
Silty SAND	Encountered from the surface at BH1, BH4 and at a depth of 0.9 – 1.1 m bGL at BH8. It had a brown appearance, loose soil strength and comprised of fine to medium grained sands at all locations.
Sandy CLAY	Encountered at BH1 at a depth of 1.5 – 1.8 m bGL, BH2 at a depth of 3.8 – 6.5 m bGL, BH4 at a depth of 0.2 – 0.5 m bGL and BH7 at a depth of 2.9 – 4.0 m bGL. It generally had a grey appearance, medium to high plasticity and firm strength at all locations. Groundwater was noted in this layer at BH7 at a depth of 3.7 m bGL.
Silty CLAY	Encountered at all borehole locations during field investigations and directly underlying the fill material at BH2, BH3, BH5, BH7, BH9, BH11 and BH12. In the lower-lying parts of the site they had a grey appearance, high plasticity and very stiff strength while in the upper parts of the site they had a brown-red appearance, medium plasticity and firm soil strength. Groundwater was noted in this layer at a depth of 0.9 m bGL at BH2.
METASILTSTONE	Encountered at BH6 at a depth of 2.4 m bGL and BH10 at a depth of 1.0 m bGL. Metasiltstone had an orange and grey appearance and a very low strength.

Groundwater was encountered at BH2 at a depth of 0.9 m bGL and BH7 at a depth of 3.7 m bGL. Both borehole locations were located on the low-lying floodplain parts of the site. It should be noted that groundwater levels are affected by various factors including soil permeability and porosity, climatic conditions and topography that can lead to spatial and temporal variation.

No obvious soil staining, odours, building rubble or potential asbestos containing material (PACM) were observed during drilling or sampling.

Detailed ground conditions are outlined in the borehole logs provided in Appendix C.

9. Results

A summary of results has been provided in Tables 1 – 2, Appendix D. Laboratory reports and chain of custody documentation are attached in Appendix E.

Trace concentrations of metals/metalloids were detected in samples selected for analysis, however, there were no exceedances of the adopted SAC.

TRH, BTEX, PAH, OC/OP pesticides, PCB and asbestos results were all below the laboratory's limit of reporting.

10. Conclusions

Based on the results of this investigation, the following conclusions have been made:

- There were no exceedances of the soil samples selected for analysis of the adopted SAC for residential premises with garden/soil access;
- However, the selected sampling strategy was below the recommended minimal sampling density for a 12.0 ha site according to AS4482.1-2005; and
- Consequently, DP cannot comment on the contamination status of soils across the entire site, nor conclude if the site is suitable for unrestricted land use and/or the suitability of any soils removed from the site, if necessary.

11. Recommendations

The following recommendations have been considered based on the conclusions of the PSI:

- An investigation of the site should be conducted that meets the recommended sampling density for a 12.0 ha site according to AS4482.1-2005; or
- When details of the proposed works are available, an investigation should be conducted that is undertaken and designed according to the area/footprint of the proposed works.

The site's contamination status and/or site suitability could be concluded following completion of either of the above recommendations.

12. References

Colquhoun G.P., Hughes K.S., Deyssing L., Ballard J.C., Phillips G., Troedson A.L., Folkes C.B. & Fitzherbert J.A (2019), *New South Wales Seamless Geology dataset, version 1.1 [Digital Dataset]*, Geological Survey of New South Wales, NSW Department of Planning and Environment, Maitland.

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National Environment Protection Council (NEPC) (1999), *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended in 2013 (NEPM), Government of Australia, Canberra.

NSW Environment Protection Agency (EPA) (2020), *Consultants Reporting on Contaminated Land: Contaminated land guidelines*, State of NSW, Parramatta.

Standards Australia (1999) *Guide to the Sampling and Investigation of Potentially Contaminated Soil, Part 2: Volatile Substances*, AS4482.2:1999.

Standards Australia (2005) *Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil, Part 1: Non-volatile and Semi-volatile Compounds*, AS4482.1:2005.

State of NSW (1997), *Contaminated Land Management Act 1997*, State of NSW, Sydney.

WaterNSW (2020), *Real-Time Data, All Groundwater Map, North Coast Region, Tweed River Basin*, <https://realtimedata.waternsw.com.au/>, WaterNSW, Parramatta.

13. Limitations

Douglas Partners (DP) has prepared this report for this project at Murwillumbah High School, Riverview Street, Murwillumbah in accordance with DP's proposal GLD190291 dated 3 April 2020. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of NSW Department of Education for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

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

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

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

About this Report

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

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

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

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

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Drawings



Site Locality

Legend:

 Test Number and Location

Notes:

1. Test locations are approximate only and are shown with reference to existing site features.
2. Drawing Not To Scale.
3. Drawing adapted Nearmap imagery dated 6 November 2019.



CLIENT: Mace Australia Pty Ltd
OFFICE: Gold Coast
DATE: May 2020

Site and Test Location Plan

Proposed School Works

Murwillumbah High School, Murwillumbah

PROJECT No:	98119.00
DRAWING No:	1
REVISION:	Draft



Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low

reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:
4,6,7
N=13
- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:
15, 30/40 mm

Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.



Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

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

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

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

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 - 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

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

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 - 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)

- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)

- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with 'Mix of Soil and Cobbles/Boulders' with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Appendix C

Borehole Logs and Explanatory Notes

Soil Descriptions

Cohesive Soils

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

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

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

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

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

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;

- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
Soil tends to stick together.
Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- 'Moist, dry of plastic limit' or 'w < PL' (i.e. hard and friable or powdery).
- 'Moist, near plastic limit' or 'w ≈ PL' (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- 'Moist, wet of plastic limit' or 'w > PL' (i.e. soils usually weakened and free water forms on the hands when handling).
- 'Wet' or 'w ≈ LL' (i.e. near the liquid limit).
- 'Wet' or 'w > LL' (i.e. wet of the liquid limit).



Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $IS_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $IS_{(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

* Assumes a ratio of 20:1 for UCS to $IS_{(50)}$. It should be noted that the UCS to $IS_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

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

Rock Descriptions

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

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

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

Stratification Spacing

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

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

Symbols & Abbreviations

Douglas Partners



Introduction

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

Drilling or Excavation Methods

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

Water

▷	Water seep
▽	Water level

Sampling and Testing

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

Description of Defects in Rock

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

Defect Type

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

Orientation

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

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

Coating or Infilling Term

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

Coating Descriptor

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

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General



Asphalt



Road base



Concrete



Filling

Soils



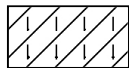
Topsoil



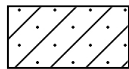
Peat



Clay



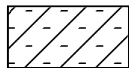
Silty clay



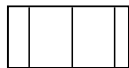
Sandy clay



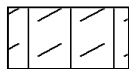
Gravelly clay



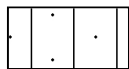
Shaly clay



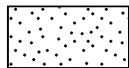
Silt



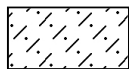
Clayey silt



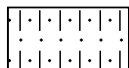
Sandy silt



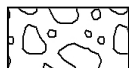
Sand



Clayey sand



Silty sand



Gravel



Sandy gravel



Cobbles, boulders



Talus

Sedimentary Rocks



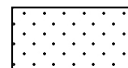
Boulder conglomerate



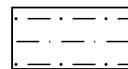
Conglomerate



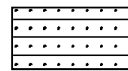
Conglomeratic sandstone



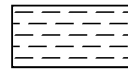
Sandstone



Siltstone



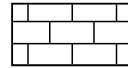
Laminite



Mudstone, claystone, shale

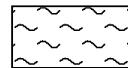


Coal

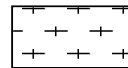


Limestone

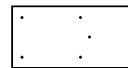
Metamorphic Rocks



Slate, phyllite, schist

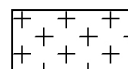


Gneiss

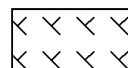


Quartzite

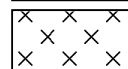
Igneous Rocks



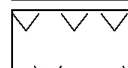
Granite



Dolerite, basalt, andesite



Dacite, epidote



Tuff, breccia



Porphyry

BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 3.8 Approx
EASTING: 538388
NORTHING: 6865693
DIP/AZIMUTH: 90°/-

BORE No: 1
PROJECT No: 98119.00
DATE: 16-4-2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 100mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
	0.1	TOPSOIL Clayey SAND (SC): fine to medium grained sand, brown, moist										
		Silty CLAY (CI): medium plasticity, brown with pale brown, with fine to medium grained sand, stiff		D	0.2							
				D	0.5							
	0.8	(CI-CH) - medium to high plasticity, red with pale brown			0.8							
	1.5	Sandy CLAY (CI): medium plasticity, red with pale brown and grey, fine to coarse grained sand, stiff		D	1.5							
	1.8	Silty CLAY (CI-CH): medium to high plasticity, red with pale grey and brown, moist, stiff		S	1.7		3,5,5 N = 10					
				D	1.8							
					1.95							
	2.3	- red with pale grey and orange, traces fine to medium gravel			2.0							
				S	3.0		5,7,11 N = 18					
					3.45							
				S	4.5		4,8,7 N = 15					
					4.95							
	5.0	Bore discontinued at 5.0m . Limit of Investigation.										

RIG: Christie Soil Rig

DRILLER: Geoserve

LOGGED: BM

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was encountered during the investigation.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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

SAMPLING & IN SITU TESTING LEGEND

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



Douglas Partners
 Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 3.5 Approx
EASTING: 538428
NORTHING: 6865737
DIP/AZIMUTH: 90°/-

BORE No: 2
PROJECT No: 98119.00
DATE: 16-4-2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 100mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILL Silty CLAY (CL): low plasticity, pale brown with red, trace fine to coarse grained sand, moist, poorly compacted		D	0.1							
				D	0.3							
				B	0.5							
				D	0.6							
					0.8							
	1.0	Silty CLAY (CH): high plasticity, pale grey, moist, soft to firm		D	1.1							
	1.3	- grey with red, firm			1.2							
					1.5		1,1,3 N = 4					
				S	1.95							
	2.2	- grey with red and orange										
					3.0		2,3,4 N = 7					
	3.4	- trace fine to medium gravel		S	3.45							
	3.8	Sandy CLAY (CI): medium plasticity, pale grey with red and orange, fine to coarse grained sand with fine to medium gravel (quartz), moist, firm										
				S	4.5		2,2,4 N = 6					
					4.95							
	6.0	- stiff		S	6.0		4,4,4 N = 8					
	6.5	Bore discontinued at 6.5m . Limit of Investigation.			6.45							

RIG: Christie Soil Rig

DRILLER: Geoserve

LOGGED: BM

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: Seepage observed at 0.9 m depth.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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

SAMPLING & IN SITU TESTING LEGEND

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



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BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 8.9 Approx
EASTING: 538288
NORTHING: 6865733
DIP/AZIMUTH: 90°/-

BORE No: 3
PROJECT No: 98119.00
DATE: 16-4-2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 100mm)
				Type	Depth	Sample	Results & Comments		
		FILL Sandy CLAY (CL): low plasticity, brown with orange, fine to coarse grained sand, with fine to coarse gravel, moist, apparently well compacted		D	0.1				
					0.3				
	0.5	Silty CLAY (CL): low plasticity, orange-brown, trace sand, moist, firm		D	0.5				
	0.7	- trace fine to coarse gravel		B	0.8				
					1.0				
	1				1.5				
				S	1.95		3,3,4 N = 7		
	2								
	2.3	- stiff							
					3.0				
				S	3.45		3,4,5 N = 9		
	4								
	4.4	- pale grey with orange							
				S	4.5		4,6,10 N = 16		
	5				4.95				
	5.0	Bore discontinued at 5.0m . Limit of Investigation.							
	6								

RIG: Christie Soil Rig

DRILLER: Geoserve

LOGGED: BM

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was encountered during the investigation.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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

SAMPLING & IN SITU TESTING LEGEND

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



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BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 12.4 Approx
EASTING: 538243
NORTHING: 6865769
DIP/AZIMUTH: 90°/-

BORE No: 4
PROJECT No: 98119.00
DATE: 16-4-2020
SHEET 1 OF 1

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 100mm)			
			Type	Depth	Sample	Results & Comments		5	10	15	20
0.2	Silty SAND (SM): fine to medium grained sand, brown, moist, loose										
0.5	Sandy CLAY (CL): low plasticity, brown, fine to medium grained sand, moist, firm		D	0.4							
				0.5							
	Silty CLAY (CI): medium plasticity, brown-red, trace fine to coarse grained sand, moist, firm		D	0.6							
1.0				1.0							
1.5			S	1.5		2,2,2 N = 4					
1.95				1.95							
2.5	- stiff, pale brown										
2.8	- with fine to coarse grained sand and fine to medium gravel										
3.0			S	3.0		4,10,8 N = 18					
3.45				3.45							
4.5			S	4.5		5,5,7 N = 12					
4.95				4.95							
5.0	Bore discontinued at 5.0m . Limit of Investigation.										

