

NBRS & PARTNERS PTY LTD

JULY 2018

TARGETED SOIL CONTAMINATION ASSESSMENT

ARMIDALE HIGH
SCHOOL
BUTLER ST, ARMIDALE
NSW 2350

wsp



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Targeted Soil Contamination Assessment
Armidale High School
Butler St, Armidale NSW 2350

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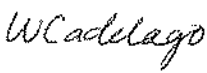
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ABBREVIATIONS

ALS	Australian Laboratory Services Pty Ltd
BTEXN	Benzene, toluene, ethylbenzene, xylene and naphthalene
C ₆ -C ₁₀	Light petroleum hydrocarbon chain fraction (for example petrol)
>C ₁₀ -C ₁₆	Medium petroleum hydrocarbon chain fraction (for example jet fuel, kerosene, diesel)
>C ₁₆ -C ₃₄	Medium-heavy petroleum hydrocarbon chain fraction (for example diesel, lube oils)
>C ₃₄ -C ₄₀	Heavy petroleum hydrocarbon chain fraction (for example lube oils, waxes)
COC	Chain of custody
CRC CARE	Cooperative Research Centre for Contamination Assessment and Remediation of the Environment
CT	Contaminant threshold
EILs	Ecological investigation levels
ESLs	Ecological screening levels
EPA	Environment Protection Authority
HESP	Health, environment and safety plan
HILs	Health investigation levels
HSLs	Health screening levels
LCS	Laboratory control samples
LOR	Limit of reporting
mAHD	Metres in Australian Height Datum
mBGL	Metres below ground level
mg/kg	Milligrams per kilogram
mg/L	Milligrams per litre
NATA	National Association of Testing Authorities
NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)
NSW	New South Wales
OCP	Organochlorine pesticide
OPP	Organophosphorus pesticide
PAH	Polycyclic aromatic hydrocarbons

PCB	Polychlorinated biphenyl
PID	Photoionization detector
PQL	Practical quantification limit
QA	Quality assurance
QC	Quality control
RPD	Relative per cent difference
SCC	Specific contaminant concentration
SGS	SGS Australia Pty Ltd
SWMS	Safe work method statements
TEQ	Toxic Equivalence Quotient
TCLP	Toxicity characteristics leaching procedure
TPH	Total petroleum hydrocarbon
TRH	Total recoverable hydrocarbon
VENM	Virgin Excavated Natural Material
VOCs	Volatile organic compounds
WSP	WSP Australia

EXECUTIVE SUMMARY

INTRODUCTION

NBRS & Partners Pty Ltd (NBRS) engaged WSP Australia Pty Ltd (WSP) to undertake a soil assessment at Armidale High School located on Butler Street, Armidale, NSW 2350 (the site). The purpose of the report is to assess the soil contamination conditions at the site, prior to work planned at the site.

The site is an operational secondary school with several buildings, three sports ovals and an agricultural plot. The site is planned for redevelopment that is understood to include the demolition of most school buildings, except for two buildings, one of which is heritage listed and construction of a new school building and games courts. It is understood that this upgrade will consolidate students from nearby Duval High School to Armidale High School.

OBJECTIVE

The objectives of the investigation were to determine the presence of contaminants in soil at the site and evaluate whether the potential site contamination would represent a potential ecological and/or health risk to on-site and off-site receptors.

SCOPE OF WORK

Prior to fieldworks being undertaken, the following preliminaries were conducted:

- completion of a site-specific health, environment and safety plan
- completion of a 'Dial Before You Dig' search.

Field works undertaken on 17 to 18 January 2018 included:

- service location by a licensed sub-contractor using provided service plans
- advancement of soil bores at 18 locations using a hand auger to target depths of 0.5 to 1 metre depth, or shallower if refusal encountered. The bores targeted the proposed new building, new gym addition, new games courts and identified polycyclic aromatic hydrocarbons (PAHs) in soil
- logging of subsurface conditions by an experienced environmental engineer during hand augering
- screening of soil in the field for volatile hydrocarbons using a photo-ionisation detector (PID), with recording of any staining or other evidence of potential contamination
- collection of soil samples at two depths per location; at the surface and between 0.5 m and 1 m depth or shallower if refusal encountered
- submission of all soil samples to a National Association of Testing Authorities (NATA) accredited laboratory for analysis of total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN), PAHs, heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) and asbestos, as well as polychlorinated biphenyls (PCBs) and pesticides for four composite samples
- analysis and interpretation of results for targeted contaminants against the adopted site threshold criteria
- preparation of this report presenting the results of the current assessment and a comparison against relevant site suitability criteria along with any subsequent recommendations.

RESULTS

Generally consistent subsurface conditions were encountered across the site during the current investigation. This included fill material that was either reworked natural or suspected to be imported, comprising silt, clayey silt or silty clay.

PID screening indicated no presence of volatile hydrocarbons at any borehole locations. No visual or olfactory indications of contamination were identified during the fieldworks.

The analytical results included the following with respect to the health and ecological criteria:

- Chrysotile and amosite asbestos was detected as present in sample HA1_0.
- Benzo(a)pyrene exceeded the ecological criteria in samples HA1_0, HA4_0, HA10_0, HA11_0 (and QA2A), HA12_0, HA16_0 and HA18_0. Benzo(a)pyrene toxicity equivalency quotient (BaP TEQ) exceeded the health-based criteria in samples HA1_0, HA11_0 and HA12_0, as well as duplicate samples QA1 and QA1A (primary sample HA19_0) and QA2 and QA2A (primary sample HA11_0).
- Nickel exceeded the ecological criteria in samples HA5_0, HA6_0.5, HA7_0.7 and HA15_0 and zinc exceeded the ecological criteria in sample HA1_0.
- No exceedances were identified in adopted health or ecological criteria for TRH/BTEXN concentrations, with most samples below the limits of reporting (LORs).
- All samples analysed for PCBs, OCPs and OPPs had concentrations below the LORs.

In the context of waste classification, the following laboratory results were notable:

- Benzo(a)pyrene concentrations exceeded the general solid waste criteria for total concentration without leachate assessment (CT1) for seven samples. However, concentrations were below the general solid waste criteria for total concentration when leachability is assessed (SCC1), and the toxicity characteristic leaching procedure (TCLP) assessment was undertaken on the samples with the highest concentrations. Leachate analyses were below the reporting limits and are assumed to be below the leachate criteria.
- No exceedances of adopted criteria for TRH/BTEXN were found, with most samples below the reporting limits.
- The lead concentration in sample HA1_0 exceeded the CT1 criteria, and TCLP analysis was requested to the lab. However, due to insufficient soil it was not possible to conduct the analysis. The 95% upper confidence limit (UCL) was calculated using lead concentrations for all samples that were identified as imported fill material. A 95% UCL value of 121.1 mg/kg was calculated, which exceeds the CT1 criteria.
- Nickel concentrations exceeded the CT1 in six samples but were below SCC1 criteria. TCLP analysis was undertaken on the samples with the highest concentrations, which were below the TCLP1 criteria.
- All samples analysed for PCBs and pesticides indicated concentrations below the reporting limits.

CONCLUSION

Analytical results for soil samples collected from the 18 bore holes were generally below the adopted assessment criteria and/or below the laboratory LORs, with the exception of BaP TEQ health exceedances and benzo(a)pyrene, nickel and zinc ecological exceedances. BaP TEQ exceeded HIL C in samples HA1_0, HA11_0, HA12_0 and the duplicate samples of HA18_0. Benzo(a)pyrene exceeded ESL C in samples HA1_0, HA4_0, HA10_0, HA11_0, HA12_0, HA16_0 and HA18_0. Nickel exceeded the EIL C criteria in samples HA5_0, HA6_0.5, HA7_0.7 and HA15_0 and zinc exceeded the EIL in HA1_0.

Overall, the results indicate that PAHs exceed the HIL criteria in some shallow soil samples, including samples taken to confirm the previous assessment's findings. Shallow impacted soils at locations HA1, HA11 and HA12 will be excavated

during the proposed works. The soil at HA18 is not anticipated to be excavated. PAH exceedances were not widespread although detections in the shallow soils were common. Based on the results some soil around HA18 may require excavation to natural soil (0.2 mBGL) or management.

No other unacceptable health risk was identified for on-site or off-site receptors, including but not limited to students, teachers and maintenance workers.

A potential risk has been identified to ecological receptors due to elevated benzo(a)pyrene and metals concentrations in soil across the site. However, no stressed vegetation or evidence of ecological effects were noted.

The results indicated that the soil at the site is likely to be classified as general solid waste for the majority of the site, except for the area around HA1, which has an indicative classification of asbestos waste in a matrix of restricted solid waste. Please note that these results are indicative only and additional sampling is required for waste classification purposes as per the NSW EPA waste guidelines. Excavated natural soil, beneath the top 0.2 mBGL to 0.3 mBGL, can be reused on the site provided no unexpected evidence of contamination is encountered. However, the surficial soil, where PAHs have been detected, would need to be resampled to confirm it is suitable before reusing it on the site.

Based on the results of this assessment, the site can be made suitable for the proposed continued use as a school from a contaminated land perspective, provided the identified asbestos and PAH impact exceeding health-based criteria are removed during the redevelopment work. If these impacts aren't removed they will need to be managed to prevent exposure to ensure the site is suitable for ongoing use.

1 PROJECT BACKGROUND

1.1 PURPOSE

NBRS & Partners Pty Ltd (NBRS) engaged WSP Australia Pty Ltd (WSP) to undertake a soil assessment at Armidale High School located at Butler St, Armidale, NSW 2350 (the site). The purpose of the report is to provide an evaluation of the current potential soil contamination conditions at the site, prior to planned work.

1.2 BACKGROUND

The site is an operational school with several buildings, three sports ovals and an agricultural plot. The site is planned for redevelopment that is understood to include the demolition of most school buildings, except for two heritage-listed buildings, and construction of a new school building and games courts. It is understood that this upgrade will consolidate students from nearby Duval High School to Armidale High School.

A site layout plan is presented as Figure 1 in Appendix A. Surrounding site uses include residential properties, an arboretum to the south, commercial properties to the north-west and a rail line to the north-east.

Previous geotechnical assessments and some environmental sampling and analysis have been undertaken at the site. The investigation by GeoEnviro Consultancy Pty Ltd in December 2017 found polycyclic aromatic hydrocarbon (PAH) impact in soil, considered likely to be due to leaching of PAHs from the asphaltic driveway which was not considered a hot-spot for contamination.

1.3 OBJECTIVES

The objectives of the investigation were to determine the presence of contaminants of concern in soil at the site and to evaluate whether the potential site contamination would represent a potential ecological and/or health risk to on-site and off-site receptors.

1.4 SCOPE OF WORKS

Prior to fieldworks being undertaken, the following preliminaries were conducted:

- completion of a site-specific health, environment and safety plan (HESP)
- completion of a 'Dial Before You Dig' search.

Field works undertaken on 17 to 18 January 2018 included:

- service location by a licensed sub-contractor using provided service plans
- advancement of soil bores at 18 locations using a hand auger to target depths ranging between 0.5 to 1 metre depth, or shallower if refusal encountered. The bores targeted the proposed new building, new gym addition, new games courts and identified PAH-impacted soil
- logging of subsurface conditions by an experienced environmental scientist/engineer during hand augering
- screening of soil in the field for volatile hydrocarbons using a photo-ionisation detector (PID), with recording of any staining or other evidence of potential contamination
- collection of soil samples at two depths per location; at the surface and between 0.5 m and 1 m depth or shallower if refusal encountered

- submission of selected soil samples for laboratory analysis of total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN), PAHs, heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) and asbestos, as well as four composite samples analysed for polychlorinated biphenyls (PCBs), organophosphorus pesticides (OPPs) and organochlorine pesticides (OCPs)
- analysis and interpretation of results for targeted contaminants against the adopted site threshold criteria
- preparation of this report presenting the results of the current assessment and a comparison against relevant site suitability criteria along with any subsequent recommendations.

2 SITE CHARACTERISTICS

2.1 LOCATION AND IDENTIFICATION

The site is located approximately 1 km south-west of Armidale city centre and approximately 200 m south of Armidale train station. The general site identification information is summarised in Table 2.1.

Table 2.1 Summary of general information

Site name	Armidale High School
Site address	Butler Street, Armidale, NSW 2350
Legal identification	The site is comprised of the following lots: — Lot 1 in deposited plan (DP) 196298 — Lot 1, Section 161 in DP 758032 — Lot 1151 in DP 821627 — Lot 704 in DP 755808 — Lots 1 and 2, Section 49 in DP 758032 — Lot 7005 in DP 1052246.
Local government area	Armidale Regional Council
Zoning	R1- general residential
Current land use	Secondary school
Land size	18.38 ha approximately

2.2 SURROUNDING LAND USE

Surrounding land uses include:

- North: light industrial/commercial zone with Armidale train station approximately 200 m north and residential properties beyond
- East: residential properties followed by the commercial city centre approximately 1 km to the north-east
- South: Armidale Bicentennial Arboretum, which is a public recreation space, followed by suburban residential properties; approximately 600 m south and beyond are sparsely distributed residential properties
- West: residential properties to the north-west, followed by light industrial/commercial properties, two schools (St John's Junior School and NEGS) followed by sparse residential properties and farmland, with New England Highway approximately 1.7 km west.

2.3 TOPOGRAPHY AND HYDROLOGY

Based on Google Earth, the site generally slopes downwards to the north from 1,031 metres in Australian Height Datum (mAHD) to 1,002 mAHD, with steep slopes inclining from the gymnasium down towards the main oval, and from the southern carpark and western buildings down towards the sports oval.

The nearest surface water bodies include an on-site dam located in the south-west portion of the site, a dam located in the Armidale Bicentennial Arboretum approximately 35 m south of the site and a dam located approximately 250 m north-west of the site.

2.4 GEOLOGY

The site is underlain by Devonian-Carboniferous sedimentary rocks, comprising quartz-rich pebbly sandstone, conglomerate units deposited in fluvial (river) systems, and siltstone, mudstone and sandstone with lithic fragments, all of which were deposited 300 to 419 million years old (Geological Survey of NSW Department of Resources and Energy – Interactive Geological Map of NSW; <https://www.resourcesandenergy.nsw.gov.au/>; accessed 24 January 2018).

2.5 HYDROGEOLOGY

A review of the Department of Primary Industries registered groundwater bore database (allwaterdata.water.nsw.gov.au) conducted on 24 January 2018 identified 80 groundwater bores registered within a 1 km radius of the site. The bores are located in three clusters, namely around the Telstra site at 129 Allingham Street, the industrial zone north-west of the site around the Rose Valley Steel Works on Mann Street and at the Lowes Petroleum fuel depot on McLennan Street.

A summary of the registered groundwater bores within a 1 km radius is presented in Appendix C.

2.6 SUMMARY OF PREVIOUS INVESTIGATIONS

One previous assessment report was provided by the client, undertaken by GeoEnviro Consultancy Pty Ltd (GeoEnviro) in 2017, titled *Geotechnical, Salinity and Contamination Investigation Proposed Redevelopment, Armidale High School, Butler Street Armidale NSW*. This report is summarised in this section and the results were used for planning the scope of work for this investigation.

A geotechnical and contamination investigation was conducted for the proposed redevelopment at Armidale High School. The investigation found that the site is generally underlain by natural ground; topsoil over natural silty clay and gravelly clay overlying siltstone and sandstone. No obvious signs of foreign fill material or building debris was found, including asbestos, except for a thin layer of fill at two borehole locations (BH1 and BH9).

Soil samples were collected and analysed from four boreholes (BH1, BH4, BH5 and BH8) for heavy metals, OCPs, PCBs, TRH, BTEX, PAHs and asbestos. The majority of results were below laboratory reporting limits, although metals were detected at concentrations below the site criteria. PAHs were detected in two samples, from BH4 and BH8. Although they did not exceed the site criteria the result from BH8 was equal to the site criteria for benzo(a)pyrene toxicity equivalency quotient. GeoEnviro considered the PAHs to likely be due to leaching from the asphalt at the site.

The site soils were classified as general solid waste (non-putrescible) based on the results. Natural soils were also considered to be suitable for classification as virgin excavated natural material.

3 SAMPLING AND ANALYSIS PLAN

3.1 SAMPLING PLAN AND RATIONALE

The 18 soil bores were located to target the proposed new building, new gym addition, new games courts and identified PAH-impacted soil. Target soil bore depths from 0.5 to 1 metres below ground level (mBGL), or shallower if refusal encountered, were chosen to identify potential contamination in soils anticipated to be excavated during the redevelopment of the school.

3.2 ANALYTICAL SCHEDULE AND RATIONALE

The analytical schedule adopted was generally consistent with the proposed schedule. One soil sample per soil bore location, plus six additional samples selected based on conditions, were chosen for analysis of the identified primary contaminants of concern for the site based on the site history. Primary soil contaminants of concern comprised TRH, BTEXN, PAHs, metals and asbestos. Four composite samples were collected for the site and were analysed for PCBs, OPPs and OCPs.

The adopted analytical schedule is summarised in Table 3.1.

Table 3.1 Proposed sampling and analytical schedule

LOCATIONS	RATIONALE	ANALYTES
HA1 to HA10	Targeting proposed new building	TRH, BTEXN, PAHs and metals: 1 per location, 6 additional samples selected based on conditions Asbestos: 1 per location.
HA11 to HA15	Targeting proposed new gym addition	
HA16 and HA17	Targeting proposed games courts	
HA18	Targeting identified PAH-impacted soil	PCBs, OPPs and OCPs: 4 composite samples for the site
Composite C1: HA16, HA17, HA18	Assessing potential for uncontrolled fill impacts	
Composite C2: HA1, HA2, HA3, HA4, HA5		
Composite C3: HA6, HA7, HA8, HA9, HA10		
Composite C4: HA11, HA12, HA13, HA14		

3.3 FIELDWORK METHODOLOGY

3.3.1 PRELIMINARIES

Prior to the fieldworks, a site-specific HESP and site specific safe work method statements (SWMS) were developed for the investigation works. WSP team members working at the site were required to read, understand, sign and conform to the HESP and SWMS. All works on the site were undertaken in accordance with the HESP and SWMS.

A desktop search for underground services using the Dial Before You Dig service was undertaken prior to intrusive works. All utilities plans were referenced on-site when selecting final locations for intrusive works. The sampling locations were cleared for the presence of underground services by a licensed and experienced service locating subcontractor.

Additionally, a ground penetration permit was prepared on-site prior to works.

3.3.2 FIELDWORK

All fieldworks were conducted by a suitably qualified and experienced environmental engineer. Works were undertaken in accordance with WSP standard operating procedures which are based on industry accepted standard practice. The methodologies adopted for the investigation are outlined in Table 3.2.

Table 3.2 Sampling methodology

Drilling method	Soil bores were advanced by non-destructive digging (hand auger) to the target depths.
Target depths	Soil bores were advanced to target depths of between 0.5 m and 1 mBGL or shallower depending on subsurface conditions encountered.
Gas monitoring	A PID was used to screen a sub sample of each soil sample for the presence of volatile organic compounds (VOCs).
Soil logging	The subsurface profile was described and classified in general accordance with Geotechnical Site Investigations, AS1726–1993. A copy of the borehole logs is provided in Appendix D.
Soil sampling method	Soil samples were collected directly from the hand auger using disposable nitrile gloves. Re-useable equipment was brushed after every sample was collected to minimise the potential for cross-contamination. All samples collected were placed in clean, laboratory-supplied containers. Soil samples were generally collected at the surface, 0.5 mBGL and at changes in lithology or evidence of contamination. All samples were labelled clearly with the bore location, depth and the sampling date and sent to the laboratory for selected analyses. Composite samples were collected by placing a sub-sample from select borehole locations into a dedicated container.
Decontamination	Where possible, dedicated sampling equipment was used in each location. The hand auger was brushed between boreholes to minimise cross-contamination.
Sample preservation	Samples were stored in an insulated ice-cooled box immediately after sampling. Samples were kept chilled after collection and during delivery to the selected National Association of Testing Authorities (NATA) accredited laboratories by the field staff under appropriate ‘chain of custody’ documentation.
Quality assurance/quality control (QA/QC)	One intra-laboratory duplicate and 1 inter-laboratory duplicate per 20 primary samples were collected and analysed for contaminants of concern (excluding asbestos) by each of the primary and secondary laboratories. One trip blank sample and one trip spike was collected and analysed for volatile contaminants. One rinsate blank was collected and analysed for contaminants of concern (excluding asbestos) per day of field works.
Waste disposal	All boreholes were backfilled with drill cuttings and left flush with the surrounding ground to prevent trip hazards. All general waste generated during the sampling works was disposed of offsite at an appropriate facility.

3.4 LABORATORY ANALYSIS

Two NATA accredited laboratories were used during the soil assessment. The primary analytical laboratory for soil analysis was Australian Laboratory Services Pty Ltd (ALS) in Smithfield, NSW. The secondary analytical laboratory for soil analysis was SGS Australia Pty Ltd (SGS) in Alexandria, NSW.

3.5 QUALITY ASSURANCE AND QUALITY CONTROL METHODOLOGY

The analytical laboratories used undertook internal quality assurance testing including method blanks, laboratory duplicates, matrix spikes, and laboratory control samples (LCS) where applicable in accordance with NEPM (2013) and NATA requirements.

Acceptable limits set for quality assurance assessment of the laboratory analysis are detailed below:

- Laboratory method blank results should be below the limit of reporting (LOR).
- Recovery of matrix spike additions, laboratory control samples and surrogate spike additions should be between 70% and 130% of the expected value.
- Relative percent differences (RPDs) of laboratory duplicates less than 50%, determined as follows:

$$RPD\% = \frac{|R_o - R_d|}{|(R_o + R_d)/2|} \times 100\%$$

where R_o is the concentration of primary sample and R_d is the concentration of the duplicate.

4 ENVIRONMENTAL SITE ASSESSMENT CRITERIA

The purpose of this assessment is to determine the soil conditions, with respect to current potential soil contamination, prior to work planned at the site. It is considered appropriate to assess the site based on the current use as a secondary school. Assessment criteria applicable for assessing laboratory analytical data is provided by the following:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM; as amended 2013), specifically Schedule B1, Investigation Levels for Soil and Groundwater.
- Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) *Technical Report No. 10 Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater, Part 2: Application Document* (Friebel and Nadebaum, 2011).

Schedule B1 provides a framework for the use of investigation and screening levels based on a matrix of human health and ecological risks.

4.1 SOIL ASSESSMENT CRITERIA

4.1.1 HEALTH INVESTIGATION AND SCREENING LEVELS

Schedule B1 of the NEPM (2013) provides health screening levels (HSLs) for the assessment of hydrocarbon impacted soil and health investigation levels (HILs) for metals and other organic substances. HSLs/HILs are scientifically based, generic assessment criteria designed to be used in the first stage (Tier 1 or 'screening') of an assessment of potential risks to human health from chronic exposure to contaminants.

HSLs have been developed for selected petroleum compounds and fractions, and are applicable to assessing human health risk via vapour intrusion and inhalation. The HSLs depend on specific soil physicochemical properties and land use scenarios, with criteria presented for sand, silt and clay soils at several depth intervals. Where there is reasonable doubt as to the appropriate soil texture to select, either a conservative selection should be made (i.e. sand) or laboratory analysis carried out to determine particle size and hence soil texture sub-class.

HILs have been developed for metals and organic substances and are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are general for all soil types and generally apply to the top 3 m of soil.

HSLs/HILs have been developed for four generic land use settings:

- HSL/HIL A: Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children's day care centres, preschools and primary schools, as well as secondary school buildings (HSL only)
- HSL/HIL B: Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats
- HSL/HIL C: Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary school playing fields and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves) which should be subject to a site-specific assessment where appropriate
- HSL/HIL D: Commercial/industrial such as shops, offices, factories and industrial sites.

For this investigation, criteria for HSL A, HSL C and HIL C have been adopted based on the current land use under the zoning as a secondary school.

For HSLs, sand was adopted as the soil type for on-site soil assessment. Although on the soils on-site were predominantly silt and clay, some gravel and sand was reported in the shallow fill and reworked natural soil.

The CRC CARE Technical Report No. 10 (Friebel and Nadebaum, 2011) provides HSLs for petroleum hydrocarbons specifically for vapour inhalation for intrusive maintenance workers in shallow trenches, and for direct contact. These have also been adopted.

The adopted soil assessment criteria for secondary school land use receptors has been summarised in Table 4.1.