RIG: Christie Soil Rig

DRILLER: Geoserve

LOGGED: BM

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was encountered during the investigation.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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

SAMPLING & IN SITU TESTING LEGEND

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



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BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 16.0 Approx
EASTING: 538275
NORTHING: 6865570
DIP/AZIMUTH: 90°/-

BORE No: 5
PROJECT No: 98119.00
DATE: 16-4-2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 100mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
16	0.1	FILL Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, trace fine gravel, moist, poorly compacted										
	0.3	Silty CLAY (CL): low plasticity, dark brown, with fine to medium grained sand, moist, stiff										
		(Cl): medium plasticity, red, trace fine to medium grained sand, stiff										
				D	0.5							
					0.8							
15	1											
	1.3	- orange-pale grey-red, very stiff										
	1.5	- hard			1.5		8,15,24 N = 39					
	1.8	- tending to extremely weathered metasilstone		S	1.95							
14	2											
					3.0		10,18,24 N = 42					
13	3			S	3.45							
12	4											
					4.5		16,14,18 N = 32					
				S	4.95							
11	5	Bore discontinued at 5.0m . Limit of Investigation.										
10	6											

RIG: Christie Soil Rig

DRILLER: Geoserve

LOGGED: BM

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was encountered during the investigation.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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

SAMPLING & IN SITU TESTING LEGEND

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



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BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 19.7 Approx
EASTING: 538256
NORTHING: 6865608
DIP/AZIMUTH: 90°/-

BORE No: 6
PROJECT No: 98119.00
DATE: 16-4-2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 100mm)
				Type	Depth	Sample	Results & Comments		
	0.1	FILL Sandy GRAVEL (GP): fine to coarse gravel, grey, fine to coarse grained sand, moist, apparently well compacted		D	0.1				
		FILL Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with fine to coarse gravel, poorly compacted			0.3				
	1								
	1.3	Silty CLAY (CI): medium plasticity, orange with pale grey, trace fine to coarse grained sand, moist, very stiff			1.5				
	1.8	- hard, tending to extremely weathered metasiltstone		S	1.95		5,8,16 N = 24		
	2.2	- with very low strength metasiltstone layers							
	2.4	METASILTSTONE: pale grey with orange, very low strength							
	2.9	Bore discontinued at 2.9m . TC bit refusal on inferred low strength or stronger metasiltstone. Limit of Investigation.		S	2.9 2.91		30/10mm		
	3								
	4								
	5								
	6								

RIG: Christie Soil Rig

DRILLER: Geoserve

LOGGED: BM

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was encountered during the investigation.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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

SAMPLING & IN SITU TESTING LEGEND

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



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BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 3.7 Approx
EASTING: 538450
NORTHING: 6865582
DIP/AZIMUTH: 90°/-

BORE No: 7
PROJECT No: 98119.00
DATE: 17-4-2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 100mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
	0.1	FILL Sandy CLAY (CL): low plasticity, dark brown, fine to medium grained sand, moist, poorly compacted		D	0.0							
		FILL Silty CLAY (CI): medium plasticity, brown with orange, with fine to medium grained sand, moist, poorly compacted		D	0.1							
				D	0.2							
				D	0.6							
	0.9	Silty CLAY (CH): high plasticity, pale grey with orange and red, trace fine gravel, moist, firm		D	1.0							
				D	1.2							
				S	1.5		2,3,3 N = 6					
				S	1.95							
	2.5	- with fine to medium grained sand										
	2.9	Sandy CLAY (CH): high plasticity, grey with orange and brown, fine to medium grained sand, moist, firm		S	3.0		2,3,3 N = 6					
				S	3.45							
	3.7	- wet										
	4.0	Silty CLAY (CI-CH): medium to high plasticity, red with grey, trace fine gravel, moist, very stiff, residual		S	4.5		4,10,18 N = 28					
				S	4.95							
	5.0	Bore discontinued at 5.0m . Limit of Investigation.										

RIG: Christie Soil Rig

DRILLER: Geoserve

LOGGED: BM

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: Groundwater encountered at 3.7 m depth.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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

SAMPLING & IN SITU TESTING LEGEND

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



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BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 14.6 Approx
EASTING: 538243
NORTHING: 6865709
DIP/AZIMUTH: 90°/-

BORE No: 8
PROJECT No: 98119.00
DATE: 17-4-2020
SHEET 1 OF 1

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 100mm)
			Type	Depth	Sample	Results & Comments		
0.0	FILL Gravelly SAND (SP): fine to coarse grained sand, dark brown, fine to coarse gravel, with silt, moist		D	0.0				
0.2				0.2				
0.3	FILL Silty SAND (SM): fine to medium grained sand, brown, moist, poorly compacted		D	0.3				
0.4				0.4				
0.9	Silty SAND (SM): fine to medium grained sand, dark brown, moist, loose							
1.1								
1.3	Silty CLAY (CI): medium plasticity, brown with, fine to medium grained sand, soft to firm							
1.5	- pale brown, with fine to medium gravel, stiff							
1.5	- pale brown with grey		S	1.5		5.5,6 N = 11		
1.95				1.95				
2.4	- very stiff							
2.8	Bore discontinued at 2.8m . TC bit refusal on inferred low strength or stronger metasiltstone. Limit of Investigation.		S	2.8		20/30mm		
2.83				2.83				

RIG: Christie Soil Rig

DRILLER: Geoserve

LOGGED: BM

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was encountered during the investigation.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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

SAMPLING & IN SITU TESTING LEGEND

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



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BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 14.5 Approx
EASTING: 538287
NORTHING: 6865701
DIP/AZIMUTH: 90°/-

BORE No: 9
PROJECT No: 98119.00
DATE: 17-4-2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 100mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
	0.5	FILL Silty SAND (SM): fine to medium grained sand, brown, trace fine to medium gravel, moist, apparently well compacted										
	1.0	Fill Sandy CLAY (CL): low plasticity, brown with pale brown, fine to coarse grained sand, with fine gravel, moist, apparently poorly compacted		D	0.5							
	1.5				1.0							
	1.8				1.5							
	2.0	Silty CLAY (CL): low plasticity, dark brown, trace fine to medium grained sand, moist, firm		S	1.95		2,4,3 N = 7					
	2.2	(CI): medium plasticity										
	2.6	- pale brown-orange, stiff										
	3.0	- pale brown-orange with grey		S	3.0		5,5,6 N = 11					
	3.6	- stiff to very stiff			3.45							
	4.1	- hard, pale grey and orange and pale red, tending to extremely weathered metasiltstone		S	4.5		8,18,30/140mm					
	5.0	Bore discontinued at 5.0m . Limit of Investigation.			4.95							

RIG: Christie Soil Rig

DRILLER: Geoserve

LOGGED: BM

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was encountered during the investigation.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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

SAMPLING & IN SITU TESTING LEGEND

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



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BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 21.9 Approx
EASTING: 538210
NORTHING: 6865658
DIP/AZIMUTH: 90°/--

BORE No: 10
PROJECT No: 98119.00
DATE: 17-4-2020
SHEET 1 OF 1

[illegible]

CASING: N/A

TYPE OF BORING: Auger

WATER OBSERVATIONS: No free groundwater was encountered during the investigation.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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

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



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BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 16.4 Approx
EASTING: 538296
NORTHING: 6865653
DIP/AZIMUTH: 90°/--

BORE No: 11
PROJECT No: 98119.00
DATE: 17-4-2020
SHEET 1 OF 1

[illegible]

CASING: N/A

TYPE OF BORING: Hand Auger

WATER OBSERVATIONS: No free groundwater was encountered during the investigation.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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



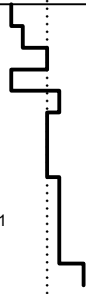
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BOREHOLE LOG

CLIENT: School Infrastructure NSW/DoE
PROJECT: Proposed School Works
LOCATION: Murwillumbah High School, Murwillumbah

SURFACE LEVEL: 16.4 Approx
EASTING: 538294
NORTHING: 6865612
DIP/AZIMUTH: 90°/--

BORE No: 12
PROJECT No: 98119.00
DATE: 17-4-2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 100mm)
				Type	Depth	Sample	Results & Comments		
	0.4	FILL Silty CLAY (CL): low plasticity, dark brown, with fine to medium grained sand, trace fine gravel, moist, poorly compacted							
	1.9	Silty CLAY (CI-CH): medium to high plasticity, red with pale brown, moist, very stiff							
	2.0	Bore discontinued at 1.9m . Limit of Investigation.							

RIG: Hang Auger

DRILLER: Geoserve

LOGGED: BM

CASING: N/A

TYPE OF BORING: Hand Auger

WATER OBSERVATIONS: No free groundwater was encountered during the investigation.

REMARKS: Surface level interpolated from Intergovernmental Committee on Surveying and Mapping (ICSM) data dated 2019.

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

SAMPLING & IN SITU TESTING LEGEND

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



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Appendix D

Summary Results Tables

Table 1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH

			Metals								TRH						BTEX				PAH		
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene ^b	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ
		PQL	5	1	2	5	5	0.1	2	5	10	50	10	50	100	100	0.2	0.5	0.5	0.5	1	0.5	0.5
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1/0.2	0.1 - 0.2 m	16/04/2020	<5 100 100	<1 20 NC	18 100 580	7 6000 95	15 300 1100	0.1 40 NC	3 400 260	12 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
R1	0.1 - 0.2 m		<5 100 100	<1 20 NC	18 100 580	7 6000 95	13 300 1100	0.1 40 NC	3 400 260	15 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
2/0.1	0.0 - 0.1 m		<5 100 100	<1 20 NC	12 100 580	7 6000 95	12 300 1100	0.1 40 NC	2 400 260	10 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
3/0.2	0.1 - 0.2 m		<5 100 100	<1 20 NC	4 100 580	7 6000 95	8 300 1100	<0.1 40 NC	6 400 260	20 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
4/0.2	0.1 - 0.2 m		<5 100 100	<1 20 NC	6 100 580	7 6000 95	20 300 1100	0.1 40 NC	<2 400 260	19 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
5/0.1	0.0 - 0.1 m		<5 100 100	<1 20 NC	11 100 580	15 6000 95	20 300 1100	<0.1 40 NC	5 400 260	93 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
6/0.5	0.4 - 0.5 m		<5 100 100	<1 20 NC	8 100 580	9 6000 95	5 300 1100	<0.1 40 NC	8 400 260	15 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
7/0.2	0.1 - 0.2 m	17/04/2020	<5 100 100	<1 20 NC	22 100 580	6 6000 95	10 300 1100	0.1 40 NC	4 400 260	13 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
8/0.2	0.1 - 0.2 m		<5 100 100	<1 20 NC	3 100 580	8 6000 95	6 300 1100	<0.1 40 NC	10 400 260	52 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
9/0.5	0.4 - 0.5 m		<5 100 100	<1 20 NC	7 100 580	8 6000 95	7 300 1100	<0.1 40 NC	4 400 260	23 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
10/0.5	0.4 - 0.5 m		5 100 100	<1 20 NC	6 100 580	7 6000 95	<5 300 1100	<0.1 40 NC	3 400 260	13 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
11/0.5	0.4 - 0.5 m		<5 100 100	<1 20 NC	16 100 580	7 6000 95	36 300 1100	<0.1 40 NC	3 400 260	26 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC
12/0.2	0.1 - 0.2 m		<5 100 100	<1 20 NC	25 100 580	17 6000 95	38 300 1100	0.2 40 NC	5 400 260	54 7400 290	<10 NC NC	<50 NC NC	<10 45 180	<50 110 120	<100 NC 300	<100 NC 2800	<0.2 0.5 50	<0.5 160 85	<0.5 55 70	<0.5 40 105	<1 3 170	<0.5 NC 0.7	<0.5 3 NC

Lab result
HIL/HSL value EIL/ESL value

■ HIL/HSL exceedance ■ EIL/ESL exceedance ■ HIL/HSL and EIL/ESL exceedance ■ ML exceedance ■ ML and HIL/HSL or EIL/ESL exceedance
■ Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report ■ Blue = DC exceedance
Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

- Notes:
- HIL/HSL/DC NEPC, Schedule B1 - HIL A (undefined), HSL A/B (undefined), DC HSL A (undefined)
- EIL/ESL NEPC, Schedule B1 - EIL UR/POS (undefined), ESL UR/POS (undefined)
- ML NEPC, Schedule B1 - ML R/P/POS (undefined)
- a QA/QC replicate of sample listed directly below the primary sample
- b reported naphthalene laboratory result obtained from BTEXN suite