Table 4.1 Soil health assessment criteria

ANALYTE	HSL A ¹ IN SAND, 0 m to <1 m (mg/kg)	HSL C ² IN SAND, 0 m to <1 m (mg/kg)	HIL C ³ (mg/kg)	INTRUSIVE WORKERS ⁴ (mg/kg)	DIRECT CONTACT ⁵ (mg/kg)
TRH/BTEXN compounds					
(F1) TRH C ₆ –C ₁₀ minus BTEX	45	NL	-	NL	5,100
(F2) TRH >C ₁₀ –C ₁₆ minus naphthalene	110	NL	-	NL	3,800
(F3) TRH >C ₁₆ –C ₃₄	-	-	-	-	5,300
(F4) TRH >C ₃₄ –C ₄₀	-	-	-	-	7,400
Benzene	0.5	NL	-	77	120
Toluene	160	NL	-	NL	18,000
Ethylbenzene	55	NL	-	NL	5,300
Xylene (total)	40	NL	-	NL	15,000
Naphthalene	3	NL	-	NL	1,900
PAHs					
Carcinogenic PAHs (as BaP TEQ)	-	-	3	-	-
Total PAHs	-	-	300	-	-
Metals					
Arsenic	-	-	300	-	-
Cadmium	-	-	100	-	-
Chromium	-	-	300	-	-
Copper	-	-	17,000	-	-
Lead	-	-	600	-	-
Mercury	-	-	80	-	-
Nickel	-	-	1,200	-	-
Zinc	-	-	30,000	-	-
PCBs					
Non-dioxin-like PCBs	-	-	1	-	-

ANALYTE	HSL A ¹ IN SAND, 0 m to <1 m (mg/kg)	HSL C ² IN SAND, 0 m to <1 m (mg/kg)	HIL C ³ (mg/kg)	INTRUSIVE WORKERS ⁴ (mg/kg)	DIRECT CONTACT ⁵ (mg/kg)
OPPs/OCPs					
DDT+DDE+DDD	-	-	400	-	-
Aldrin and dieldrin	-	-	10	-	-
Chlordane	-	-	70	-	-
Endosulfan	-	-	340	-	-
Endrin	-	-	20	-	-
Heptachlor	-	-	10	-	-
HCB	-	-	10	-	-
Methoxychlor	-	-	400	-	-
Mirex	-	-	20	-	-
Toxaphene	-	-	30	-	-
Asbestos (HSL C)⁴					
Bonded	0.02%	-	-	-	-
Asbestos fines and friable asbestos	0.001%	-	-	-	-
Surficial asbestos (all forms)	None visible	-	-	-	-

– No assessment criteria available.

NL Non-limiting due to maximum vapour concentrations being below the acceptable health risk level.

- (1) NEPM (2013) Schedule B-1 Investigation Levels for Soil and Groundwater – Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low – high density residential (mg/kg).
- (2) NEPM (2013) Schedule B-1 Investigation Levels for Soil and Groundwater – Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space (mg/kg).
- (3) NEPM (2013) Schedule B-1 Investigation Levels for Soil and Groundwater – Table 1A(1) HILs for soil contaminants – Recreational C (mg/kg).
- (4) CRC CARE technical report no. 10. – Table B3 Soil health screening levels for vapour intrusion (mg/kg).
- (5) CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg).
- (6) NEPM (2013) Schedule B1 Health Screening Levels for Asbestos Contamination in Soil – Table 7.

4.1.2 ECOLOGICAL SCREENING LEVELS

The NEPM (2013) provides ecological screening levels (ESLs) for TRH and BTEX compounds, and ecological investigation levels (EILs) for metals and organic substances, for use as an initial screening risk assessment and are applicable for assessing risk to terrestrial ecosystems. The ESLs apply to different land use scenarios, and to coarse- and fine-grained soils. The EILs depend on specific soil physicochemical properties and land use scenarios. ESLs/EILs generally apply to the top 2 m of soil.

For this investigation, urban residential and public open space values have been adopted. Based on the soil strata the criteria for fine-texture soil has been used. The EILs were calculated using the CSIRO ecological investigation level calculation spreadsheet with inputs of pH 7.8, 68% clay content and cation exchange capacity of 5.4 milliequivalents per 100 g, based on laboratory analysis.

Adopted ESLs and EILs are outlined in Table 4.2.

Table 4.2 Soil ecological assessment criteria

ANALYTE	ESLs ¹ (mg/kg)	EILs ² (mg/kg)
TRH/BTEXN compounds		
TRH C ₆ -C ₁₀ minus BTEX (F1)	180	-
TRH >C ₁₀ -C ₁₆ minus naphthalene (F2)	120	-
TRH >C ₁₆ -C ₃₄ (F3)	1,300	-
TRH >C ₃₄ -C ₄₀ (F4)	5,600	-
Benzene	65	-
Toluene	105	-
Ethylbenzene	125	-
Xylene (total)	45	-
naphthalene	-	170
PAHS		
Benzo(a)pyrene	0.7	-
METALS		
Arsenic	-	100
Chromium	-	760
Copper	-	120
Lead ³	-	1,100
Nickel	-	45
Zinc	-	320
DDT	-	180

- (1) NEPM (2013) Schedule B1 Table 1B(6) ESLs for TPH Fractions F1 to F4, BTEX and benzo(a)pyrene in soil.
- (2) NEPM (2013) Schedule B1 Table 1B(5) EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties.
- (3) NEPM (2013) Schedule B1 Table 1B(2) Soil-specific added contaminant limits for aged copper in soils
- (4) NEPM (2013) Schedule B1 Table 1B(3) Soil-specific added contaminant limits for aged chromium III and nickel in soil
- (5) NEPM (2013) Schedule B1 Table 1B(4) EILs for Generic added contaminant limits for lead in soils irrespective of their physicochemical properties.
- (6) NEPM (2013) Schedule B1 Table 1B(1) Soil-specific added contaminant limits for aged zinc in soil

4.1.3 WASTE CLASSIFICATION CRITERIA

The NSW EPA 2014, *Waste Classification Guidelines – Part 1: Classifying Waste* provides the criteria for classifying waste. The guidelines follow a step-by-step process to classify wastes into groups that pose similar risks to the environment and human health, enabling their management and appropriate disposal.

For solid waste, such as soil, the waste may be classified as either hazardous waste, restricted solid waste, general solid waste (putrescible) or general solid waste (non-putrescible). The classification is assessed initially using the contaminant

threshold (CT). Where the concentrations exceed the CT values it is assessed using the specific contaminant concentration (SCC) values and the leachable concentration using toxicity characteristics leaching procedure (TCLP) test values.

A summary of the CT, SCC and TCLP values is presented in Table 4.1.

Table 4.3 Waste classification criteria

CHEMICALS	CT (WITHOUT TCLP) (1)		SCC (WITH TCLP) (2)			
	MAXIMUM VALUE FOR CLASSIFICATION WITHOUT TCLP		MAXIMUM VALUES FOR LEACHABLE CONCENTRATION AND SPECIFIC CONTAMINANT CONCENTRATIONS WHEN USED TOGETHER			
	GENERAL SOLID (CT1)	RESTRICTED SOLID (CT2)	GENERAL SOLID		RESTRICTED SOLID	
	(MG/KG)	(MG/KG)	TCLP1 (MG/L)	SCC1 (MG/KG)	TCLP2 (MG/L)	SCC2 (MG/KG)
TRH C ₆ -C ₉	650 ⁽³⁾	2,600 ⁽³⁾	NA	650	NA	2,600
TRH C ₁₀ -C ₃₆	10,000 ⁽³⁾	40,000 ⁽³⁾	NA	10,000	NA	40,000
Benzene	10	40	0.5	18	2	72
Toluene	288	1,152	14.4	518	57.6	2,073
Ethylbenzene	600	2,400	30	1,080	120	4,320
Total xylene	1,000	4,000	50	1,800	200	7,200
Benzo(a)pyrene	0.8	3.2	0.04	10	0.16	23
Total PAHs	200 ⁽³⁾	800 ⁽³⁾	NA	200	NA	800
Arsenic	100	400	5	500	20	2,000
Cadmium	20	80	1	100	4	400
Chromium (VI)	100	400	5	1,900	20	7,600
Lead	100	400	5	1,500	20	6,000
Mercury	4	16	0.2	50	0.8	200
Nickel	40	160	2	1,050	8	4,200
Endosulfan	60	240	3	108	12	432
Moderately harmful pesticides	250	1,000	NA	250	NA	1,000
Total PCBs	<50	<50	NA	<50	NA	<50

CT Contaminant threshold

SCC Specific contaminant concentration

NA Not applicable

- (1) Extracted from Table 1 in Waste Classification Guidelines. Part 1: Classifying Waste (NSW EPA, 2014).
- (2) Extracted from Table 2 in Waste Classification Guidelines. Part 1: Classifying Waste (NSW EPA, 2014).
- (3) These chemicals are assessed using SCC values only, except for nickel and benzo(a)pyrene that were assessed using TCLP values.

Any waste that contains asbestos must be classified as asbestos waste. Asbestos is the fibrous form of mineral silicates within the serpentine or amphibole groups of rock-forming minerals. This includes actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.

To assess the dataset, the 95% upper confidence limit (UCL) and maximum concentrations should be compared to the relevant screening criteria. Within this, the possibility of localised higher values should be considered. When using the 95% UCL, the results should also:

- have a standard deviation less than 50% of the applicable investigation or screening level; and
- no single concentration should exceed the applicable investigation or screening level by 250%.

Additionally, a minimum sample size is required to provide a meaningful assessment, generally greater than six samples.

4.1.4 *AESTHETIC CONSIDERATIONS*

Aesthetic considerations operate separately to the human health. Issues to be considered include:

- highly malodorous soils e.g. strong residual petroleum hydrocarbon odours
- discoloured chemical deposits or soil staining with chemical waste other than of a very minor nature.

Site assessment requires consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity. For example, higher expectations for soil quality would apply to residential properties with gardens compared with industrial settings.

5 RESULTS

5.1 SUBSURFACE CONDITIONS

Generally consistent subsurface conditions were encountered across the site during the current investigation. A summary of the generalised subsurface geological profile encountered at the site is presented in Table 5.1. Soil bore logs are included in Appendix D.

Table 5.1 Generalised subsurface conditions

DEPTH (mBGL)	GENERAL SOIL DESCRIPTION
0.0 to 0.2	Reworked natural silt, brown, dry, or Imported fill, silt, with fine to coarse gravels, brown, dry
0.2 to 0.7	Clayey silt/silty clay, low plasticity, brown, stiff, dry

5.2 FIELD SCREENING

PID screening indicated no presence of VOCs at any borehole locations. No visual or olfactory indications of contamination were identified during the fieldworks.

5.3 SOIL ANALYTICAL RESULTS

Soil analytical results are summarised in Tables E1 to E3, Appendix E. Laboratory reports are presented in Appendix H. In the context of the adopted NEPM 2013 health and ecological guidelines, notable laboratory results include the following:

- Chrysotile and amosite asbestos was detected as present in sample HA1_0.
- Benzo(a)pyrene exceeded the ESL criteria in samples HA1_0, HA4_0, HA10_0, HA11_0 (and QA2A), HA12_0, HA16_0 and HA18_0. Benzo(a)pyrene TEQ exceeded the HIL C criteria in sample HA1_0, HA11_0 and HA12_0, as well as duplicate samples QA1 and QA1A (primary sample HA19_0) and QA2 and QA2A (primary sample HA11_0).
- Nickel exceeded the EIL C criteria in samples HA5_0, HA6_0.5, HA7_0.7 and HA15_0 and zinc exceeded the EIL in sample HA1_0.
- No exceedances were identified in adopted health or ecological criteria for TRH/BTEXN concentrations, with most samples below the LORs.
- All samples analysed for PCBs, OCPs and OPPs had concentrations below the LORs.

5.3.1 WASTE CLASSIFICATION

In the context of waste classification, the following laboratory results were notable:

- Benzo(a)pyrene exceeded the CT1 criteria in samples HA1_0, HA4_0, HA10_0, HA11_0, HA12_0, HA16_0 and HA18_0. The samples with the highest concentrations (HA11_0, HA12_0 and QA1) were analysed for leachability by TCLP. The criteria were below the SCC1 criteria, and the TCLP analyses were below the LOR. As such, it is assumed that concentrations are below the TCLP1 criteria.
- The chromium concentration in sample HA03_0.5 exceeded the CT1 criteria, and TCLP analysis was conducted. The results were below the SCC1 and TCLP1 criteria.
- The lead concentration in sample HA1_0 exceeded the CT1 criteria, and TCLP analysis was requested to the laboratory. However, due to insufficient soil it was not possible to conduct the analysis. As such, the 95% UCL was calculated using lead concentrations for all samples that were identified as imported fill material. A 95% UCL value of 121.1 mg/kg was calculated; this exceeds the CT1 criteria.
- Nickel concentrations exceeded the CT1 in samples HA3_0.5, HA5_0, HA5_0.5, HA6_0.5, HA7_0.7 and HA15_0. TCLP analyses were conducted for the three samples with the highest exceedances (HA5_0, HA6_0.5 and HA7_0.7). The nickel concentrations were below SCC1 and TCLP1 criteria.
- No exceedances were identified in adopted waste classification criteria for TRH/BTEXN concentrations, with most samples below the LORs.
- All samples analysed for PCBs and pesticides indicated concentrations below the reporting limits.

These results indicate that the waste generated from the soil at the site is likely to be classified as general solid waste for the majority of the site, with the exception of the area around HA1_0. Due to lead and asbestos at HA01, this soil has an indicative classification of asbestos waste in a restricted solid waste matrix, as TCLP analysis was unable to be completed. Further sampling, including leachate testing, in this area may result in a classification of asbestos waste and general solid waste. Please note, for waste classification purposes, these results are indicative only. Additional sampling is needed to confirm a waste classification prior to disposal of waste soil.

6 QUALITY ASSURANCE/QUALITY CONTROL

The field and laboratory methods followed during the investigation were consistent with WSP protocols. It is considered that the data obtained from this testing is accurate and reliable in as far as it can be ascertained, and is adequate for the purpose of the investigation. The assessment of quality assurance and quality control undertaken is evaluated in the sections below.

6.1 FIELD METHODOLOGY

Field sampling procedures conformed to WSP's QA/QC protocols to prevent cross-contamination, preserve sample integrity and allow for collection of a suitable dataset from which to make technically sound decisions.

6.2 LABORATORY RESULTS

Table 7.1 Laboratory QA/QC procedures

QA/QC REQUIREMENT	COMPLETED	COMMENTS
Samples extracted and analysed within relevant holding times	Yes	Refer to interpretive quality control reports.
All analyses NATA accredited	Yes	ALS is NATA accredited for all the analyses performed.
Appropriate analytical methodologies used, in accordance with Schedule B(3) of the NEPM	Yes	Refer to the interpretive quality control reports.
Acceptable laboratory LORs adopted	Yes	A summary of the limits of reporting adopted are provided in the laboratory analysis reports.
Acceptable laboratory QC results	Yes	Laboratory replicate RPD values were all within the acceptable range. The matrix spike recovery for all samples were all within the acceptable range Laboratory control blank results were all below the LORs.

6.3 ASSESSMENT OF SOIL INVESTIGATION

All RPD and QA/QC were within acceptable criteria. The RPD and QA/QC assessment tables are presented in Appendix F.

7 DISCUSSION AND CONCLUSIONS

Analytical results for soil samples collected from the 18 bore holes were generally below the adopted assessment criteria and/or below the laboratory LORs, with the exception of BaP TEQ health exceedances and benzo(a)pyrene, nickel and zinc ecological exceedances. BaP TEQ exceeded HIL C in samples HA1_0, HA11_0, HA12_0 and the duplicate samples of HA18_0. Benzo(a)pyrene exceeded ESL C in samples HA1_0, HA4_0, HA10_0, HA11_0, HA12_0, HA16_0 and HA18_0. Nickel exceeded the EIL C criteria in samples HA5_0, HA6_0.5, HA7_0.7 and HA15_0 and zinc exceeded the EIL in HA1_0.

Overall, the results indicate that PAHs exceed the HIL criteria in some shallow soil samples, including samples taken to confirm the previous assessment's findings. Shallow impacted soils at locations HA1, HA11 and HA12 will be excavated during the proposed works. The soil at HA18 is not anticipated to be excavated. PAH exceedances were not widespread although detections in the shallow soils were common. Based on the results some soil around HA18 may require excavation to natural soil (0.2 mBGL) or management.

No other unacceptable health risk was identified for on-site or off-site receptors, including but not limited to students, teachers and maintenance workers.

A potential risk has been identified to ecological receptors due to elevated benzo(a)pyrene and metals concentrations in soil across the site. However, no stressed vegetation or evidence of ecological effects were noted. An erosion and sediment control plan should be developed as part of the construction environment management plan, describing the methodology to minimise soil erosion and contain sediment that may be eroded during the redevelopment of the site to minimise the risk of a completed pathway to ecological receptors.

The results indicated that the soil at the site is likely to be classified as general solid waste for the majority of the site, except for the area around HA1, which has an indicative classification of asbestos waste in a matrix of restricted solid waste. Please note that these results are indicative only and additional sampling is required for waste classification purposes as per the NSW EPA waste guidelines.

WSP recommends additional sampling for asbestos in the area surrounding HA1 to assist in differentiating the asbestos contaminated material, or excavation of a conservative area surrounding HA1 and validation of the excavated area to ensure all asbestos contaminated material has been excavated. This material should be stockpiled separately to other material excavated during the redevelopment work. Asbestos management should be included in the construction environment management plan and must be in accordance with the relevant codes of practice for the management and control of asbestos. Excavated natural soil, beneath the top 0.2 mBGL to 0.3 mBGL, can be reused on the site provided no unexpected evidence of contamination is encountered. However, the surficial soil, where PAHs have been detected, would need to be resampled to confirm it is suitable before reusing it on the site.

Based on the results of this assessment, the site can be made suitable for the proposed continued use as a school from a contaminated land perspective, provided the identified asbestos and PAH impact exceeding health-based criteria are removed during the redevelopment work. If these impacts aren't removed they will need to be managed to prevent exposure to ensure the site is suitable for ongoing use.

8 LIMITATIONS

SCOPE OF SERVICES

This environmental site assessment report (the report) has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the client and WSP (scope of services). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

RELIANCE ON DATA

In preparing the report, WSP has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations, most of which are referred to in the report (the data). Except as otherwise stated in the report, WSP has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WSP will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.

ENVIRONMENTAL CONCLUSIONS

In accordance with the scope of services, WSP has relied upon the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

On all sites, varying degrees of non-uniformity of the vertical and horizontal soil or groundwater conditions are encountered. Hence no monitoring, common testing or sampling technique can eliminate the possibility that monitoring or testing results/samples are not totally representative of soil and/or groundwater conditions encountered. The conclusions are based upon the data and the environmental field monitoring and/or testing and are therefore merely indicative of the environmental condition of the site at the time of preparing the report, including the presence or otherwise of contaminants or emissions.

Also, it should be recognised that site conditions, including the extent and concentration of contaminants, can change with time.

Within the limitations imposed by the scope of services, the monitoring, testing, sampling and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

REPORT FOR BENEFIT OF CLIENT

The report has been prepared for the benefit of the client and no other party. WSP assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of WSP or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

OTHER LIMITATIONS

WSP will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in the report nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

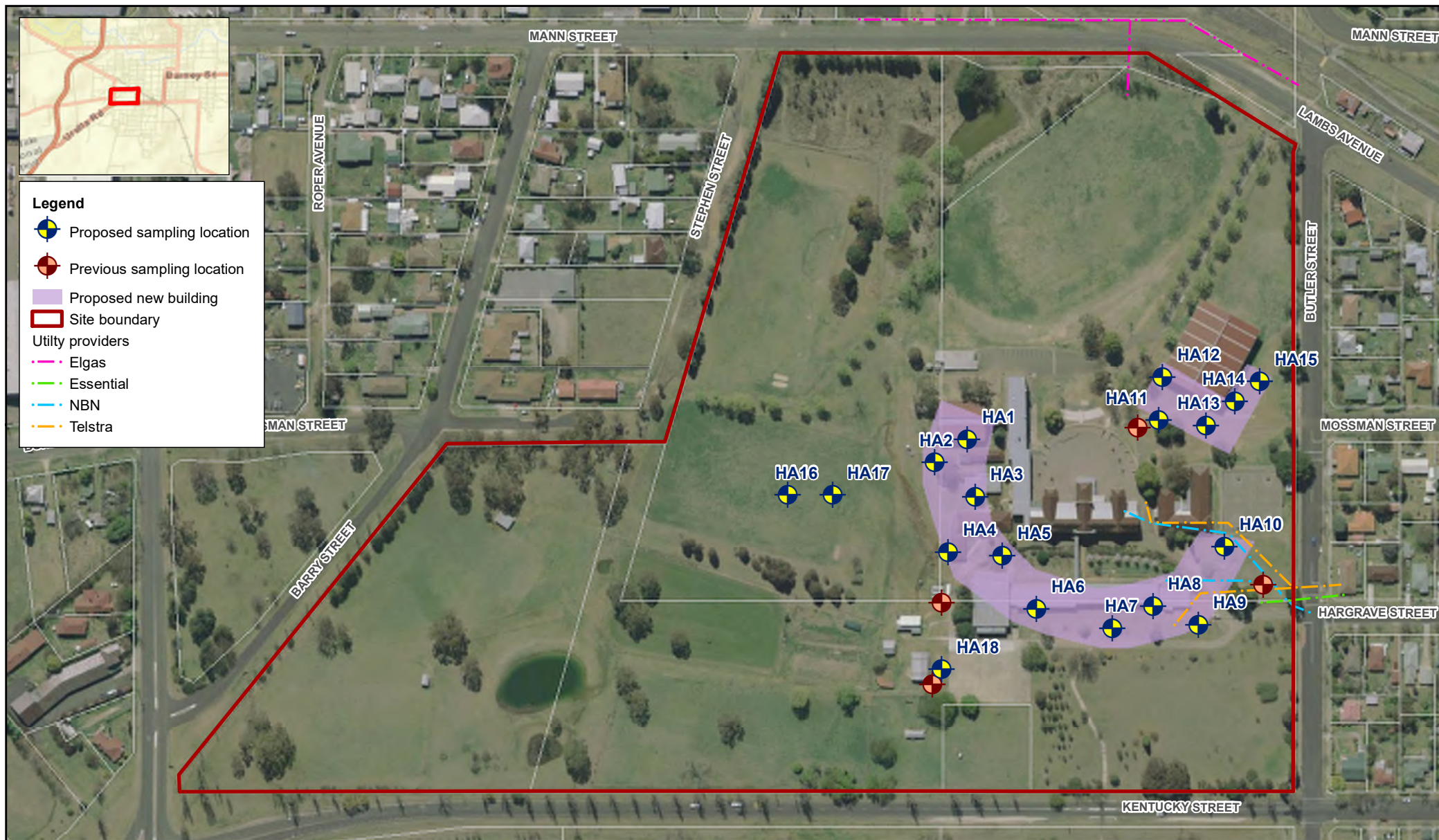
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APPENDIX A

FIGURES





Legend

- Proposed sampling location
- Previous sampling location
- Proposed new building
- Site boundary
- Utility providers
 - Elgas
 - Essential
 - NBN
 - Telstra

Map: PS107410_GIS_001_A1

Author: SuansriR



Date: 14/03/2018

Approved by: -



1:3,000

Scale ratio correct when printed at A4
Coordinate system: GDA 1994 MGA Zone 56

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PRELIMINARY

WSP

NSW Government

**Armidale Future School
Figure 1
Site overview**

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APPENDIX B

SITE PHOTOGRAPHS





Photo 1. Hand auger one (HA1) location



Photo 2. Hand auger one (HA1) soil profile

PROJECT:	Intrusive HAZMAT surveys and targeted soil contamination assessment
SITE:	Armidale High School
ADDRESS:	Butler Street, Armidale, NSW 2350



Photo 3. Hand auger two (HA2) location



Photo 4. Hand auger two (HA2) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
 SITE: Armidale High School
 ADDRESS: Butler Street, Armidale, NSW 2350



Photo 5. Hand auger three (HA3) location



Photo 6. Hand auger three (HA3) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
 SITE: Armidale High School
 ADDRESS: Butler Street, Armidale, NSW 2350



Photo 7. Hand auger four (HA4) location



Photo 8. Hand auger four (HA4) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
 SITE: Armidale High School
 ADDRESS: Butler Street, Armidale, NSW 2350



Photo 9. Hand auger five (HA5) location



Photo 10. Hand auger five (HA5) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
SITE: Armidale High School
ADDRESS: Butler Street, Armidale, NSW 2350



Photo 11. Hand auger six (HA6) location



Photo 12. Hand auger six (HA6) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
 SITE: Armidale High School
 ADDRESS: Butler Street, Armidale, NSW 2350



Photo 13. Hand auger seven (HA7) location



Photo 14. Hand auger seven (HA7) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
 SITE: Armidale High School
 ADDRESS: Butler Street, Armidale, NSW 2350