Table 2: Summary of Laboratory Results – OCP, OPP, PCB

			OCP														OPP	PCB
			DDT+DDE+DDD ^c	DDD	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endosulfan I	Endosulfan II	Endosulfan Sulphate	Endrin	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyrifos	Total PCB
		PQL	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.05	0.1
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1/0.2	0.1 - 0.2 m	16/04/2020	<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
R1	0.1 - 0.2 m		<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
2/0.1	0.0 - 0.1 m		<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
3/0.2	0.1 - 0.2 m		<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
4/0.2	0.1 - 0.2 m		<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
5/0.1	0.0 - 0.1 m		<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
6/0.5	0.4 - 0.5 m		<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
7/0.2	0.1 - 0.2 m	17/04/2020	<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
8/0.2	0.1 - 0.2 m		<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
9/0.5	0.4 - 0.5 m		<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
10/0.5	0.4 - 0.5 m		<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
11/0.5	0.4 - 0.5 m		<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC
12/0.2	0.1 - 0.2 m		<0.05 240 180	<0.05 NC NC	<0.05 NC NC	<0.2 NC 180	<0.05 6 NC	<0.05 50 NC	<0.05 270 NC	<0.05 NC NC	<0.05 NC NC	<0.05 NC NC	<0.05 10 NC	<0.05 6 NC	<0.05 10 NC	<0.2 300 NC	<0.05 160 NC	<0.1 1 NC

Lab result
HIL/HSL value EIL/ESL value

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

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

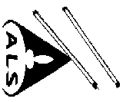
Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

Notes:

HIL/HSL/DC	NEPC, Schedule B1 - HIL A (undefined), HSL A/B (undefined), DC HSL A (undefined)
EIL/ESL	NEPC, Schedule B1 - EIL UR/POS (undefined), ESL UR/POS (undefined)
ML	NEPC, Schedule B1 - ML R/P/POS (undefined)
a	QA/QC replicate of sample listed directly below the primary sample
b	reported naphthalene laboratory result obtained from BTEXN suite
c	criteria applies to DDT only

Appendix E

Laboratory Results and Chain of Custody Documentation



CHAIN OF CUSTODY

ALS Laboratory: please tick ->

- ☐ Sydney: 227 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8784 8555 E: samples@alsenviro.com
- ☐ Brisbane: 32 Shand St, Stretton QLD 4055
Ph: 07 3243 7222 E: samples@alsenviro.com
- ☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8549 9500 E: samples@alsenviro.com
- ☐ Perth: 10 Hot Way, Malaga WA 6060
Ph: 08 9209 7...
- ☐ Newcastle: 5 Rosegum Rd, Warialook NSW 2304
Ph: 02 4968 5433 E: samples@alsenviro.com
- ☐ Townsville: 14-15 Desma Ck, Bohle QLD 4818
Ph: 07 4766 0000 E: townsville@alsenviro.com
- ☐ Adelaide: 2-1 Burns Rd, Pooraka SA 5065
Ph: 08 8359 0880 E: adelaide@alsenviro.com
- ☐ Launceston: ...
Ph: 03 6331

CLIENT:	Douglas Partners Pty Ltd	TURNAROUND REQUIREMENTS:	☒ Standard TAT (Last due date):	Standard	FOR
OFFICE:	439 Montague Road, West End Qld 4101	☐ (Standard TAT may be longer for some tests)	☐ Non Standard or urgent TAT (Last due date):		Cus
PROJECT:	98119.01	ALS QUOTE NO.:	EN / 222 / 18	COC SEQUENCE NUMBER (circle)	ETES
ORDER NUMBER:		CONTACT PH:	(07) 3237 8900	COC: 1 2 3 4 5 6 7	REF
PROJECT MANAGER:	Paul Barfield	SAMPLER MOBILE:	0439 006 695	OF: 1 2 3 4 5 6 7	OK
SAMPLER:	Mitchell Valley	RELINQUISHED BY:	Mitchell Valley	RECEIVED BY:	RELINQ
COC emailed to ALS?	YES	EDD FORMAT (or default):		DATE/TIME:	DATE/TI
Email Reports to (will default to PM if no other addresses are listed):	paul.barfield@douglaspartners.com.au	DATE/TIME:	17/04/2020	DATE/TIME:	
Email Invoice to (will default to PM if no other addresses are listed):	brianne@douglaspartners.com.au	DATE/TIME:	22/4	DATE/TIME:	1258

Environmental Division
Brisbane
Work Order Reference
EB2010615

Telephone : + 61-7-3243 7222

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	ANALYSIS REQUIRED INCLUDING SUITES (NB: Suite Codes must be listed to attract suite price) (When Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required).)				Additional Information
						S19 - TRH/BTEX, 8 Metals, PAH, PCB, OC/OP, Phenols	S18 - TRH/BTEXN	P22 - NEPM Screen	EA200 - Asbestos presence/absence	
1	10.2	16/04/2020	S	Jar	1	x				
2	10.5	16/04/2020	S	Jar	1					
3	11.0	16/04/2020	S	Jar	1					
4	20.1	16/04/2020	S	Jar	1	x				
5	20.5	16/04/2020	S	Jar	1		x			
6	21.0	16/04/2020	S	Jar	1					
7	30.2	16/04/2020	S	Jar	1	x				
8	30.5	16/04/2020	S	Jar	1					
9	31.0	16/04/2020	S	Jar	1					
10	40.2	16/04/2020	S	Jar	1	x				
11	40.5	16/04/2020	S	Jar	1					
12	41.0	16/04/2020	S	Jar	1					
13	50.1	16/04/2020	S	Jar	1	x				
14	50.5	16/04/2020	S	Jar	1					

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; OGC = Nitric Preserved OGC; SH = Sodium Hydroxide/Cl Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA via HCl Preserved; VB = VOA via Sodium Bisulphate Preserved; VS = VOA via Sulfuric Preserved; AV = Airfreight Unpreserved via SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass.
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solids; B = Unpreserved Bag

CHAIN OF CUSTODY

ALS Laboratory, please tick →

☐ Sydney 277 Woodpark Rd, Smithfield NSW 2178
Ph: 02 8784 8535 E: samples.sydney@alsenviro.com
☐ Newcastle 5 Rosegum Rd, Warbrook NSW 2304
Ph: 02 4868 9433 E: samples.newcastle@alsenviro.com

☐ Brisbane 32 Shand St, Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
☐ Townsville 14-15 Deanna Ct, Bohle QLD 4818
Ph: 07 4796 0800 E: townsville@alsenviro.com

☐ Melbourne 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8548 9800 E: samples.melbourne@alsenviro.com
☐ Adelaide 2-1 Burma Rd, Peralta SA 5095
Ph: 08 8358 0880 E: adelaide@alsenviro.com

☐ Perth 10 Hod Way, Malaga WA 6060
Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston 27 Wellingdon St, Launceston TAS 7250
Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Douglas Partners Pty Ltd	TURNAROUND REQUIREMENTS:		☒ Standard TAT (List due date):		Standard		FOR LABORATORY USE ONLY (Circle)	
OFFICE:	439 Montague Road, West End Qld 4101	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)		☐ Non Standard or urgent TAT (List due date):				Gassy, Seal Intact?	
PROJECT:	98119.01	ALS QUOTE NO.:		EN / 222 / 18				Pres. (or frozen) ice bricks present upon receipt?	
ORDER NUMBER:								Random Sample Temperature outside?	
PROJECT MANAGER:	Paul Barfield	CONTACT PH.:	(07) 3237 8900					Other comment:	
SAMPLER:	Mitchell Valley	SAMPLER MOBILE:	0439 006 695	RELINQUISHED BY:		RECEIVED BY:			
COC emailed to ALS? YES		EDD FORMAT (or default):		Mitchell Valley		DATE/TIME:		DATE/TIME:	
Email Reports to (will default to PM if no other addresses are listed):		paul.barfield@douglaspartners.com.au		DATE/TIME:		DATE/TIME:		DATE/TIME:	
Email Invoice to (will default to PM if no other addresses are listed):		brisanee@douglaspartners.com.au		17/04/2020					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	ANALYSIS REQUIRED INCLUDING SUITES (NB: Suite Codes must be listed to attract suite price) (Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required))	Additional Information
						S19 - TRH/BTEX, 8 Metals, PAH, PCB, OC/OP, Phenols	
						S18 - TRH/BTEXN	
						P22 - NEPM Screen	
						EA200 - Asbestos presence/absence	
15	5/1.0	16/04/2020	S	Jar	1		
16	6/0.2	16/04/2020	S	Jar	1		
17	6/0.5	16/04/2020	S	Jar	1	X	
18	6/1.0	16/04/2020	S	Jar	1		
19	6/1.5	16/04/2020	S	Jar	1		
20	7/0.2	17/04/2020	S	Jar	1	X	
21	7/0.5	17/04/2020	S	Jar	1		
22	7/1.0	17/04/2020	S	Jar	1		
23	7/1.5	17/04/2020	S	Jar	1		
24	8/0.2	17/04/2020	S	Jar	1	X	
25	8/0.5	17/04/2020	S	Jar	1		X
26	8/1.0	17/04/2020	S	Jar	1		
27	9/0.2	17/04/2020	S	Jar	1		X
28	9/0.5	17/04/2020	S	Jar	1	X	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airtight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airtight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Special bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Stable Bottle; ASS = Plastic Bag for Acid Sulphate Solids; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory, please tick →

Sydney: 277 Woodrow Rd, Smithfield NSW 2176
Ph: 02 8784 5655 E: samples.syd@alsenviro.com
Newcastle: 5 Rossignol Rd, Warminster NSW 2304
Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com

Brisbane: 32 Shand St, Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
Townsville: 14-15 Peasma Ct, Borneo QLD 4818
Ph: 07 4796 0900 E: townsville.environment@alsenviro.com

Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
Adelaide: 2-1 Burma Rd, Pooraka SA 5005
Ph: 08 8359 0890 E: adelaide@alsenviro.com

Perth: 10 Hoj Way, Malaga WA 6090
Ph: 08 9209 7655 E: samples.perth@alsenviro.com
Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 6331 2158 E: launceston@alsenviro.com

FOR LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Freeze / frozen bottles present upon receipt? Yes No N/A

Random Sample Temperature on Receipt? °C

Other comments:

Standard

TURNAROUND REQUIREMENTS: ☒ Standard TAT (list due date): ☐ Non Standard or urgent TAT (list due date):

(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)

ALS QUOTE NO.: EN / 222 / 18

CLIENT: Douglas Partners Pty Ltd OFFICE: 439 Montague Road, West End QLD 4101 PROJECT: 98119.01 ORDER NUMBER: PROJECT MANAGER: Paul Barfield CONTACT PH: (07) 3237 8900

SAMPLER: Mitchell Valley SAMPLER MOBILE: 0439 006 695 RELINQUISHED BY: Mitchell Valley RECEIVED BY: DATE/TIME: DATE/TIME:

COC emailed to ALS? YES EDD FORMAT (or default): DATE/TIME: DATE/TIME:

Email Reports to (will default to PM if no other addresses are listed): paul.barfield@douglaspartners.com.au

Email Invoice to (will default to PM if no other addresses are listed): brisbane@douglaspartners.com.au

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY SAMPLE DETAILS MATRIX: Solid(S) Water(W)

CONTAINER INFORMATION

ANALYSIS REQUIRED INCLUDING SUITES (NB: Suite Codes must be listed to attract suite price) (Where Metals are required, specify Total (unfiltered bottles required) or Dissolved (filtered bottles required))

Additional Information

Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.

LAB ID SAMPLE ID DATE / TIME MATRIX TYPE & PRESERVATIVE (refer to codes below) TOTAL BOTTLES

43 R1 16/04/2020 S Jar 1 X S19 - TRH/BTEX, 8 Metals, PAH, PCB, OC/OP, Phenols S18 - TRH/BTEXN P22 - NEPM Screen EA200 - Asbestos presence/absence

44 R2 17/04/2020 S Jar 1 S19 - TRH/BTEX, 8 Metals, PAH, PCB, OC/OP, Phenols S18 - TRH/BTEXN P22 - NEPM Screen EA200 - Asbestos presence/absence

45 S1 16/04/2020 S Jar 1 S19 - TRH/BTEX, 8 Metals, PAH, PCB, OC/OP, Phenols S18 - TRH/BTEXN P22 - NEPM Screen EA200 - Asbestos presence/absence

46 Trip Blank 17/04/2020 S Jar 1 S19 - TRH/BTEX, 8 Metals, PAH, PCB, OC/OP, Phenols S18 - TRH/BTEXN P22 - NEPM Screen EA200 - Asbestos presence/absence

Extras 47 6/2.0 16/4 S Jar 1 S19 - TRH/BTEX, 8 Metals, PAH, PCB, OC/OP, Phenols S18 - TRH/BTEXN P22 - NEPM Screen EA200 - Asbestos presence/absence

48 8/1.6 17/4 S Jar 1 S19 - TRH/BTEX, 8 Metals, PAH, PCB, OC/OP, Phenols S18 - TRH/BTEXN P22 - NEPM Screen EA200 - Asbestos presence/absence

TOTAL 46 13 1 1 5 0 0 0

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EB2010615

Client : DOUGLAS PARTNERS PTY LTD Contact : MR PAUL BARFIELD Address : 439 MONTAGUE ROAD WEST END QLD, AUSTRALIA 4101 E-mail : paul.barfield@douglaspartners.com.au Telephone : +61 07 32378900 Facsimile : +61 07 32378999 Project : 98119.01 Order number : ---- C-O-C number : ---- Site : ---- Sampler : MITCHELL VALLELY	Laboratory : Environmental Division Brisbane Contact : John Pickering Address : 2 Byth Street Stafford QLD Australia 4053 E-mail : john.pickering@alsglobal.com Telephone : +61 7 3552 8634 Facsimile : +61-7-3243 7218 Page : 1 of 4 Quote number : EM2017DOUPAR0002 (EN/222) QC Level : NEPM 2013 B3 & ALS QC Standard
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Dates

Date Samples Received : 17-Apr-2020 16:27	Issue Date : 24-Apr-2020
Client Requested Due : 30-Apr-2020	Scheduled Reporting Date : 30-Apr-2020
Date	

Delivery Details

Mode of Delivery : Client Drop Off	Security Seal : Not Available
No. of coolers/boxes : 2	Temperature : 5.9°C, 5.0°C - Ice present
Receipt Detail : MED ESKY	No. of samples received / analysed : 48 / 21

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **Please be advised that the sample treated as "7/1.5" did not have an ID written on the jar, but was visually similar to "7/1.0". If changes are required, please contact client services at ALSEnviro.Brisbane@alsglobal.com.**
- **Please be advised that the sample treated as "11/1.0" had "11/0.5" written on the jar with "1.0" crossed out, however "11/0.5" was already accounted for. If changes are required, please contact client services at ALSEnviro.Brisbane@alsglobal.com.**
- **24/4/20: SRN has been resent to acknowledge that EA200 has been added to sample 3/0.5 as requested. For any further information regarding these adjustments please contact client services at ALSEnviro.Brisbane@alsglobal.com.**
- **Please be advised that an extra sample "6/2.0" was received in addition to the samples listed on the COC. This sample has been added to the end of the work order and will remain on hold unless we are otherwise advised.**
- **Please be advised that an extra sample "8/1.6" was received in addition to the samples listed on the COC. This sample has been added to the end of the work order and will remain on hold unless we are otherwise advised.**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- **Asbestos analysis will be conducted by ALS Environmental, Melbourne, NATA accreditation No. 825, Site No. 13778.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - P-22 EB Only NEPM Screen for Soil Classification EB Only	SOIL - S-18 TRH(C6-C9)/BTEXN	SOIL - S-19 TRH/BTEXN/PAH/Ph/OC/OP/PCB/8 metals
EB2010615-001	16-Apr-2020 00:00	1/0.2		✓				✓
EB2010615-002	16-Apr-2020 00:00	1/0.5	✓					
EB2010615-003	16-Apr-2020 00:00	1/1.0	✓					
EB2010615-004	16-Apr-2020 00:00	2/0.1		✓				✓
EB2010615-005	16-Apr-2020 00:00	2/0.5		✓		✓		
EB2010615-006	16-Apr-2020 00:00	2/1.0	✓					
EB2010615-007	16-Apr-2020 00:00	3/0.2		✓				✓
EB2010615-008	16-Apr-2020 00:00	3/0.5			✓			
EB2010615-009	16-Apr-2020 00:00	3/1.0	✓					
EB2010615-010	16-Apr-2020 00:00	4/0.2		✓				✓
EB2010615-011	16-Apr-2020 00:00	4/0.5	✓					
EB2010615-012	16-Apr-2020 00:00	4/1.0	✓					
EB2010615-013	16-Apr-2020 00:00	5/0.1		✓				✓
EB2010615-014	16-Apr-2020 00:00	5/0.5	✓					
EB2010615-015	16-Apr-2020 00:00	5/1.0	✓					
EB2010615-016	16-Apr-2020 00:00	6/0.2			✓			
EB2010615-017	16-Apr-2020 00:00	6/0.5		✓				✓
EB2010615-018	16-Apr-2020 00:00	6/1.0	✓					
EB2010615-019	16-Apr-2020 00:00	6/1.5	✓					
EB2010615-020	17-Apr-2020 00:00	7/0.2		✓				✓
EB2010615-021	17-Apr-2020 00:00	7/0.5	✓					
EB2010615-022	17-Apr-2020 00:00	7/1.0	✓					
EB2010615-023	17-Apr-2020 00:00	7/1.5	✓					
EB2010615-024	17-Apr-2020 00:00	8/0.2		✓				✓
EB2010615-025	17-Apr-2020 00:00	8/0.5			✓			
EB2010615-026	17-Apr-2020 00:00	8/1.0	✓					
EB2010615-027	17-Apr-2020 00:00	9/0.2			✓			
EB2010615-028	17-Apr-2020 00:00	9/0.5		✓				✓
EB2010615-029	17-Apr-2020 00:00	9/1.0	✓					
EB2010615-030	17-Apr-2020 00:00	9/1.5	✓					
EB2010615-031	17-Apr-2020 00:00	9/2.0	✓					
EB2010615-032	17-Apr-2020 00:00	10/0.2			✓			
EB2010615-033	17-Apr-2020 00:00	10/0.5		✓				✓
EB2010615-034	17-Apr-2020 00:00	10/1.0	✓					
EB2010615-035	17-Apr-2020 00:00	10/1.2	✓					

CERTIFICATE OF ANALYSIS

Work Order : **EB2010615**
Client : **DOUGLAS PARTNERS PTY LTD**
Contact : MR PAUL BARFIELD
Address : 439 MONTAGUE ROAD
 WEST END QLD, AUSTRALIA 4101
Telephone : +61 07 32378900
Project : 98119.01
Order number : ----
C-O-C number : ----
Sampler : MITCHELL VALLELY
Site : ----
Quote number : EN/222
No. of samples received : 48
No. of samples analysed : 21

Page : 1 of 24
Laboratory : Environmental Division Brisbane
Contact : John Pickering
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61 7 3552 8634
Date Samples Received : 17-Apr-2020 16:27
Date Analysis Commenced : 23-Apr-2020
Issue Date : 30-Apr-2020 08:51



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Morgan Lennox		Brisbane Organics, Stafford, QLD
Uyen Dalkin	Approved Asbestos Identifier	Melbourne Asbestos, Springvale, VIC
Vanessa Phung	Team Leader - Asbestos	Melbourne Asbestos, Springvale, VIC



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EG005T (Total Metals by ICP-AES): Sample 2/0.1 (EB2010615-004) shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- ED007 (Exchangeable Cations by ICP-AES): Unable to calculate Magnesium/Potassium Ratio for some samples as required Exchangeable Magnesium and/or Potassium results are less than the limit of reporting.
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	1/0.2	2/0.1	2/0.5	3/0.2	3/0.5
Client sampling date / time					16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-001	EB2010615-004	EB2010615-005	EB2010615-007	EB2010615-008
					Result	Result	Result	Result	Result
EA001: pH in soil using 0.01M CaCl extract									
pH (CaCl2)	----	0.1	pH Unit		----	----	4.4	----	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		----	----	5.2	----	----
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		----	----	10	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		----	----	21.1	----	----
Moisture Content	----	1.0	%		20.3	22.6	----	7.7	----
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		----	----	30	----	----
EA152: Soil Particle Density									
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		----	----	2.61	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		----	----	----	----	No
Asbestos (Trace)	1332-21-4	5	Fibres		----	----	----	----	No
Asbestos Type	1332-21-4	-	--		----	----	----	----	-
Synthetic Mineral Fibre	----	0.1	g/kg		----	----	----	----	No
Organic Fibre	----	0.1	g/kg		----	----	----	----	Yes
Sample weight (dry)	----	0.01	g		----	----	----	----	296
APPROVED IDENTIFIER:	----	-	--		----	----	----	----	U.DALKIN
ED005: Exchange Acidity									
∅ Exchange Acidity	----	0.1	meq/100g		----	----	0.9	----	----
∅ Exchangeable Aluminium	----	0.1	meq/100g		----	----	0.8	----	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	----	0.5	----	----
Exchangeable Magnesium	----	0.1	meq/100g		----	----	0.3	----	----
Exchangeable Potassium	----	0.1	meq/100g		----	----	<0.1	----	----
Exchangeable Sodium	----	0.1	meq/100g		----	----	<0.1	----	----
Cation Exchange Capacity	----	0.1	meq/100g		----	----	1.9	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Iron	7439-89-6	0.005	%		----	----	1.80	----	----
Arsenic	7440-38-2	5	mg/kg		<5	<5	----	<5	----
Cadmium	7440-43-9	1	mg/kg		<1	<1	----	<1	----
Chromium	7440-47-3	2	mg/kg		18	12	----	4	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	1/0.2	2/0.1	2/0.5	3/0.2	3/0.5
Client sampling date / time					16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-001	EB2010615-004	EB2010615-005	EB2010615-007	EB2010615-008
					Result	Result	Result	Result	Result
EG005(ED093)T: Total Metals by ICP-AES - Continued									
Copper	7440-50-8	5	mg/kg		7	7	----	7	----
Lead	7439-92-1	5	mg/kg		15	12	----	8	----
Nickel	7440-02-0	2	mg/kg		3	2	----	6	----
Zinc	7440-66-6	5	mg/kg		12	10	----	20	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		0.1	0.1	----	<0.1	----
EP004: Organic Matter									
Organic Matter	----	0.5	%		----	----	1.2	----	----
Total Organic Carbon	----	0.5	%		----	----	0.7	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	----	<0.1	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
Aldrin	309-00-2	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
4,4'-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
4,4'-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	----	<0.05	----
4,4'-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	----	<0.2	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	----	<0.05	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				1/0.2	2/0.1	2/0.5	3/0.2	3/0.5
Client sampling date / time				16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010615-001	EB2010615-004	EB2010615-005	EB2010615-007	EB2010615-008
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	----	<0.2	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	----	<0.2	----
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	----	<0.2	----
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	----	<0.2	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	----	<0.05	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	----	<1	----
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	----	<0.5	----
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	----	<0.5	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	1/0.2	2/0.1	2/0.5	3/0.2	3/0.5
Client sampling date / time					16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-001	EB2010615-004	EB2010615-005	EB2010615-007	EB2010615-008
					Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds - Continued									
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	----	<2	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	----	0.6	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	----	1.2	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	----	<10	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	----	<50	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	----	<100	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	----	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	----	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	----	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	----	<10	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	----	<50	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	1/0.2	2/0.1	2/0.5	3/0.2	3/0.5
Client sampling date / time					16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-001	EB2010615-004	EB2010615-005	EB2010615-007	EB2010615-008
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	----	<100	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	----	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	----	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	----	<50	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	----	<0.2	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	----	<0.5	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	<1	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		114	112	----	102	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		90.1	86.1	----	87.5	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		99.7	76.2	----	77.1	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		90.3	87.4	----	121	----
2-Chlorophenol-D4	93951-73-6	0.5	%		91.6	87.5	----	124	----
2,4,6-Tribromophenol	118-79-6	0.5	%		58.5	58.9	----	78.7	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		92.3	81.9	----	124	----
Anthracene-d10	1719-06-8	0.5	%		88.2	86.8	----	116	----
4-Terphenyl-d14	1718-51-0	0.5	%		98.7	97.1	----	130	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		81.9	92.5	----	102	----
Toluene-D8	2037-26-5	0.2	%		74.3	81.9	----	92.5	----
4-Bromofluorobenzene	460-00-4	0.2	%		86.7	90.6	----	120	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	4/0.2	5/0.1	6/0.2	6/0.5	7/0.2
Client sampling date / time					16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	17-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-010	EB2010615-013	EB2010615-016	EB2010615-017	EB2010615-020
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		16.6	26.9	----	11.3	26.2
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		----	----	No	----	----
Asbestos (Trace)	1332-21-4	5	Fibres		----	----	No	----	----
Asbestos Type	1332-21-4	-	--		----	----	-	----	----
Synthetic Mineral Fibre	----	0.1	g/kg		----	----	No	----	----
Organic Fibre	----	0.1	g/kg		----	----	Yes	----	----
Sample weight (dry)	----	0.01	g		----	----	204	----	----
APPROVED IDENTIFIER:	----	-	--		----	----	V.PHUNG	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	----	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	----	<1	<1
Chromium	7440-47-3	2	mg/kg		6	11	----	8	22
Copper	7440-50-8	5	mg/kg		7	15	----	9	6
Lead	7439-92-1	5	mg/kg		20	20	----	5	10
Nickel	7440-02-0	2	mg/kg		<2	5	----	8	4
Zinc	7440-66-6	5	mg/kg		19	93	----	15	13
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		0.1	<0.1	----	<0.1	0.1
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	----	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	<0.05	----	<0.05	<0.05