Photo 15. Hand auger eight (HA8) location



Photo 16. Hand auger eight (HA8) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
SITE: Armidale High School
ADDRESS: Butler Street, Armidale, NSW 2350



Photo 17. Hand auger nine (HA9) location



Photo 18. Hand auger nine (HA9) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
 SITE: Armidale High School
 ADDRESS: Butler Street, Armidale, NSW 2350



Photo 19. Hand auger ten (HA10) location



Photo 20. Hand auger ten (HA10) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
 SITE: Armidale High School
 ADDRESS: Butler Street, Armidale, NSW 2350



Photo 21. Hand auger eleven (HA11) location



Photo 22. Hand auger eleven (HA11) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
 SITE: Armidale High School
 ADDRESS: Butler Street, Armidale, NSW 2350



Photo 23. Hand auger twelve (HA12) location



Photo 24. Hand auger twelve (HA12) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
SITE: Armidale High School
ADDRESS: Butler Street, Armidale, NSW 2350



Photo 25. Hand auger thirteen (HA13) location



Photo 26. Hand auger thirteen (HA13) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
 SITE: Armidale High School
 ADDRESS: Butler Street, Armidale, NSW 2350



Photo 27. Hand auger fourteen (HA14) location



Photo 28. Hand auger fourteen (HA14) soil profile

PROJECT:	Intrusive HAZMAT surveys and targeted soil contamination assessment
SITE:	Armidale High School
ADDRESS:	Butler Street, Armidale, NSW 2350



Photo 29. Hand auger fifteen (HA15) location



Photo 30. Hand auger fifteen (HA15) soil profile

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
SITE: Armidale High School
ADDRESS: Butler Street, Armidale, NSW 2350



Photo 31. Hand auger sixteen (HA16) location



Photo 32. Hand auger sixteen (HA16) soil profile

PROJECT:	Intrusive HAZMAT surveys and targeted soil contamination assessment
SITE:	Armidale High School
ADDRESS:	Butler Street, Armidale, NSW 2350



Photo 33. Hand auger sixteen (HA16) siltstone/sandstone fragment



Photo 34. Hand auger seventeen (HA17) location

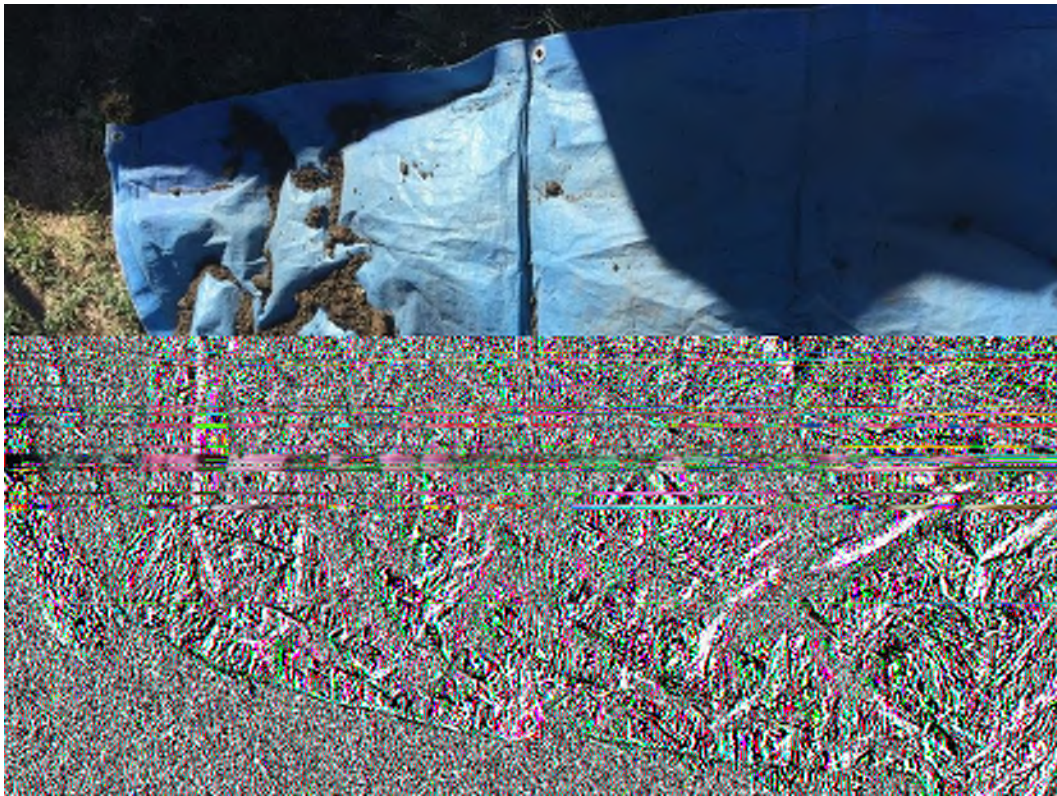


Photo 35. Hand auger seventeen (HA17) soil profile



Photo 36. Hand auger eighteen (HA18) location

PROJECT: Intrusive HAZMAT surveys and targeted soil contamination assessment
 SITE: Armidale High School
 ADDRESS: Butler Street, Armidale, NSW 2350



Photo 37. Hand auger eighteen (HA18) soil profile

APPENDIX C

SUMMARY OF REGISTERED BORES



Table C.1 Summary of groundwater bores

GROUNDWATER BORE ID	APPROXIMATE LOCATION	PURPOSE	STATUS
GW306258	Offsite	Monitoring bore	active
GW307186	Offsite	Monitoring bore	active
GW307187	Offsite	Monitoring bore	active
GW307188	Offsite	Monitoring bore	active
GW307189	Offsite	Monitoring bore	active
GW307253	Offsite	Industrial	active
GW307254	Offsite	Industrial	active
GW307255	Offsite	Industrial	active
GW307256	Offsite	Industrial	active
GW307257	Offsite	Industrial	active
GW307258	Offsite	Industrial	active
GW307259	Offsite	Industrial	active
GW307260	Offsite	Industrial	active
GW307261	Offsite	Industrial	active
GW307262	Offsite	Industrial	active
GW307263	Offsite	Industrial	active
GW307264	Offsite	Industrial	active
GW307265	Offsite	Industrial	active
GW307266	Offsite	Industrial	active
GW307267	Offsite	Industrial	active
GW307268	Offsite	Industrial	active
GW307269	Offsite	Industrial	active
GW307270	Offsite	Industrial	active
GW307271	Offsite	Industrial	active
GW307272	Offsite	Industrial	active
GW307273	Offsite	Industrial	active
GW307274	Offsite	Industrial	active
GW307275	Offsite	Industrial	active
GW307276	Offsite	Industrial	active
GW307277	Offsite	Industrial	active
GW307290	Offsite	Monitoring bore	active

GROUNDWATER BORE ID	APPROXIMATE LOCATION	PURPOSE	STATUS
GW307291	Offsite	Monitoring bore	active
GW307292	Offsite	Monitoring bore	active
GW307293	Offsite	Monitoring bore	active
GW307354	Offsite	Monitoring bore	active
GW307355	Offsite	Monitoring bore	active
GW307356	Offsite	Monitoring bore	active
GW307357	Offsite	Monitoring bore	active
GW307358	Offsite	Monitoring bore	active
GW307359	Offsite	Monitoring bore	active
GW307360	Offsite	Monitoring bore	active
GW307361	Offsite	Monitoring bore	active
GW307362	Offsite	Monitoring bore	active
GW307366	Offsite	Monitoring bore	active
GW307370	Offsite	Monitoring bore	active
GW307380	Offsite	Monitoring bore	active
GW307381	Offsite	Monitoring bore	active
GW307382	Offsite	Monitoring bore	active
GW307468	Offsite	No data/report for this site	
GW307469	Offsite	No data/report for this site	
GW307470	Offsite	No data/report for this site	
GW307471	Offsite	No data/report for this site	
GW307472	Offsite	No data/report for this site	
GW902482	Offsite	Monitoring bore	active
GW902484	Offsite	Monitoring bore	active
GW966335	Offsite	Monitoring bore	active
GW966336	Offsite	Monitoring bore	active
GW966337	Offsite	Monitoring bore	active
GW966338	Offsite	Monitoring bore	active
GW966339	Offsite	Monitoring bore	active
GW966340	Offsite	Monitoring bore	active
GW966341	Offsite	Monitoring bore	active
GW966342	Offsite	Monitoring bore	active

GROUNDWATER BORE ID	APPROXIMATE LOCATION	PURPOSE	STATUS
GW966343	Offsite	Monitoring bore	active
GW966344	Offsite	Monitoring bore	active
GW967628	Offsite	Test bore/monitoring bore	active
GW967629	Offsite	Test bore/monitoring bore	active
GW967630	Offsite	Test bore/monitoring bore	active
GW967631	Offsite	Test bore/monitoring bore	active
GW967632	Offsite	Test bore/monitoring bore	active
GW967633	Offsite	Test bore/monitoring bore	active
GW967635	Offsite	Test bore/monitoring bore	active
GW967636	Offsite	Test bore/monitoring bore	active
GW967637	Offsite	Monitoring bore	active
GW967638	Offsite	Test bore/monitoring bore	active
GW967639	Offsite	Test bore/monitoring bore	active
GW967640	Offsite	Test bore/monitoring bore	active
GW969036	Offsite	Monitoring bore	active
GW969244	Offsite	Monitoring bore	cancelled
GW969644	Offsite	Monitoring bore	active

APPENDIX D

BORELOGS





BOREHOLE ENVIRONMENTAL LOG

HA1

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armidale High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370606.118 N 6622911.08

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA				PID=0 ppm					FILL: SILT: light brown; with fine gravel; trace medium to coarse sand; dry			HA1_0
				0.20					As above, with tree roots			
				0.30					FILL: SILT with trace gravel; brown; trace glass shards; with tree roots; dry			
				0.40					SILT: light brown; dry			HA1_0.5
									END OF BOREHOLE AT 0.50 m			



BOREHOLE ENVIRONMENTAL LOG

HA2

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370580.2 N 6622849.188

Borehole Information						Field Material Description							
1	2	3	4	5	6	7	8	9	10	11	12	13	
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)	
HA					PID=0.1 ppm				SILT (reworked natural): brown; trace fine gravel; trace siltstone gravels; yellow; dry		VS FB VL SL ST MD VST DD H		HA2_0
				0.20					Clayey SILT: brown; dry		VS FB VL SL ST MD VST DD H		
				0.40					Silty CLAY: low plasticity; red-brown; trace fine gravel; dry		VS FB VL SL ST MD VST DD H		
									END OF BOREHOLE AT 0.50 m		VS FB VL SL ST MD VST DD H		



BOREHOLE ENVIRONMENTAL LOG

HA3

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370606.854 N 6622849.506

Borehole Information						Field Material Description							
1	2	3	4	5	6	7	8	9	10	11	12	13	
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	HAND PENETROMETER (kPa)	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA					PID=0 ppm				FILL: SILT: brown; dry		VS FB VL SL ST MD VST VD H		HA3_0
				0.15					As above, with fine gravel				
				0.30					Clayey SILT: low plasticity; brown; trace fine gravel; dry				HA3_0.5
									END OF BOREHOLE AT 0.50 m				



BOREHOLE ENVIRONMENTAL LOG

HA4

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370580.2 N 6622849.188

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA				PID=0 ppm					FILL: Silty CLAY: low plasticity; brown; with fine to medium gravel; dry			HA4_0
				0.30					CLAY: brown; mottled yellow; dry; stiff; low plasticity; with silt			
				0.35					Gravelly SILT: brown; dry; stiff; low plasticity; with clay			
									END OF BOREHOLE AT 0.50 m			



BOREHOLE ENVIRONMENTAL LOG

HA5

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370633.876 N 6622819.038

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA					PID=0 ppm				FILL: SILT: brown; trace fine gravel; dry			HA5_0
				0.30					Silty CLAY: low plasticity; brown; dry			HA5_0.5
									END OF BOREHOLE AT 0.50 m			



BOREHOLE ENVIRONMENTAL LOG

HA6

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370634.244 N 6622788.252

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA				PID=0 ppm					SILT (reworked natural): brown; dry			HA6_0
				0.20					Clayey SILT: low plasticity; brown; trace fine gravel; dry			
				0.40					CLAY: low plasticity; red-brown; stiff; trace fine gravel			
				0.60					As above, becoming more gravelly			HA6_0.7
									END OF BOREHOLE AT 0.70 m			



BOREHOLE ENVIRONMENTAL LOG

HA7

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370660.898 N 6622788.57

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA				PID=1.3 ppm					FILL: Gravelly SILT: brown; gravel fine grained; dry			HA7_0
				0.20					CLAY: low plasticity; brown; stiff; trace fine gravel; dry			
				0.60					As above, becoming more gravelly			HA7_0.7
									END OF BOREHOLE AT 0.70 m			



BOREHOLE ENVIRONMENTAL LOG

HA8

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armidale High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370687.551 N 6622788.889

Borehole Information						Field Material Description							
1	2	3	4	5	6	7	8	9	10	11	12	13	
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	HAND PENETROMETER (kPa)	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA									SILT (reworked natural): brown; dry		VS FB VL SL ST MD VST DD H VD		HA8_0
				0.20					SILT: brown; dry; with fine gravel		VS FB VL SL ST MD VST DD H VD		
				0.30					FILL: Silty Clayey GRAVEL: brown; dry; friable		VS FB VL SL ST MD VST DD H VD		
				0.40					CLAY: low plasticity; red-brown; stiff; with fine gravel; dry		VS FB VL SL ST MD VST DD H VD		HA8_0.5
									END OF BOREHOLE AT 0.50 m		VS FB VL SL ST MD VST DD H VD		



BOREHOLE ENVIRONMENTAL LOG

HA10

SHEET 1 OF 1

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370740.491 N 6622820.312

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA				PID=0 ppm					SILT (re-worked natural): brown; dry			HA10_0
				0.20					Clayey SILT: brown; stiff; dry			
									END OF BOREHOLE AT 0.50 m			



BOREHOLE ENVIRONMENTAL LOG

HA11

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370739.756 N 6622881.886

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA					PID=0 ppm				FILL: Silty CLAY: low plasticity; brown; trace coarse gravel; moist			HA11_0, QA2, QA2A
				0.20					Silty CLAY: low plasticity; brown with yellow mottles; stiff			HA11_0.5
									END OF BOREHOLE AT 0.50 m			



BOREHOLE ENVIRONMENTAL LOG

HA12

SHEET 1 OF 1

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370739.388 N 6622912.672

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA					PID=0 ppm				FILL: SILT: grey brown; with gravel; dry			HA12_0
				0.30					Clayey SILT: low plasticity; brown; dry			
									END OF BOREHOLE AT 0.50 m			



BOREHOLE ENVIRONMENTAL LOG

HA13

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370766.777 N 6622851.417

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA				PID=0 ppm					FILL: Silty CLAY: brown; trace gravels; moist			HA13_0
				0.20					Silty Sandy CLAY: low plasticity; mottled orange; with siltstone gravels; moist			
				0.30					As above, mottled grey, orange, brown			
				0.40					As above, with medium to coarse gravel, black			
									END OF BOREHOLE AT 0.50 m			



BOREHOLE ENVIRONMENTAL LOG

HA14

SHEET 1 OF 1

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370766.41 N 6622882.204

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA				PID=0 ppm					FILL: Gravelly SILT: brown; dry; with cobbles			HA14_0
				0.20					Gravelly SILT: brown; gravels grey; trace siltstone gravels; yellow; dry			
				0.30					Silty CLAY: low plasticity; brown; dry			
				0.40					CLAY: low plasticity; brown with yellow mottles; stiff; moist			HA14_0.5
									END OF BOREHOLE AT 0.50 m			



BOREHOLE ENVIRONMENTAL LOG

HA15

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armidale High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370792.696 N 6622913.309

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA					PID=0 ppm				Silty CLAY: low plasticity; brown; dry			HA15_0
				0.20					CLAY: low plasticity; brown; stiff; with silt; dry			
				0.40					CLAY: low plasticity; brown; dry			
									END OF BOREHOLE AT 0.50 m			



BOREHOLE ENVIRONMENTAL LOG

HA16

SHEET 1 OF 1

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armidale High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370499.501 N 6622909.805

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA				PID=0 ppm					SILT (reworked natural): brown; with clay; dry			HA16_0
				0.10					FILL: Clayey SILT: brown; trace medium to coarse gravel; trace siltstone gravel; dry			
				0.20					CLAY: low plasticity; dark brown; trace siltstone gravel; dry			HA16_0.5
									END OF BOREHOLE AT 0.50 m			



BOREHOLE ENVIRONMENTAL LOG

HA17

SHEET 1 OF 1

Client:	NBRS Architecture	Date Commenced:	18/1/18
Project:	Intrusive HAZMAT surveys and targeted soil contamination assessment	Date Completed:	18/1/18
Borehole Location:	Armida High School	Recorded By:	WC
Project Number:	PS107410	Log Checked By:	AV

Drill Model/Mounting:	Hand auger	Hole Angle:	90°	Surface RL:	
Borehole Diameter:	80 mm	Bearing:	---	Co-ords:	E 370552.81 N 6622910.442

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA					PID=0 ppm				FILL: Silty CLAY: low plasticity; brown; trace sand; dry			HA17_0
				0.20					CLAY: low plasticity; orange-brown; trace fine to medium gravel; dry			
				0.40					Silty CLAY: low plasticity; dark brown; dry			
									END OF BOREHOLE AT 0.50 m			



BOREHOLE ENVIRONMENTAL LOG

HA18

Client: NBR Architecture

Date Commenced: 18/1/18

Project: Intrusive HAZMAT surveys and targeted soil contamination assessment

Date Completed: 18/1/18

Borehole Location: Armidale High School

Recorded By: WC

Project Number: PS107410

Log Checked By: AV

Drill Model/Mounting: Hand auger

Hole Angle: 90°

Surface RL:

Borehole Diameter: 80 mm

Bearing: ---

Co-ords: E 370554.282 N 6622787.296

Borehole Information						Field Material Description						
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	MOISTURE	RELATIVE DENSITY / CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS (Defects - depth, type, orientation, spacing, planarity, roughness, thickness, coating)
HA				PID=0 ppm					SILT (reworked natural): brown; with clay; dry			HA18_0, QA1, QA1A
				0.20					Silty CLAY: low plasticity; dark brown; dry			
									END OF BOREHOLE AT 0.50 m			

APPENDIX E

ANALYTICAL RESULTS



Table E1
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - TRH & BTEXN

ADOPTED ASSESSMENT CRITERIA				TRH							BTEXN							Asbestos	
				C ₆ -C ₉	C ₆ -C ₁₀	F1	>C ₁₀ -C ₁₆	F2	>C ₁₆ -C ₃₄	>C ₃₄ -C ₄₀	C ₁₀ - C ₃₆ (Sum of total)	Benzene	Toluene	Ethyl- benzene	Xylene (m&p)	Xylene (o)	Total Xylene		Naphthalene
HSL A ¹																			
HSL C ²				-	-	NL	-	NL	-	-	-	NL	NL	NL	-	-	NL	-	-
HIL C ³				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct contact ⁴				-	-	5,100	-	3,800	5,300	7,400	-	120	18,000	5,300	-	-	15,000	-	-
ESL C ⁵				-	-	180	-	120	1,300	5,600	-	65	105	125	-	-	45	-	-
EIL C ⁶				-	-	-	-	-	-	-	-	-	-	-	-	-	170	-	

Sample ID	Sample date	Laboratory report reference	Sample depth (mBGL)	Analytical results															
HA1_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	130	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	Yes
HA1_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA2_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA3_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA3_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA4_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	50	50	930	260	1,000	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA5_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA5_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA6_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA6_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA7_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA7_0.7	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA8_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA9_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA9_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA10_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA11_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	430	170	490	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA11_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA12_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	200	<100	260	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA13_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA14_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA14_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA15_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA16_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	120	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA17_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA18_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	120	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
QA1	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	110	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
QA2	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	150	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
QA1A	18-01-18	SE174604	0 - 0.1	<20	<25	<25	<25	<25	<90	<120	<110	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.1	-
QA2A	18-01-18	SE174604	0 - 0.1	<20	<25	<25	<25	<25	240	<120	270	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.1	-
ALS Practical quantitation limit				10	10	10	50	50	100	100	50	0	0.5	0.5	0.5	0.5	0.5	1	Yes/No
SGS Practical quantitation limit				20	25	25	25	25	90	120	110	0.1	0.1	0.1	0.2	0.1	0.3	0.1	-

Notes:
Bold Sample concentration exceeds the adopted assessment criteria

All results expressed as mg/kg, unless stated otherwise

F1 = C₆-C₁₀ Fraction minus BTEX

F2 = TRH >C₁₀-C₁₆ less naphthanlene

NL = Non-limiting due to maximum vapour concentrations being below the acceptable health risk level.

¹ NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low - high density residential

² NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space

³ NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(1) HILs for soil contaminants – Recreational C

⁴ CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg)

⁵ NEPM (2013) Schedule B1 Table 1B(6) ESLs for TPH Fractions F1 to F4, BTEX and benzo(a)pyrene in soil.

⁶ NEPM (2013) Schedule B1 Table 1B(5) EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties

Table E2
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - PAHs & metals

ADOPTED ASSESSMENT CRITERIA				PAHs																Metals							
				Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(bj)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel
HSL A ¹				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HSL C ²				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIL C ³				-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	300	300	90	300	17,000	600	80	1,200	30,000
Direct contact ⁴				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ESL C ⁵				-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EIL C ⁶				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-	400 ⁸	95 ¹⁰	1,100 ⁷	-	30 ⁸	230 ⁹

Sample ID	Sample date	Laboratory report reference	Sample depth (mBGL)	Analytical results																										
HA1_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.9	2.5	2.7	1.1	1.7	2.2	<0.5	5.3	<0.5	1.3	<0.5	2.9	5.1	26.7	35	<1	36	40	170	1.1	16	324		
HA1_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	74	13	16	<0.1	19	29		
HA2_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	64	18	15	0.1	24	101		
HA3_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	118	22	10	<0.1	43	21		
HA4_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1	1.1	0.9	<0.5	<0.5	1	<0.5	2.3	<0.5	<0.5	<0.5	1.7	2.3	10.3	<5	<1	42	21	26	<0.1	33	90		
HA5_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	0.5	0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	0.7	1.2	4.1	<5	<1	45	23	66	<0.1	61	41		
HA5_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	69	24	6	<0.1	44	24		
HA6_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	86	24	<5	<0.1	75	24		
HA7_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	0.8	1.6	<5	<1	39	12	13	<0.1	23	25		
HA7_0.7	18-01-18	ES1802402	0.6 - 0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	77	27	5	<0.1	98	25		
HA8_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	0.8	1.5	<5	<1	38	13	10	<0.1	26	31		
HA9_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	32	5	<5	<0.1	7	<5		
HA10_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	0.7	0.8	0.8	<0.5	<0.5	0.8	<0.5	2.2	<0.5	<0.5	<0.5	1.4	1.9	8.6	<5	<1	74	16	28	0.3	15	36		
HA11_0	18-01-18	ES1802402	0 - 0.1	<0.5	1.2	2.1	7.6	7.9	8	2.3	2.7	7.6	0.7	16.8	<0.5	2.4	<0.5	11.4	17	87.7	<5	<1	58	17	23	<0.1	24	49		
HA11_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	63	14	9	<0.1	26	13		
HA12_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	0.6	2.3	2.8	2.9	1.1	1.1	2.6	<0.5	6.9	<0.5	0.9	<0.5	4.3	6.5	32	<5	<1	54	12	19	<0.1	15	37		
HA13_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	0.5	0.9	2.3	<5	<1	27	8	18	<0.1	6	22		
HA14_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	76	22	10	<0.1	29	22		
HA15_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	93	35	10	<0.1	55	58		
HA16_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.1	1.3	1.1	<0.5	<0.5	1.2	<0.5	2.7	<0.5	<0.5	<0.5	1.6	2.7	<0.5	<5	<1	45	21	20	<0.1	32	43		
HA17_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	0.5	0.8	2.1	<5	<1	44	21	13	<0.1	24	39		
HA18_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.6	1.7	1.6	0.6	0.9	1.6	<0.5	2.7	<0.5	0.7	<0.5	1.2	2.8	15.4	<5	<1	30	15	14	<0.1	18	55		
QA1	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	0.6	2.8	2.6	2.5	1	1.3	2.7	<0.5	4.9	<0.5	1	<0.5	2.3	4.9	26.6	<5	<1	31	12	15	<0.1	19	39		
QA2	18-01-18	ES1802402	0 - 0.1	<0.5	0.6	1.3	3.4	3	2.9	1	1.3	3.4	<0.5	6.8	<0.5	1.1	<0.5	4.9	6.7	36.4	<5	<1	62	12	10	<0.1	17	15		
QA1A	18-01-18	SE174604	0 - 0.1	<0.1	0.4	0.3	2.3	2.5	2.7	1.1	1.1	1.8	0.2	3.3	<0.1	1.5	<0.1	1.7	3.7	23	4	<0.3	38	15	16	<0.05	22	54		
QA2A	18-01-18	SE174604	0 - 0.1	0.3	1.0	1.7	6.5	6.2	6.4	2.8	2.5	4.4	0.4	11	0.6	3.4	0.2	6.8	11	65	<3	<0.3	70	25	23	<0.05	28	67		
ALS Practical quantitation limit				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	1	2	5	5	0.1	2	5		
SGS Practical quantitation limit				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8	3.0	0.3	0.3	0.5	1.0	0.1	0.5	0.5		