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID		4/0.2	5/0.1	6/0.2	6/0.5	7/0.2
Client sampling date / time				16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	17-Apr-2020 00:00	
Compound	CAS Number	LOR	Unit	EB2010615-010	EB2010615-013	EB2010615-016	EB2010615-017	EB2010615-020		
				Result	Result	Result	Result	Result		
EP068A: Organochlorine Pesticides (OC) - Continued										
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	----	<0.2	<0.2		
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	----	<0.2	<0.2		
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
EP068B: Organophosphorus Pesticides (OP)										
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	----	<0.2	<0.2		
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	----	<0.2	<0.2		
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	----	<0.2	<0.2		
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	----	<0.05	<0.05		
EP075(SIM)A: Phenolic Compounds										

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	4/0.2	5/0.1	6/0.2	6/0.5	7/0.2
Client sampling date / time				16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	17-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010615-010	EB2010615-013	EB2010615-016	EB2010615-017	EB2010615-020	
				Result	Result	Result	Result	Result	
EP075(SIM)A: Phenolic Compounds - Continued									
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	----	<1	<1	
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	----	<2	<2	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Benzo(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Benzo(b+j)fluoranthene	205-99-2	205-82-3	0.5	mg/kg	<0.5	<0.5	----	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	----	0.6	0.6	
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	----	1.2	1.2	
EP080/071: Total Petroleum Hydrocarbons									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	4/0.2	5/0.1	6/0.2	6/0.5	7/0.2
Client sampling date / time					16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	17-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-010	EB2010615-013	EB2010615-016	EB2010615-017	EB2010615-020
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	----	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	----	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	----	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	----	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	----	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	----	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	----	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	----	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	----	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	----	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	----	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	----	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	----	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	----	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	----	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		114	109	----	119	118
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		89.2	86.7	----	101	97.2
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		86.7	96.3	----	116	109
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		93.5	89.2	----	86.7	89.8
2-Chlorophenol-D4	93951-73-6	0.5	%		97.2	91.8	----	88.6	91.0
2,4,6-Tribromophenol	118-79-6	0.5	%		66.1	68.4	----	65.4	65.7



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	4/0.2	5/0.1	6/0.2	6/0.5	7/0.2
Client sampling date / time					16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	16-Apr-2020 00:00	17-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-010	EB2010615-013	EB2010615-016	EB2010615-017	EB2010615-020
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		96.0	89.1	----	86.2	88.6
Anthracene-d10	1719-06-8	0.5	%		89.5	90.3	----	83.2	88.4
4-Terphenyl-d14	1718-51-0	0.5	%		100	100	----	89.6	96.8
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		97.1	94.1	----	106	99.8
Toluene-D8	2037-26-5	0.2	%		86.7	80.8	----	87.1	85.8
4-Bromofluorobenzene	460-00-4	0.2	%		112	108	----	114	110



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	8/0.2	8/0.5	9/0.2	9/0.5	10/0.2
Client sampling date / time					17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-024	EB2010615-025	EB2010615-027	EB2010615-028	EB2010615-032
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		13.8	----	----	10.5	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		----	No	No	----	No
Asbestos (Trace)	1332-21-4	5	Fibres		----	No	No	----	No
Asbestos Type	1332-21-4	-	--		----	-	-	----	-
Synthetic Mineral Fibre	----	0.1	g/kg		----	No	No	----	No
Organic Fibre	----	0.1	g/kg		----	Yes	Yes	----	Yes
Sample weight (dry)	----	0.01	g		----	235	191	----	285
APPROVED IDENTIFIER:	----	-	--		----	V.PHUNG	V.PHUNG	----	V.PHUNG
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	----	----	<5	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	<1	----
Chromium	7440-47-3	2	mg/kg		3	----	----	7	----
Copper	7440-50-8	5	mg/kg		8	----	----	8	----
Lead	7439-92-1	5	mg/kg		6	----	----	7	----
Nickel	7440-02-0	2	mg/kg		10	----	----	4	----
Zinc	7440-66-6	5	mg/kg		52	----	----	23	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	<0.1	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	----	----	<0.1	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	----	<0.05	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	----	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	----	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	----	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	----	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	----	<0.05	----
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	----	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	----	<0.05	----
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	----	----	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	----	<0.05	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	----	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	----	<0.05	----

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID		8/0.2		8/0.5		9/0.2		9/0.5		10/0.2	
Client sampling date / time				17-Apr-2020 00:00		17-Apr-2020 00:00		17-Apr-2020 00:00		17-Apr-2020 00:00		17-Apr-2020 00:00		17-Apr-2020 00:00	
Compound	CAS Number	LOR	Unit	EB2010615-024		EB2010615-025		EB2010615-027		EB2010615-028		EB2010615-032			
				Result		Result		Result		Result		Result			
EP068A: Organochlorine Pesticides (OC) - Continued															
Dieldrin	60-57-1	0.05	mg/kg	<0.05		----		----		<0.05		----			
4,4`-DDE	72-55-9	0.05	mg/kg	<0.05		----		----		<0.05		----			
Endrin	72-20-8	0.05	mg/kg	<0.05		----		----		<0.05		----			
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05		----		----		<0.05		----			
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05		----		----		<0.05		----			
4,4`-DDD	72-54-8	0.05	mg/kg	<0.05		----		----		<0.05		----			
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05		----		----		<0.05		----			
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05		----		----		<0.05		----			
4,4`-DDT	50-29-3	0.2	mg/kg	<0.2		----		----		<0.2		----			
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05		----		----		<0.05		----			
Methoxychlor	72-43-5	0.2	mg/kg	<0.2		----		----		<0.2		----			
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05		----		----		<0.05		----			
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05		----		----		<0.05		----			
EP068B: Organophosphorus Pesticides (OP)															
Dichlorvos	62-73-7	0.05	mg/kg	<0.05		----		----		<0.05		----			
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05		----		----		<0.05		----			
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2		----		----		<0.2		----			
Dimethoate	60-51-5	0.05	mg/kg	<0.05		----		----		<0.05		----			
Diazinon	333-41-5	0.05	mg/kg	<0.05		----		----		<0.05		----			
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05		----		----		<0.05		----			
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2		----		----		<0.2		----			
Malathion	121-75-5	0.05	mg/kg	<0.05		----		----		<0.05		----			
Fenthion	55-38-9	0.05	mg/kg	<0.05		----		----		<0.05		----			
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05		----		----		<0.05		----			
Parathion	56-38-2	0.2	mg/kg	<0.2		----		----		<0.2		----			
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05		----		----		<0.05		----			
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05		----		----		<0.05		----			
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05		----		----		<0.05		----			
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05		----		----		<0.05		----			
Prothiofos	34643-46-4	0.05	mg/kg	<0.05		----		----		<0.05		----			
Ethion	563-12-2	0.05	mg/kg	<0.05		----		----		<0.05		----			
Carbophenothion	786-19-6	0.05	mg/kg	<0.05		----		----		<0.05		----			
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05		----		----		<0.05		----			
EP075(SIM)A: Phenolic Compounds															

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID		8/0.2		8/0.5		9/0.2		9/0.5		10/0.2	
Client sampling date / time				17-Apr-2020 00:00		17-Apr-2020 00:00		17-Apr-2020 00:00		17-Apr-2020 00:00		17-Apr-2020 00:00		17-Apr-2020 00:00	
Compound	CAS Number	LOR	Unit	EB2010615-024		EB2010615-025		EB2010615-027		EB2010615-028		EB2010615-032			
				Result		Result		Result		Result		Result			
EP075(SIM)A: Phenolic Compounds - Continued															
Phenol	108-95-2	0.5	mg/kg	<0.5		----		----		<0.5		----			----
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5		----		----		<0.5		----			----
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5		----		----		<0.5		----			----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1		----		----		<1		----			----
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5		----		----		<0.5		----			----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5		----		----		<0.5		----			----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5		----		----		<0.5		----			----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5		----		----		<0.5		----			----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5		----		----		<0.5		----			----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5		----		----		<0.5		----			----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Pentachlorophenol	87-86-5	2	mg/kg	<2		----		----		<2		----			----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons															
Naphthalene	91-20-3	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Fluorene	86-73-7	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Anthracene	120-12-7	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Pyrene	129-00-0	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Benzo(a)anthracene	56-55-3	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Chrysene	218-01-9	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Benzo(b+j)fluoranthene	205-99-2	205-82-3	0.5	mg/kg	<0.5		----	----		<0.5		----			----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5		----		----		<0.5		----			----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5		----		----		<0.5		----			----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5		----		----		<0.5		----			----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5		----		----		<0.5		----			----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6		----		----		0.6		----			----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2		----		----		1.2		----			----
EP080/071: Total Petroleum Hydrocarbons															



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	8/0.2	8/0.5	9/0.2	9/0.5	10/0.2
Client sampling date / time					17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-024	EB2010615-025	EB2010615-027	EB2010615-028	EB2010615-032
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	<10	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	<50	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	<100	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	<10	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	<50	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	<100	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	----	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	<50	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	<0.2	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	----	<0.5	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	<1	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		120	----	----	117	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		90.6	----	----	90.6	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		105	----	----	103	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		89.8	----	----	91.0	----
2-Chlorophenol-D4	93951-73-6	0.5	%		92.5	----	----	91.2	----
2,4,6-Tribromophenol	118-79-6	0.5	%		67.6	----	----	65.5	----



Analytical Results

Sub-Matrix: **SOIL**
 (Matrix: **SOIL**)

Client sample ID

				8/0.2	8/0.5	9/0.2	9/0.5	10/0.2
Client sampling date / time				17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010615-024	EB2010615-025	EB2010615-027	EB2010615-028	EB2010615-032
				Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	90.6	----	----	89.5	----
Anthracene-d10	1719-06-8	0.5	%	89.9	----	----	88.3	----
4-Terphenyl-d14	1718-51-0	0.5	%	97.0	----	----	95.5	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.2	%	95.7	----	----	103	----
Toluene-D8	2037-26-5	0.2	%	80.1	----	----	90.4	----
4-Bromofluorobenzene	460-00-4	0.2	%	107	----	----	116	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	10/0.5	11/0.2	11/0.5	12/0.2	R1
Client sampling date / time					17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	16-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-033	EB2010615-037	EB2010615-038	EB2010615-040	EB2010615-043
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		6.8	----	24.3	21.1	26.9
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		----	No	----	----	----
Asbestos (Trace)	1332-21-4	5	Fibres		----	No	----	----	----
Asbestos Type	1332-21-4	-	--		----	-	----	----	----
Synthetic Mineral Fibre	----	0.1	g/kg		----	No	----	----	----
Organic Fibre	----	0.1	g/kg		----	Yes	----	----	----
Sample weight (dry)	----	0.01	g		----	228	----	----	----
APPROVED IDENTIFIER:	----	-	--		----	V.PHUNG	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		5	----	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	----	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		6	----	16	25	18
Copper	7440-50-8	5	mg/kg		7	----	7	17	7
Lead	7439-92-1	5	mg/kg		<5	----	36	38	13
Nickel	7440-02-0	2	mg/kg		3	----	3	5	3
Zinc	7440-66-6	5	mg/kg		13	----	26	54	15
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	<0.1	0.2	0.1
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	----	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	<0.05	<0.05	<0.05

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	10/0.5	11/0.2	11/0.5	12/0.2	R1
Client sampling date / time				17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	16-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010615-033	EB2010615-037	EB2010615-038	EB2010615-040	EB2010615-043	
				Result	Result	Result	Result	Result	
EP068A: Organochlorine Pesticides (OC) - Continued									
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Endrin	72-20-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2	
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2	
Dimethoate	60-51-5	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Diazinon	333-41-5	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2	
Malathion	121-75-5	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Fenthion	55-38-9	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Parathion	56-38-2	0.2	mg/kg	<0.2	----	<0.2	<0.2	<0.2	
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Ethion	563-12-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05	
EP075(SIM)A: Phenolic Compounds									