Notes:
Sample concentration exceeds the adopted assessment criteria
All results expressed as mg/kg, unless stated otherwise

¹ NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low - high density residential
² NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space
³ NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(1) HILs for soil contaminants – Recreational C
⁴ CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg)
⁵ NEPM (2013) Schedule B1 Table 1B(6) ESLs for TPH Fractions F1 to F4, BTEX and benzo(a)pyrene in soil.
⁶ NEPM (2013) Schedule B1 Table 1B(5) EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties
⁷ NEPM (2013) Schedule B1 Table 1B(4) EILs for Generic added contaminant limits for lead in soils irrespective of their physicochemical properties
⁸ NEPM (2013) Schedule B1 Table 1B(3) Soil-specific added contaminant limits for aged chromium III and nickel in soil
⁹ NEPM (2013) Schedule B1 Table 1B(1) Soil-specific added contaminant limits for aged zinc in soil
¹⁰ NEPM (2013) Schedule B1 Table 1B(2) Soil-specific added contaminant limits for aged copper in soils

Table E3
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - PCBs, OCPs & OPPs

ADOPTED ASSESSMENT CRITERIA				PCBs	OCPs																		OPPs														
				Total Polychlorinated biphenyls																																	
					pp-DDE	Aldrin	cis-Chlordane	trans-Chlordane	delta-BHC	pp-DDD	pp-DDT	Dieldrin	alpha-Endosulfan	beta-Endosulfan	Endosulfan sulphate	Endrin	Endrin aldehyde	alpha - BHC	beta - BHC	delta- BHC	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Azinphos methyl	Bromophos-ethyl	Chlorpyrifos	Diazinon	Dichlorvos	Dimethoate	Fenthion	Ethion	Malathion	Parathion			
					HSL A ¹	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
					HSL C ²	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
					HIL C ³	1	400	10	70	70	.	400	400	10	.	.	.	20	.	.	.	.	.	10	400	.	.	.	250	.	.	.	.	.	.	.	
					Direct contact ⁴	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
					ESL C ⁵	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
EIL C ⁶	.	.	.	.	.	.	.	180	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.					

Sample ID	Sample Date	Laboratory report reference	Sample Depth (mBGL)	Analytical Results																															
C1	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<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	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2		
C2	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<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	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2		
C3	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<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	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2		
C4	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<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	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2		
ALS Practical quantitation limit				0.1	0.05	0.05	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	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.20		

Notes:
Bold Sample concentration exceeds the adopted assessment criteria
All results expressed as mg/kg, unless stated otherwise

¹ NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low - high density residential
² NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space
³ NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(1) HILs for soil contaminants – Recreational C
⁴ CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg)
⁵ NEPM (2013) Schedule B1 Table 1B(6) ESLs for TPH Fractions F1 to F4, BTEX and benzo(a)pyrene in soil.
⁶ NEPM (2013) Schedule B1 Table 1B(5) EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties

Table E4
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - Waste Classification - TRH & BTEXN

ADOPTED ASSESSMENT CRITERIA	TRH								BTEXN						Asbestos	
	C ₆ -C ₉	C ₆ -C ₁₀	F1	>C ₁₀ -C ₁₆	F2	>C ₁₆ -C ₃₄	>C ₃₄ -C ₄₀	C ₁₀ - C ₃₆ (Sum of total)	Benzene	Toluene	Ethyl benzene	Xylene (m&p)	Xylene (o)	Total Xylene		Naphthalene
NSW 2014 General Solid Waste CT1 (No Leaching) ¹	650	-	-	-	-	-	-	10,000	10	288	600	-	-	1,000	-	-
NSW 2014 General Solid Waste SCC1 (Leached) ²	650	-	-	-	-	-	-	10,000	18	518	1,080	-	-	1,800	-	-
NSW 2014 General Solid Waste TCLP1 ³	NA	-	-	-	-	-	-	NA	1	14	30			50	-	-
NSW 2014 Restricted Solid Waste CT2 (No Leaching) ⁴	2,600	-	-	-	-	-	-	40,000	40	1,152	2,400	-	-	4,000	-	-
NSW 2014 Restricted Solid Waste SCC2 (Leached) ⁵	2,600	-	-	-	-	-	-	40,000	72	2,073	4,320	-	-	7,200	-	-
NSW 2014 Restricted Solid Waste TCLP2 ⁶	NA	-	-	-	-	-	-	NA	2	58	120	-	-	200	-	-

Sample ID	Sample Date	Laboratory report reference	Sample Depth (mBGL)	Analytical Results															
HA1 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	130	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	Yes
HA1 0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA2 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA3 0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA3 0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA4 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	50	50	930	260	1,000	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA5 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA5 0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA6 0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA6 0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA7 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA7 0.7	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA8 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA9 0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA9 0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA10 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA11 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	430	170	490	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA11 0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA12 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	200	<100	260	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA13 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA14 0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA14 0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA15 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA16 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	120	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA17 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA18 0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	120	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
ALS Practical quantitation limit				10	10	10	50	50	100	100	50	0	0.5	0.5	0.5	0.5	0.5	1	Yes/No
SGS Practical quantitation limit				20	25	25	25	25	90	120	110	0.1	0.1	0.1	0.2	0.1	0.3	0.1	-

Notes:

Bold Sample concentration exceeds the adopted assessment criteria

All results expressed as mg/kg, unless stated otherwise

F1 = C₆-C₁₀ Fraction minus BTEX

F2 = TRH >C₁₀-C₁₆ less naphthanlene

NL = Non-limiting due to maximum vapour concentrations being below the acceptable health risk level.

TCLP1 & TCLP2 unit are mg/L

NA = Not applicable

¹ Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - General solid waste CT1

² Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Specific contaminant concentration

³ Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Leachable concentration

⁴ Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - Restricted solid waste CT2

⁵ Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Specific contaminant concentration

⁶ Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Leachable concentration

Table E5
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - Waste Classification - PAHs & metals

ADOPTED ASSESSMENT CRITERIA	PAHs																	Metals							
	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
NSW 2014 General Solid Waste CT1 (No leaching) ¹	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	200	100	20	100	-	100	4	40	-
NSW 2014 General Solid Waste SCC1 (Leached) ²	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	200	500	100	1900	-	1500	50	1050	-
NSW 2014 Restricted Solid Waste CT2 (No leaching) ³	-	-	-	-	3.2	-	-	-	-	-	-	-	-	-	-	-	800	400	80	400	-	400	16	160	-
NSW 2014 Restricted Solid Waste SCC2 (Leached) ⁴	-	-	-	-	23	-	-	-	-	-	-	-	-	-	-	-	800	2000	400	7600	-	6000	200	4200	-

Sample ID	Sample Date	Laboratory report reference	Sample Depth (mBGL)	Analytical Results																									
HA1 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.9	2.5	2.7	1.1	1.7	2.2	<0.5	5.3	<0.5	1.3	<0.5	2.9	5.1	26.7	35	<1	36	40	170	1.1	16	324	
HA1 0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	74	13	16	<0.1	19	29	
HA2 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	64	18	15	0.1	24	101	
HA3 0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	118	22	10	<0.1	43	21	
HA4 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1	1.1	0.9	<0.5	<0.5	1	<0.5	2.3	<0.5	<0.5	<0.5	1.7	2.3	10.3	<5	<1	42	21	26	<0.1	33	90	
HA5 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	0.5	0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	0.7	1.2	4.1	<5	<1	45	23	66	<0.1	61	41	
HA5 0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	69	24	6	<0.1	44	24	
HA6 0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	86	24	<5	<0.1	75	24	
HA7 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	0.8	1.6	<5	<1	39	12	13	<0.1	23	25	
HA7 0.7	18-01-18	ES1802402	0.6 - 0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	77	27	5	<0.1	98	25	
HA8 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	0.8	1.5	<5	<1	38	13	10	<0.1	26	31	
HA9 0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	32	5	<5	<0.1	7	<5	
HA10 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	0.7	0.8	0.8	<0.5	<0.5	0.8	<0.5	2.2	<0.5	<0.5	<0.5	1.4	1.9	8.6	<5	<1	74	16	28	0.3	15	36	
HA11 0	18-01-18	ES1802402	0 - 0.1	<0.5	1.2	2.1	7.6	7.9	8	2.3	2.7	7.6	0.7	16.8	<0.5	2.4	<0.5	11.4	17	87.7	<5	<1	58	17	23	<0.1	24	49	
HA11 0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	63	14	9	<0.1	26	13	
HA12 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	0.6	2.3	2.8	2.9	1.1	1.1	2.6	<0.5	6.9	<0.5	0.9	<0.5	4.3	6.5	32	<5	<1	54	12	19	<0.1	15	37	
HA13 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	0.5	0.9	2.3	<5	<1	27	8	18	<0.1	6	22	
HA14 0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<1	76	22	10	<0.1	29	22	
HA15 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<1	93	35	10	<0.1	55	58	
HA16 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.1	1.3	1.1	<0.5	<0.5	1.2	<0.5	2.7	<0.5	<0.5	<0.5	1.6	2.7	<0.5	<5	<1	45	21	20	<0.1	32	43	
HA17 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	0.5	0.8	2.1	<5	<1	44	21	13	<0.1	24	39	
HA18 0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.6	1.7	1.6	0.6	0.9	1.6	<0.5	2.7	<0.5	0.7	<0.5	1.2	2.8	15.4	<5	<1	30	15	14	<0.1	18	55	

ADOPTED ASSESSMENT CRITERIA																										
NSW 2014 General Solid Waste TCLP1 ⁵	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	NA	5	1	5	-	5	0.2	2	-	
NSW 2014 Restricted Solid Waste TCLP2 ⁶	-	-	-	-	0.16	-	-	-	-	-	-	-	-	-	-	-	NA	20	4	20	-	20	0.8	8	-	

Sample ID	Sample Date	Laboratory report reference	Sample Depth (mBGL)	TCLP Analytical Results																									
HA3 0.5	18-01-18	ES1804634	0.4 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	
HA5 0	18-01-18	ES1804634	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	
HA6 0.5	18-01-18	ES1804634	0.4 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	
HA7 0.7	18-01-18	ES1804634	0.6 - 0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	
HA11 0	18-01-18	ES1804634	0 - 0.1	-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA12 0	18-01-18	ES1804634	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	
QA1	18-01-18	ES1804634	0 - 0.1	-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
ALS Practical quantitation limit				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	1	2	5	5	0.1	2	5	
SGS Practical quantitation limit				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8	3.0	0.3	0.3	0.5	1.0	0.1	0.5	0.5		

Notes:

Bold Sample concentration exceeds the adopted assessment criteria

All results expressed as mg/kg, unless stated otherwise

TCLP1 & TCLP2 unit are mg/L

NA = Not applicable

¹Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - General solid waste CT1

²Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Specific contaminant concentration

³Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - Restricted solid waste CT2

⁴Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Specific contaminant concentration

⁵Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Leachable concentration

⁶Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Leachable concentration

Table E6
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - Waste Classification - PCBs, OCPs & OPPs