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	10/0.5	11/0.2	11/0.5	12/0.2	R1
Client sampling date / time				17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	16-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	EB2010615-033	EB2010615-037	EB2010615-038	EB2010615-040	EB2010615-043	
				Result	Result	Result	Result	Result	
EP075(SIM)A: Phenolic Compounds - Continued									
Phenol	108-95-2	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	----	<1	<1	<1	
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Pentachlorophenol	87-86-5	2	mg/kg	<2	----	<2	<2	<2	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	----	0.6	0.6	0.6	
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	----	1.2	1.2	1.2	
EP080/071: Total Petroleum Hydrocarbons									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	10/0.5	11/0.2	11/0.5	12/0.2	R1
Client sampling date / time					17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	16-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-033	EB2010615-037	EB2010615-038	EB2010615-040	EB2010615-043
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C6 - C9 Fraction	----	10	mg/kg		<10	----	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	----	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	----	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	----	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	----	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	----	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	----	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	----	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		115	----	114	115	118
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		91.6	----	86.0	88.3	90.9
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		79.8	----	76.4	80.9	92.0
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		76.6	----	72.3	87.7	88.2
2-Chlorophenol-D4	93951-73-6	0.5	%		69.8	----	59.6	91.1	91.6
2,4,6-Tribromophenol	118-79-6	0.5	%		49.9	----	49.2	60.5	62.6



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	10/0.5	11/0.2	11/0.5	12/0.2	R1
Client sampling date / time					17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	17-Apr-2020 00:00	16-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		EB2010615-033	EB2010615-037	EB2010615-038	EB2010615-040	EB2010615-043
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		73.2	----	62.0	89.9	90.9
Anthracene-d10	1719-06-8	0.5	%		76.5	----	82.5	83.8	86.2
4-Terphenyl-d14	1718-51-0	0.5	%		83.5	----	91.0	96.2	95.8
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		111	----	135	96.9	97.9
Toluene-D8	2037-26-5	0.2	%		86.2	----	82.4	84.4	87.0
4-Bromofluorobenzene	460-00-4	0.2	%		118	----	130	108	111



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Trip Blank	----	----	----	----
Client sampling date / time				17-Apr-2020 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2010615-046	-----	-----	-----	-----	-----
Result				----	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	133	----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	90.2	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	118	----	----	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: SOIL		
Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	3/0.5 - 16-Apr-2020 00:00	Tan beige clay like soil with rock and organic matter.
EA200: Description	6/0.2 - 16-Apr-2020 00:00	Brown tan soil with rock and organic matter.
EA200: Description	8/0.5 - 17-Apr-2020 00:00	Brown tan soil with rock and organic matter.
EA200: Description	9/0.2 - 17-Apr-2020 00:00	Brown tan soil with rock and organic matter.
EA200: Description	10/0.2 - 17-Apr-2020 00:00	Yellow soil with rock and organic matter.
EA200: Description	11/0.2 - 17-Apr-2020 00:00	Brown tan soil with rock and organic matter.



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	16	134
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	138
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	23	134
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	35	154
2-Chlorophenol-D4	93951-73-6	42	153
2,4,6-Tribromophenol	118-79-6	26	157
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	34	156
Anthracene-d10	1719-06-8	37	153
4-Terphenyl-d14	1718-51-0	42	172
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	53	134
Toluene-D8	2037-26-5	60	131
4-Bromofluorobenzene	460-00-4	59	127

QUALITY CONTROL REPORT

Work Order	: EB2010615	Page	: 1 of 14
Client	: DOUGLAS PARTNERS PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR PAUL BARFIELD	Contact	: John Pickering
Address	: 439 MONTAGUE ROAD WEST END QLD, AUSTRALIA 4101	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 32378900	Telephone	: +61 7 3552 8634
Project	: 98119.01	Date Samples Received	: 17-Apr-2020
Order number	: ----	Date Analysis Commenced	: 23-Apr-2020
C-O-C number	: ----	Issue Date	: 30-Apr-2020
Sampler	: MITCHELL VALLELY		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 48		
No. of samples analysed	: 21		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Morgan Lennox		Brisbane Organics, Stafford, QLD
Uyen Dalkin	Approved Asbestos Identifier	Melbourne Asbestos, Springvale, VIC
Vanessa Phung	Team Leader - Asbestos	Melbourne Asbestos, Springvale, VIC

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 2982415)									
EB2010615-033	10/0.5	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	6	5	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	5	5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	7	7	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	13	15	8.23	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	9370	10100	7.22	0% - 20%
EB2010615-001	1/0.2	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	18	22	21.6	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	7	7	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	15	13	14.6	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	12	11	9.96	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	27400	27600	1.02	0% - 20%
EA001: pH in soil using 0.01M CaCl extract (QC Lot: 2983626)									
EB2010615-005	2/0.5	EA001: pH (CaCl2)	----	0.1	pH Unit	4.4	4.4	0.00	0% - 20%
EB2010976-009	Anonymous	EA001: pH (CaCl2)	----	0.1	pH Unit	5.6	5.6	0.00	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 2982833)									
EB2010615-005	2/0.5	EA002: pH Value	----	0.1	pH Unit	5.2	5.2	0.00	0% - 20%
EA010: Conductivity (1:5) (QC Lot: 2982834)									
EB2010615-005	2/0.5	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	10	10	0.00	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 2982435)									



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 2982435) - continued									
EB2010615-001	1/0.2	EA055: Moisture Content	----	0.1	%	20.3	18.8	7.87	0% - 20%
EB2010615-033	10/0.5	EA055: Moisture Content	----	0.1	%	6.8	6.4	6.01	No Limit
ED005: Exchange Acidity (QC Lot: 2987825)									
EB2010615-005	2/0.5	ED005: Exchange Acidity	----	0.1	meq/100g	0.9	1.0	0.00	No Limit
		ED005: Exchangeable Aluminium	----	0.1	meq/100g	0.8	0.8	0.00	No Limit
ED007: Exchangeable Cations (QC Lot: 2987824)									
EB2010615-005	2/0.5	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.5	0.5	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	0.3	0.3	0.00	No Limit
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2982416)									
EB2010615-038	11/0.5	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EB2010615-001	1/0.2	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	0.1	0.00	No Limit
EP004: Organic Matter (QC Lot: 2981923)									
EB2010615-005	2/0.5	EP004: Organic Matter	----	0.5	%	1.2	1.2	0.00	No Limit
		EP004: Total Organic Carbon	----	0.5	%	0.7	0.7	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 2982412)									
EB2010615-001	1/0.2	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	0.1	0.00	No Limit
EB2010615-038	11/0.5	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2982411)									
EB2010615-001	1/0.2	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2982411) - continued									
EB2010615-001	1/0.2	EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EB2010615-038	11/0.5	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 2982411)									
EB2010615-001	1/0.2	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 2982411) - continued									
EB2010615-001	1/0.2	EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EB2010615-038	11/0.5	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 2982410)									
EB2010615-001	1/0.2	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)		
EP075(SIM)A: Phenolic Compounds (QC Lot: 2982410) - continued											
EB2010615-001	1/0.2	EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit		
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit		
EB2010615-038	11/0.5	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit		
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit		
		EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2982410)									
		EB2010615-001	1/0.2	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Acenaphthylene	208-96-8			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Acenaphthene	83-32-9			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Fluorene	86-73-7			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Phenanthrene	85-01-8			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Anthracene	120-12-7			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Fluoranthene	206-44-0			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Pyrene	129-00-0			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Benz(a)anthracene	56-55-3			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Chrysene	218-01-9			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
	205-82-3										
EP075(SIM): Benzo(k)fluoranthene	207-08-9			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Benzo(a)pyrene	50-32-8			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Dibenz(a,h)anthracene	53-70-3			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Benzo(g,h,i)perylene	191-24-2			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Benzo(a)pyrene TEQ (zero)	----			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EB2010615-038	11/0.5			EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
				EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2982410) - continued									
EB2010615-038	11/0.5	EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2982409)									
EB2010615-001	1/0.2	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EB2010615-038	11/0.5	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2982413)									
EB2010615-001	1/0.2	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EB2010615-038	11/0.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2982409)									
EB2010615-001	1/0.2	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EB2010615-038	11/0.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2982413)									
EB2010615-001	1/0.2	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EB2010615-038	11/0.5	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 2982413)									
EB2010615-001	1/0.2	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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 Work Order : EB2010615
 Client : DOUGLAS PARTNERS PTY LTD
 Project : 98119.01



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 2982413) - continued									
EB2010615-001	1/0.2	EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EB2010615-038	11/0.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2982415)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	98 mg/kg	107	84.0	123
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
EG005T: Chromium	7440-47-3	2	mg/kg	<2	15.4 mg/kg	120	83.0	125
EG005T: Copper	7440-50-8	5	mg/kg	<5	48 mg/kg	113	86.0	122
EG005T: Iron	7439-89-6	50	mg/kg	<50	27922 mg/kg	117	70.0	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	50 mg/kg	114	84.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	12.4 mg/kg	115	81.5	118
EG005T: Zinc	7440-66-6	5	mg/kg	<5	115 mg/kg	110	80.0	120
EA001: pH in soil using 0.01M CaCl extract (QCLot: 2983626)								
EA001: pH (CaCl2)	----	----	pH Unit	----	4 pH Unit	101	99.0	101
				----	7 pH Unit	100	99.0	101
EA002: pH 1:5 (Soils) (QCLot: 2982833)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	101	98.0	102
				----	7 pH Unit	100	98.0	102
EA010: Conductivity (1:5) (QCLot: 2982834)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	99.6	97.0	103
EA152: Soil Particle Density (QCLot: 2982455)								
EA152: Soil Particle Density (Clay/Silt/Sand)	----	----	g/cm3	----	2.68 g/cm3	100	80.0	120
ED005: Exchange Acidity (QCLot: 2987825)								
ED005: Exchange Acidity	----	0.1	meq/100g	<0.1	----	----	----	----
ED005: Exchangeable Aluminium	----	0.1	meq/100g	<0.1	----	----	----	----
ED007: Exchangeable Cations (QCLot: 2987824)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	18.1 meq/100g	97.9	79.0	113
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	9.08 meq/100g	92.9	85.0	115
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.918 meq/100g	89.6	70.0	122
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	3.15 meq/100g	105	76.0	112
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	31.3 meq/100g	96.8	82.0	112
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2982416)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.0847 mg/kg	113	70.0	125
EP004: Organic Matter (QCLot: 2981923)								
EP004: Organic Matter	----	0.5	%	<0.5	80 %	89.6	83.0	115
EP004: Total Organic Carbon	----	0.5	%	<0.5	46.4 %	89.6	85.0	115
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2982412)								



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2982412) - continued								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	107	71.6	155
EP068A: Organochlorine Pesticides (OC) (QCLot: 2982411)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	81.2	54.0	121
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	82.2	80.1	134
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	82.8	49.0	121
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	80.4	75.5	136
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	78.9	61.0	122
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	65.0	130
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	85.0	70.0	130
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	81.1	58.0	118
EP068: Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	----	----	----
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.2	56.0	119
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.6	51.0	125
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	84.4	57.0	118
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	81.7	67.0	129
EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.9	62.0	121
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	80.9	60.0	137
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	82.9	61.0	122
EP068: Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	----	----	----	----
EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	82.4	60.0	123
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	68.6	52.0	125
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	72.3	55.0	125
EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	74.8	70.0	130
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	77.2	55.0	129
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	70.8	53.0	136
EP068: Sum of DDD + DDE + DDT	72-54-8/72-5 5-9/50-2	0.05	mg/kg	<0.05	----	----	----	----
EP068: Sum of Aldrin + Dieldrin	309-00-2/60- 57-1	0.05	mg/kg	<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2982411)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	79.9	41.0	114
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	104	25.0	120
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	54.2	35.0	135
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	89.0	44.0	131
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	88.5	70.0	131
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	91.8	70.0	130
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	102	60.0	122
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	87.2	64.0	125
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	80.2	69.0	115



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2982411) - continued								
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	99.9	66.0	120
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	84.0	57.0	118
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	85.4	70.0	130
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	85.8	62.0	127
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	81.0	80.0	130
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	80.9	55.0	106
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	82.3	80.0	134
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	83.6	61.0	123
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	84.3	57.0	124
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	72.3	35.0	127
EP075(SIM)A: Phenolic Compounds (QCLot: 2982410)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	1.5 mg/kg	96.3	78.0	134
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	1.5 mg/kg	95.9	78.0	132
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	1.5 mg/kg	95.0	78.0	132
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	3 mg/kg	97.9	77.2	135
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	1.5 mg/kg	95.6	42.9	156
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	1.5 mg/kg	92.0	70.3	141
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	1.5 mg/kg	96.2	69.9	135
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	1.5 mg/kg	97.2	72.9	136
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	1.5 mg/kg	98.1	53.3	138
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	1.5 mg/kg	82.0	50.9	140
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	1.5 mg/kg	93.1	45.5	140
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	3 mg/kg	87.4	20.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2982410)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	92.6	72.6	133
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	94.5	63.2	144
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	94.9	83.5	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	93.3	76.2	134
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	92.0	71.8	137
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	99.3	77.1	143
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	93.5	74.1	140
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	90.1	72.0	139
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	88.6	58.0	145
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	95.4	63.0	147
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	1.5 mg/kg	91.0	70.5	142
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	1.5 mg/kg	83.4	75.5	138
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	90.6	68.5	140
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	94.4	58.4	143



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2982410) - continued								
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	90.6	52.1	149
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	95.3	64.6	140
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2982409)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	310 mg/kg	97.3	79.0	123
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	490 mg/kg	107	77.0	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2982413)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	18 mg/kg	83.7	59.7	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2982409)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	450 mg/kg	101	81.0	122
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	320 mg/kg	105	74.0	122
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2982413)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	22.5 mg/kg	85.8	58.1	124
EP080: BTEXN (QCLot: 2982413)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	94.6	66.8	115
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	95.5	68.8	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	94.4	68.5	116
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	98.4	69.7	118
	106-42-3							
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	102	72.2	116
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	104	73.2	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2982415)							
EB2010615-004	2/0.1	EG005T: Arsenic	7440-38-2	100 mg/kg	# 65.5	70.0	130
		EG005T: Cadmium	7440-43-9	25 mg/kg	96.0	70.0	130
		EG005T: Chromium	7440-47-3	100 mg/kg	95.2	70.0	130
		EG005T: Copper	7440-50-8	100 mg/kg	98.6	70.0	130
		EG005T: Lead	7439-92-1	100 mg/kg	94.3	70.0	130
		EG005T: Nickel	7440-02-0	100 mg/kg	94.4	70.0	130
		EG005T: Zinc	7440-66-6	100 mg/kg	93.9	70.0	130

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2982416)							
EB2010615-004	2/0.1	EG035T: Mercury	7439-97-6	0.5 mg/kg	103	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2982412)							
EB2010615-004	2/0.1	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	117	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 2982411)							
EB2010615-004	2/0.1	EP068: gamma-BHC	58-89-9	0.5 mg/kg	80.1	75.5	136
		EP068: Heptachlor	76-44-8	0.5 mg/kg	94.7	65.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	82.3	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	79.0	67.0	129
		EP068: Endrin	72-20-8	0.5 mg/kg	74.5	60.0	137
		EP068: 4,4'-DDT	50-29-3	0.5 mg/kg	73.4	70.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2982411)							
EB2010615-004	2/0.1	EP068: Diazinon	333-41-5	0.5 mg/kg	82.3	70.0	131
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	95.0	70.0	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	90.5	70.0	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	84.6	80.0	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	80.4	80.0	134
EP075(SIM)A: Phenolic Compounds (QCLot: 2982410)							
EB2010615-004	2/0.1	EP075(SIM): Phenol	108-95-2	1.5 mg/kg	94.5	70.0	130
		EP075(SIM): 2-Chlorophenol	95-57-8	1.5 mg/kg	94.6	70.0	130
		EP075(SIM): 2-Nitrophenol	88-75-5	1.5 mg/kg	94.6	70.0	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1.5 mg/kg	92.1	70.0	130
		EP075(SIM): Pentachlorophenol	87-86-5	3 mg/kg	107	20.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2982410)							
EB2010615-004	2/0.1	EP075(SIM): Acenaphthene	83-32-9	1.5 mg/kg	93.8	70.0	130
		EP075(SIM): Pyrene	129-00-0	1.5 mg/kg	90.3	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2982409)							
EB2010615-004	2/0.1	EP071: C10 - C14 Fraction	----	310 mg/kg	96.1	70.0	130
		EP071: C15 - C28 Fraction	----	490 mg/kg	109	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2982413)							
EB2010615-004	2/0.1	EP080: C6 - C9 Fraction	----	8 mg/kg	72.1	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2982409)							
EB2010615-004	2/0.1	EP071: >C10 - C16 Fraction	----	450 mg/kg	102	70.0	130
		EP071: >C16 - C34 Fraction	----	320 mg/kg	105	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2982413)							
EB2010615-004	2/0.1	EP080: C6 - C10 Fraction	C6_C10	8 mg/kg	71.5	70.0	130
EP080: BTEXN (QCLot: 2982413)							



Sub-Matrix: SOIL

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080: BTEXN (QCLot: 2982413) - continued							
EB2010615-004	2/0.1	EP080: Benzene	71-43-2	2 mg/kg	87.6	70.0	130
		EP080: Toluene	108-88-3	2 mg/kg	79.0	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order : **EB2010615**

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Client : **DOUGLAS PARTNERS PTY LTD**
Contact : **MR PAUL BARFIELD**
Project : **98119.01**
Site : **----**
Sampler : **MITCHELL VALLELY**
Order number : **----**

Laboratory : **Environmental Division Brisbane**
Telephone : **+61 7 3552 8634**
Date Samples Received : **17-Apr-2020**
Issue Date : **30-Apr-2020**
No. of samples received : **48**
No. of samples analysed : **21**

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG005(ED093)T: Total Metals by ICP-AES	EB2010615--004	2/0.1	Arsenic	7440-38-2	65.5 %	70.0-130%	Recovery less than lower data quality objective

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP080S: TPH(V)/BTEX Surrogates	EB2010615-038	11/0.5	1,2-Dichloroethane-D4	17060-07-0	135 %	52.7-134 %	Recovery greater than upper data quality objective
EP080S: TPH(V)/BTEX Surrogates	EB2010615-038	11/0.5	4-Bromofluorobenzene	460-00-4	130 %	59.2-127 %	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA001: pH in soil using 0.01M CaCl extract						
Soil Glass Jar - Unpreserved 2/0.5	27-Apr-2020	23-Apr-2020	4	----	----	----
EA002: pH 1:5 (Soils)						
Soil Glass Jar - Unpreserved 2/0.5	24-Apr-2020	23-Apr-2020	1	----	----	----
EA010: Conductivity (1:5)						
Soil Glass Jar - Unpreserved 2/0.5	24-Apr-2020	23-Apr-2020	1	----	----	----

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Soil Particle Density	0	1	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Organic Matter	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA001: pH in soil using 0.01M CaCl extract							
Soil Glass Jar - Unpreserved (EA001) 2/0.5	16-Apr-2020	27-Apr-2020	23-Apr-2020	✖	27-Apr-2020	27-Apr-2020	✓
EA002: pH 1:5 (Soils)							
Soil Glass Jar - Unpreserved (EA002) 2/0.5	16-Apr-2020	24-Apr-2020	23-Apr-2020	✖	24-Apr-2020	24-Apr-2020	✓
EA010: Conductivity (1:5)							
Soil Glass Jar - Unpreserved (EA010) 2/0.5	16-Apr-2020	24-Apr-2020	23-Apr-2020	✖	24-Apr-2020	22-May-2020	✓
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) 1/0.2, 2/0.5, 4/0.2, 6/0.5, R1	16-Apr-2020	----	----	----	23-Apr-2020	30-Apr-2020	✓
Soil Glass Jar - Unpreserved (EA055) 7/0.2, 9/0.5, 11/0.5, 8/0.2, 10/0.5, 12/0.2	17-Apr-2020	----	----	----	23-Apr-2020	01-May-2020	✓
EA150: Soil Classification based on Particle Size							
Soil Glass Jar - Unpreserved (EA150H) 2/0.5	16-Apr-2020	----	----	----	28-Apr-2020	13-Oct-2020	✓
EA152: Soil Particle Density							
Soil Glass Jar - Unpreserved (EA152) 2/0.5	16-Apr-2020	----	----	----	28-Apr-2020	13-Oct-2020	✓
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Soil Glass Jar - Unpreserved (EA200) 6/0.2	16-Apr-2020	----	----	----	24-Apr-2020	13-Oct-2020	✓
Soil Glass Jar - Unpreserved (EA200) 3/0.5	16-Apr-2020	----	----	----	28-Apr-2020	13-Oct-2020	✓
Soil Glass Jar - Unpreserved (EA200) 8/0.5, 10/0.2, 9/0.2, 11/0.2	17-Apr-2020	----	----	----	24-Apr-2020	14-Oct-2020	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED005: Exchange Acidity							
Soil Glass Jar - Unpreserved (ED005) 2/0.5	16-Apr-2020	27-Apr-2020	14-May-2020	✓	27-Apr-2020	14-May-2020	✓
ED006: Exchangeable Cations on Alkaline Soils							
Soil Glass Jar - Unpreserved (ED006) 2/0.5	16-Apr-2020	27-Apr-2020	14-May-2020	✓	27-Apr-2020	14-May-2020	✓
ED007: Exchangeable Cations							
Soil Glass Jar - Unpreserved (ED007) 2/0.5	16-Apr-2020	27-Apr-2020	14-May-2020	✓	27-Apr-2020	14-May-2020	✓
ED008: Exchangeable Cations							
Soil Glass Jar - Unpreserved (ED008) 2/0.5	16-Apr-2020	27-Apr-2020	14-May-2020	✓	27-Apr-2020	14-May-2020	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) 1/0.2, 2/0.1, 2/0.5, 3/0.2, 4/0.2, 5/0.1, 6/0.5, R1	16-Apr-2020	23-Apr-2020	13-Oct-2020	✓	24-Apr-2020	13-Oct-2020	✓
Soil Glass Jar - Unpreserved (EG005T) 7/0.2, 8/0.2, 9/0.5, 10/0.5, 11/0.5, 12/0.2	17-Apr-2020	23-Apr-2020	14-Oct-2020	✓	24-Apr-2020	14-Oct-2020	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) 1/0.2, 2/0.1, 3/0.2, 4/0.2, 5/0.1, 6/0.5, R1	16-Apr-2020	23-Apr-2020	14-May-2020	✓	27-Apr-2020	14-May-2020	✓
Soil Glass Jar - Unpreserved (EG035T) 7/0.2, 8/0.2, 9/0.5, 10/0.5, 11/0.5, 12/0.2	17-Apr-2020	23-Apr-2020	15-May-2020	✓	27-Apr-2020	15-May-2020	✓
EP004: Organic Matter							
Soil Glass Jar - Unpreserved (EP004) 2/0.5	16-Apr-2020	28-Apr-2020	14-May-2020	✓	28-Apr-2020	14-May-2020	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP066: Polychlorinated Biphenyls (PCB)								
Soil Glass Jar - Unpreserved (EP066)		16-Apr-2020	23-Apr-2020	30-Apr-2020	✔	27-Apr-2020	02-Jun-2020	✔
1/0.2, 2/0.1, 3/0.2, 4/0.2, 5/0.1, 6/0.5, R1								
Soil Glass Jar - Unpreserved (EP066)		17-Apr-2020	23-Apr-2020	01-May-2020	✔	27-Apr-2020	02-Jun-2020	✔
7/0.2, 8/0.2, 9/0.5, 10/0.5, 11/0.5, 12/0.2								
EP068A: Organochlorine Pesticides (OC)								
Soil Glass Jar - Unpreserved (EP068)		16-Apr-2020	23-Apr-2020	30-Apr-2020	✔	27-Apr-2020	02-Jun-2020	✔
1/0.2, 2/0.1, 3/0.2, 4/0.2, 5/0.1, 6/0.5, R1								
Soil Glass Jar - Unpreserved (EP068)		17-Apr-2020	23-Apr-2020	01-May-2020	✔	27-Apr-2020	02-Jun-2020	✔
7/0.2, 8/0.2, 9/0.5, 10/0.5, 11/0.5, 12/0.2								
EP068B: Organophosphorus Pesticides (OP)								
Soil Glass Jar - Unpreserved (EP068)		16-Apr-2020	23-Apr-2020	30-Apr-2020	✔	27-Apr-2020	02-Jun-2020	✔
1/0.2, 2/0.1, 3/0.2, 4/0.2, 5/0.1, 6/0.5, R1								
Soil Glass Jar - Unpreserved (EP068)		17-Apr-2020	23-Apr-2020	01-May-2020	✔	27-Apr-2020	02-Jun-2020	✔
7/0.2, 8/0.2, 9/0.5, 10/0.5, 11/0.5, 12/0.2								
EP075(SIM)A: Phenolic Compounds								
Soil Glass Jar - Unpreserved (EP075(SIM))		16-Apr-2020	23-Apr-2020	30-Apr-2020	✔	27-Apr-2020	02-Jun-2020	✔
1/0.2, 2/0.1, 3/0.2, 4/0.2, 5/0.1, 6/0.5, R1								
Soil Glass Jar - Unpreserved (EP075(SIM))		17-Apr-2020	23-Apr-2020	01-May-2020	✔	27-Apr-2020	02-Jun-2020	✔
7/0.2, 8/0.2, 9/0.5, 10/0.5, 11/0.5, 12/0.2								



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM)) 1/0.2, 2/0.1, 3/0.2, 4/0.2, 5/0.1, 6/0.5, R1	16-Apr-2020	23-Apr-2020	30-Apr-2020	✓	27-Apr-2020	02-Jun-2020	✓	
Soil Glass Jar - Unpreserved (EP075(SIM)) 7/0.2, 8/0.2, 9/0.5, 10/0.5, 11/0.5, 12/0.2	17-Apr-2020	23-Apr-2020	01-May-2020	✓	27-Apr-2020	02-Jun-2020	✓	
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080) 1/0.2, 2/0.1, 3/0.2, 4/0.2, 5/0.1, 6/0.5, R1	16-Apr-2020	23-Apr-2020	30-Apr-2020	✓	23-Apr-2020	30-Apr-2020	✓	
Soil Glass Jar - Unpreserved (EP071) 1/0.2, 2/0.1, 3/0.2, 4/0.2, 5/0.1, 6/0.5, R1	16-Apr-2020	23-Apr-2020	30-Apr-2020	✓	27-Apr-2020	02-Jun-2020	✓	
Soil Glass Jar - Unpreserved (EP080) 7/0.2, 8/0.2, 9/0.5, 10/0.5, 11/0.5, 12/0.2, Trip Blank	17-Apr-2020	23-Apr-2020	01-May-2020	✓	23-Apr-2020	01-May-2020	✓	
Soil Glass Jar - Unpreserved (EP071) 7/0.2, 8/0.2, 9/0.5, 10/0.5, 11/0.5, 12/0.2	17-Apr-2020	23-Apr-2020	01-May-2020	✓	27-Apr-2020	02-Jun-2020	✓	



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Soil Glass Jar - Unpreserved (EP080)		16-Apr-2020	23-Apr-2020	30-Apr-2020	✔	23-Apr-2020	30-Apr-2020	✔
1/0.2,	2/0.1,							
3/0.2,	4/0.2,							
5/0.1,	6/0.5,							
R1								
Soil Glass Jar - Unpreserved (EP071)		16-Apr-2020	23-Apr-2020	30-Apr-2020	✔	27-Apr-2020	02-Jun-2020	✔
1/0.2,	2/0.1,							
3/0.2,	4/0.2,							
5/0.1,	6/0.5,							
R1								
Soil Glass Jar - Unpreserved (EP080)		17-Apr-2020	23-Apr-2020	01-May-2020	✔	23-Apr-2020	01-May-2020	✔
7/0.2,	8/0.2,							
9/0.5,	10/0.5,							
11/0.5,	12/0.2,							
Trip Blank								
Soil Glass Jar - Unpreserved (EP071)		17-Apr-2020	23-Apr-2020	01-May-2020	✔	27-Apr-2020	02-Jun-2020	✔
7/0.2,	8/0.2,							
9/0.5,	10/0.5,							
11/0.5,	12/0.2							
EP080: BTEXN								
Soil Glass Jar - Unpreserved (EP080)		16-Apr-2020	23-Apr-2020	30-Apr-2020	✔	23-Apr-2020	30-Apr-2020	✔
1/0.2,	2/0.1,							
3/0.2,	4/0.2,							
5/0.1,	6/0.5,							
R1								
Soil Glass Jar - Unpreserved (EP080)		17-Apr-2020	23-Apr-2020	01-May-2020	✔	23-Apr-2020	01-May-2020	✔
7/0.2,	8/0.2,							
9/0.5,	10/0.5,							
11/0.5,	12/0.2,							
Trip Blank								



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification	
Analytical Methods	Method	QC	Regular	Actual	Expected		Evaluation
Laboratory Duplicates (DUP)							
Electrical Conductivity (1:5)	EA010	1	7	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	1	7	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH in soil using a 0.01M CaCl2 extract	EA001	2	10	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Soil Particle Density	EA152	0	1	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Electrical Conductivity (1:5)	EA010	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	7	28.57	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH in soil using a 0.01M CaCl2 extract	EA001	2	10	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Soil Particle Density	EA152	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Electrical Conductivity (1:5)	EA010	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchange Acidity by 1M Potassium Chloride	ED005	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **SOIL** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Polychlorinated Biphenyls (PCB)	EP066	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Organic Matter	EP004	0	1	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH in soil using a 0.01M CaCl ₂ extract	EA001	SOIL	In house: Referenced to Rayment and Lyons (2011) 4B3 (mod.) or 4B4 (mod.) 10 g of soil is mixed with 50 mL of 0.01M CaCl ₂ and tumbled end over end for 1 hour. pH is measured from the continuous suspension. This method is compliant with NEPM (2013) Schedule B(3)
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 6.1 and Table 1 (14 day holding time).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Soil Particle Density	EA152	SOIL	Soil Particle Density by AS 1289.3.5.1-2006 : Methods of testing soils for engineering purposes - Soil classification tests - Determination of the soil particle density of a soil - Standard method
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Exchange Acidity by 1M Potassium Chloride	* ED005	SOIL	In house: referenced to Rayment and Lyons, (2011), method 15G1. This method is unsuitable for near neutral and alkaline soils. NATA accreditation does not cover performance of this service.
Exchangeable Cations on Alkaline Soils	* ED006	SOIL	In house: Referenced to Soil Survey Test Method C5. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with alcoholic ammonium chloride at pH 8.5. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil.
Exchangeable Cations	ED007	SOIL	In house: Referenced to Rayment & Lyons (2011) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Higginson (2011) Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Organic Matter	EP004	SOIL	In house: Referenced to AS1289.4.1.1 - 1997. Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3).



Analytical Methods	Method	Matrix	Method Descriptions
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270E Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270E Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270E. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260D. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.

Preparation Methods	Method	Matrix	Method Descriptions
pH in soil using a 0.01M CaCl ₂ extract	EA001-PR	SOIL	In house: Referenced to Rayment and Higginson 4B1, 10 g of soil is mixed with 50 mL of 0.01M CaCl ₂ and tumbled end over end for 1 hour. pH is measured from the continuous suspension. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Exchangeable Cations Preparation Method (Alkaline Soils)	ED006PR	SOIL	In house: Referenced to Rayment and Lyons 2011 method 15C1.
Exchangeable Cations Preparation Method	ED007PR	SOIL	In house: Referenced to Rayment & Higginson (1992) method 15A1. A 1M NH ₄ Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Organic Matter	EP004-PR	SOIL	In house: Referenced to AS1289.4.1.1 - 1997. Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3) (Method 105)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Appendix F

Data Quality Objectives

QAQC1 Data Quality Assessment

QAQC 1. Data Quality Objectives

The investigation was prepared with reference to the seven-step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (the 'NEPM' 2013). The NEPM guidelines are endorsed by the NSW EPA under the CLM Act (1997). The DQO process comprised the following:

- Stating the Problem;
- Identifying the Decision;
- Identifying Inputs to the Decision;
- Defining the Boundary of the Assessment;
- Developing a Decision Rule;
- Specifying Acceptable Limits on Decision Errors; and
- Optimising the Design for Obtaining Data.

The DQOs have been addressed within the report as shown in QAQC Table 1 below.

QAQC Table 1: Data Quality Objectives

Data Quality Objective	Report Section where Addressed
State the Problem	S1 Introduction
Identify the Decision	S1 Introduction S9 Results S10 Conclusions
Identify Inputs to the Decision	S2 Site Description S3 Environmental Setting S7 Site Assessment Criteria S9 Discussion of Results
Define the Boundary of the Assessment	S2 Site Description Drawing 1, Appendix B
Develop a Decision Rule	S7 Site Assessment Criteria
Specify Acceptable Limits on Decision Errors	S5 Sampling and Analysis Plan and Methodology S6 Quality Assurance and Quality Control S7 Site Assessment Criteria Appendix F – Data Quality Assessment
Optimise the Design for Obtaining Data	S5 Sampling and Analysis Plan and Methodology Appendix F – Data Quality Assessment

QAQC 2. Field and Laboratory Quality Control

The field and laboratory quality control (QC) procedures and results are summarised in QAQC Table 2 and QAQC Table 3. Reference should be made to the field work and analysis procedures presented in Section 5 and the laboratory results in Appendix E for further details.

QAQC Table 2: Field QC

Item	Frequency	Acceptance Criteria	Achievement
Intra-laboratory replicate	10% primary samples	RPD: <30%	Yes ¹
Trip Blank	1 per field batch	< LOR	Yes

Notes for QAQC Table 2

1 Qualitative assessment of RPD results overall; refer to Section QAQC 2.1

RPD Relative Percent Difference – The difference between results of a primary and duplicate sample reported as a percentage.

LOR Limit of Reporting – see PQL definition in 'Notes' for QAQC Table 3 below.

QAQC Table 3: Laboratory QC

Item	Frequency	Acceptance Criteria	Achievement
Analytical laboratory used	-	NATA accreditation	Yes
Holding times	-	In accordance with NEPM which references various Australian and international standards	Yes
Laboratory/ Reagent Blank	1 per lab batch	<LOR	Yes
Laboratory duplicate	10% primary samples	<5 x PQL Any RPD >5 x PQL 0 – 50%	Yes
Matrix Spike	1 per lab batch	Inorganics / metals – 70% – 130% Organics – 60% – 140% SVOC and speciated phenols – 10% – 140%	Yes
Surrogate Spike	Organics by GC	Inorganics / metals – 70% – 130% Organics – 60% – 140% SVOC and speciated phenols – 10% – 140%	Yes
Control Sample	1 per lab batch	Inorganics / metals – 70% – 130% Organics – 60% – 140% SVOC and speciated phenols – 10% – 140%	Yes

Notes for QAQC Table 3

PQL Practical Quantification Limit – the lowest concentration of an analyte that can be determined with acceptable precision (repeatability) and accuracy under the stated conditions of a test.

In summary, the QC data is considered to be of sufficient quality to be acceptable for the assessment.

QAQC 2.1 Intra-Laboratory Replicates

Intra-laboratory replicates were analysed as an internal check of the reproducibility within the primary laboratory and as a measure of consistency of sampling techniques. The comparative results of analysis between original and intra-laboratory replicate samples are summarised in the tables below.

Note that, where both samples are below LOR, the difference and RPD has been given as zero. Where one sample is reported below LOR, but a concentration is reported for the other, the LOR value has been used for calculation of the RPD for the less than LOR sample.

QAQC Table 4: Relative Percentage Difference Results – Intra-laboratory Replicate (heavy metals/metalloids)

Sample ID	Lithology	Analyte (mg/kg)							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
1/0.2	Fill	<5	<1	18	7	15	0.1	3	12
R1		<5	<1	18	7	13	0.1	3	15
Difference		0	0	0	0	2	0	0	3
RPD (%)		0	0	0	0	14	0	0	22

Notes

Orange Cells containing RPD calculations greater than 30% for metals

Bold Cells containing RPD calculations greater than 0%

This table has been produced in colour to show exceedances of relevant criteria. Reproduction should be carried out in colour.

Calculated RPD values were within the acceptable range of $\pm 30\%$. Overall, the intra-laboratory replicate comparisons indicate that the sampling techniques were generally consistent and repeatable.

QAQC 3. Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs):

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

The DQIs were assessed as outlined in QAQC Table 5 below.

QAQC Table 5: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Planned, systematic and selected target locations sampled; Preparation of field logs, sample location plans and chain of custody (CoC) records; Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody; Samples analysed for contaminants of potential concern (CoPC) identified in the Conceptual Site Model (CSM); Completion of CoC documentation; NATA endorsed laboratory certificates provided by the laboratory; and Satisfactory frequency and results for field and laboratory QC samples as discussed in Section QAQC 2.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project; Works conducted by appropriately experienced and trained DP environmental scientist/engineer; Use of NATA registered laboratories, with test methods the same or similar between laboratories; and Satisfactory results for field and laboratory QC samples.

QAQC Table 5: Data Quality Indicators (continued)

Representativeness	Target media sampled; Spatial distribution of sample locations; Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs; Samples were extracted and analysed within holding times; and Samples were analysed in accordance with the analysis request.
Precision	Acceptable RPD between original samples and replicates; and Satisfactory results for all other field and laboratory QC samples.
Accuracy	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been complied with. As such, it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.