ADOPTED ASSESSMENT CRITERIA				PCBs	OCPs																		OPPs													
				Total Polychlorinated biphenyl/s	pp-DDE	Aldrin	cis-Chlordane	trans-Chlordane	delta-BHC	pp-DDD	pp-DDT	Dieldrin	alpha-Endosulfan	beta-Endosulfan	Endosulfan sulphate	Endrin	Endrin aldehyde	alpha - BHC	beta - BHC	delta- BHC	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Azinphos methyl	Bromophos-ethyl	Chlorpyrifos	Diazinon	Dichlorvos	Dimethoate	Fenthion	Ethion	Malathion	Parathion		
NSW 2014 General Solid Waste CT1 (No Leaching) ¹				<50	-	-	-	-	-	-	-	60	60	-	-	-	-	-	-	-	-	-	-	-	-	-	250	250	250	250	250	-				
NSW 2014 General Solid Waste SCC1 (Leached) ²				<50	-	-	-	-	-	-	-	108	108	-	-	-	-	-	-	-	-	-	-	-	-	-	250	250	250	250	250	-				
NSW 2014 General Solid Waste TCLP1 ³				NA	-	-	-	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA	NA	NA	NA	-				
NSW 2014 Restricted Solid Waste CT2 (No Leaching) ⁴				<50	-	-	-	-	-	-	-	240	240	-	-	-	-	-	-	-	-	-	-	-	-	-	1,000	1,000	1,000	1,000	1,000	-				
NSW 2014 Restricted Solid Waste SCC2 (Leached) ⁵				<50	-	-	-	-	-	-	-	432	432	-	-	-	-	-	-	-	-	-	-	-	-	-	1,000	1,000	1,000	1,000	1,000	-				
NSW 2014 Restricted Solid Waste TCLP2 ⁶				NA	-	-	-	-	-	-	-	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA	NA	NA	NA	-				

Sample ID	Sample Date	Laboratory report reference	Sample Depth (mBGL)																																
C1	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<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	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2			
C2	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<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	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2			
C3	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<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	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2			
C4	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<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	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2			
ALS Practical quantitation limit				0.1	0.05	0.05	0.05	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	0.05	0.05	0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.20			

Notes:

Bold Sample concentration exceeds the adopted assessment criteria

All results expressed as mg/kg, unless stated otherwise
TCLP1 & TCLP2 unit are mg/L
NA = Not applicable

¹Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - General solid waste CT1
²Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Specific contaminant concentration
³Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Leachable concentration
⁴Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - Restricted solid waste CT2
⁵Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Specific contaminant concentration
⁶Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Leachable concentration

APPENDIX F

QA/QC TABLES



Table F1
Armidale High School
Butler Street, Armidale NSW 2350
RPDs for soil analytical results - TRH & BTEXN

Sample ID	Sample Date	Laboratory report reference	TRH				BTEXN					
			C ₆ -C ₁₀	>C ₁₀ -C ₁₆	>C ₁₆ -C ₃₄	>C ₃₄ -C ₄₀	Benzene	Toluene	Ethyl benzene	Xylene (m&p)	Xylene (o)	Naphthalene
HA18_0	18-01-18	ALS	<10	<50	120	<100	<0.2	<0.5	<0.5	<0.5	<0.5	<1
QA1	18-01-18	ALS	<10	<50	110	<100	<0.2	<0.5	<0.5	<0.5	<0.5	<1
Average concentration			-	-	115	-	-	-	-	-	-	-
RPD(%)			-	-	2%	-	-	-	-	-	-	-
HA11_0	18-01-18	ALS	<10	<50	430	170	<0.2	<0.5	<0.5	<0.5	<0.5	<1
QA2	18-01-18	ALS	<10	<50	150	<100	<0.2	<0.5	<0.5	<0.5	<0.5	<1
Average concentration			-	-	290	135	-	-	-	-	-	-
RPD(%)			-	-	24%	13%	-	-	-	-	-	-
HA18_0	18-01-18	ALS	<10	<50	120	<100	<0.2	<0.5	<0.5	<0.5	<0.5	<1
QA1A	18-01-18	SGS	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1
Average concentration			-	-	-	-	-	-	-	-	-	-
RPD(%)			-	-	-	-	-	-	-	-	-	-
HA11_0	18-01-18	ALS	<10	<50	430	170	<0.2	<0.5	<0.5	<0.5	<0.5	<1
QA2A	18-01-18	SGS	<25	<25	240	<120	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1
Average concentration			-	-	335	145	-	-	-	-	-	-
RPD(%)			-	-	14%	9%	-	-	-	-	-	-
ALS Practical quantitation limit			10	50	100	100	0	0.5	0.5	0.5	0.5	1
SGS Practical quantitation limit			25	25	90	120	0.1	0.1	0.1	0.2	0.1	0.1

Notes:

All results expressed as mg/kg, unless stated otherwise

Italics: A value equal to the PQL has been used for the calculation of RPDs

RPD acceptance criterion = 30-50% for semi-volatiles and 100% for volatile organics

Bold RPD exceeds the adopted criteria

Table F2
 Armidale High School
 Butler Street, Armidale NSW 2350
 RPDs for soil analytical results - PAHs & metals

Sample ID	Sample Date	Laboratory	PAHs																Metals							
			Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
HA18_0	18-01-18	ALS	<0.5	<0.5	<0.5	1.6	1.7	1.6	0.6	0.9	1.6	<0.5	2.7	<0.5	0.7	<0.5	1.2	2.8	<5	<1	30	15	14	<0.1	18	55
QA1	18-01-18	ALS	<0.5	<0.5	0.6	2.8	2.6	2.5	1	1.3	2.7	<0.5	4.9	<0.5	1	<0.5	2.3	4.9	<5	<1	31	12	15	<0.1	19	39
Average concentration			-	-	0.6	2.2	2.2	2.1	0.8	1.1	2.2	-	3.8	-	0.9	-	1.8	3.9	-	-	30.5	13.5	14.5	-	18.5	47.0
RPD(%)			-	-	5%	14%	10%	11%	13%	9%	13%	-	14%	-	9%	-	16%	14%	-	-	1%	6%	2%	-	1%	9%
HA11_0	18-01-18	ALS	<0.5	1.2	2.1	7.6	7.9	8	2.3	2.7	7.6	0.7	16.8	<0.5	2.4	<0.5	11.4	17	<5	<1	58	17	23	<0.1	24	49
QA2	18-01-18	ALS	<0.5	0.6	1.3	3.4	3	2.9	1	1.3	3.4	<0.5	6.8	<0.5	1.1	<0.5	4.9	6.7	<5	<1	62	12	10	<0.1	17	15
Average concentration			-	0.9	1.7	5.5	5.5	5.5	1.7	2.0	5.5	0.6	11.8	-	1.8	-	8.2	11.9	-	-	60.0	14.5	16.5	-	20.5	32.0
RPD(%)			-	17%	12%	19%	22%	23%	20%	18%	19%	8%	21%	-	19%	-	20%	22%	-	-	2%	9%	20%	-	9%	27%
HA18_0	18-01-18	ALS	<0.5	<0.5	<0.5	1.6	1.7	1.6	0.6	0.9	1.6	<0.5	2.7	<0.5	0.7	<0.5	1.2	2.8	<5	<1	30	15	14	<0.1	18	55
QA1A	18-01-18	SGS	<0.1	0.4	0.3	2.3	2.5	2.7	1.1	1.1	1.8	0.2	3.3	<0.1	1.5	<0.1	1.7	3.7	4	<0.3	38	15	16	<0.05	22	54
Average concentration			-	0.5	0.4	2.0	2.1	2.2	0.9	1.0	1.7	0.4	3.0	-	1.1	-	1.5	3.3	4.5	-	34.0	15.0	15.0	-	20.0	54.5
RPD(%)			-	6%	13%	9%	10%	13%	15%	5%	3%	21%	5%	-	18%	-	9%	7%	6%	-	6%	0%	3%	-	5%	0%
HA11_0	18-01-18	ALS	<0.5	1.2	2.1	7.6	7.9	8	2.3	2.7	7.6	0.7	16.8	<0.5	2.4	<0.5	11.4	17	<5	<1	58	17	23	<0.1	24	49
QA2A	18-01-18	SGS	0.3	1.0	1.7	6.5	6.2	6.4	2.8	2.5	4.4	0.4	11	0.6	3.4	0.2	6.8	11	<3	<0.3	70	25	23	<0.05	28	67
Average concentration			0.4	1.1	1.9	7.1	7.1	7.2	2.6	2.6	6.0	0.6	13.9	0.6	2.9	0.4	9.1	14.0	-	-	64.0	21.0	23.0	-	26.0	58.0
RPD(%)			13%	5%	5%	4%	6%	6%	5%	2%	13%	14%	10%	5%	9%	21%	13%	11%	-	-	5%	10%	0%	-	4%	8%
ALS Practical quantitation limit			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	1	2	5	5	0.1	2	5
SGS Practical quantitation limit			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.0	0.3	0.3	0.5	1.0	0.1	0.5	0.5

Notes:

All results expressed as µg/L

Italics: A value equal to the PQL has been used for the calculation of RPDs

RPD acceptance criterion = 30-50% for semi-volatiles and 100% for volatile organics

Bold RPD exceeds the adopted criteria

Table F3
Armidale High School
Butler Street, Armidale NSW 2350
QAQC soil analytical results TRH/BTEXN

Sample ID	Sample date	Laboratory report reference	TRH				BTEXN					
			C ₆ -C ₁₀	>C ₁₀ -C ₁₆	>C ₁₆ -C ₃₄	>C ₃₄ -C ₄₀	Benzene	Toluene	Ethyl benzene	Xylene (m&p)	Xylene (o)	Naphthalene
TSPK	16-01-18	ES1802401	38	-	-	-	<0.2	8.6	1.4	7.6	3	<1
TSC	-	ES1802401	52	-	-	-	0.3	11.3	1.6	8.4	3.4	<1
Trip spike recovery (%)			73%	-	-	-	67%	76%	88%	90%	88%	-
Blank	16-01-18	ES1802401	<10	-	-	-	<0.2	<0.5	<0.5	<0.5	<0.5	<1
Practical quantitation limit			10	50	100	100	0.2	0.5	0.5	0.5	0.5	1

Notes:

All results expressed as µg/L

- Not analysed

TSPK Trip spike

TSC Trip spike control

APPENDIX G

LABORATORY REPORTS



CERTIFICATE OF ANALYSIS

Work Order : **ES1802402**
Client : **WSP Australia Pty Ltd**
Contact : **MS AMY VALENTINE**
Address : **PO BOX 1162**
NEWCASTLE NSW, AUSTRALIA 2300
Telephone : **----**
Project : **ARMIDALE HIGH SCHOOL**
Order number : **PS107410**
C-O-C number : **----**
Sampler : **WENDY CADELAGO**
Site : **----**
Quote number : **EN/085/15 V8**
No. of samples received : **38**
No. of samples analysed : **32**

Page : 1 of 25
Laboratory : Environmental Division Sydney
Contact : Loren Schiavon
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61 2 8784 8503
Date Samples Received : 19-Jan-2018 16:49
Date Analysis Commenced : 22-Jan-2018
Issue Date : 29-Jan-2018 15:55



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>
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- EG035: Positive Hg result for ES1802402 #17 has been confirmed by reanalysis
- EP071: Results of samples QA1 and QA2 have been confirmed by re-extraction and re-analysis.
- 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: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) 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), Dibenzo(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.
- 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
- 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	HA1_0	HA1_0.5	HA2_0	HA3_0	HA3_0.5
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-001	ES1802402-002	ES1802402-003	ES1802402-004	ES1802402-005
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		7.2	33.8	10.4	----	30.4
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos (Trace)	1332-21-4	5	Fibres		Yes	----	No	No	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		Yes	----	No	No	----
Asbestos Type	1332-21-4	-	--		Ch + Am	----	-	-	----
Sample weight (dry)	----	0.01	g		164	----	181	205	----
APPROVED IDENTIFIER:	----	-	--		G.MORGAN	----	G.MORGAN	G.MORGAN	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		35	<5	<5	----	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	----	<1
Chromium	7440-47-3	2	mg/kg		36	74	64	----	118
Copper	7440-50-8	5	mg/kg		40	13	18	----	22
Lead	7439-92-1	5	mg/kg		170	16	15	----	10
Nickel	7440-02-0	2	mg/kg		16	19	24	----	43
Zinc	7440-66-6	5	mg/kg		324	29	101	----	21
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		1.1	<0.1	0.1	----	<0.1
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		2.9	<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		5.3	<0.5	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg		5.1	<0.5	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		1.9	<0.5	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg		2.2	<0.5	<0.5	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		2.7	<0.5	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		1.1	<0.5	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		2.5	<0.5	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		1.3	<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



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA1_0	HA1_0.5	HA2_0	HA3_0	HA3_0.5
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-001	ES1802402-002	ES1802402-003	ES1802402-004	ES1802402-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg		1.7	<0.5	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		26.7	<0.5	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		3.2	<0.5	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		3.5	0.6	0.6	----	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		3.7	1.2	1.2	----	1.2
EP080/071: Total Petroleum Hydrocarbons									
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		130	<100	<100	----	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		130	<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
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		71.2	72.7	73.4	----	74.3
2-Chlorophenol-D4	93951-73-6	0.5	%		73.3	73.0	76.8	----	77.7
2,4,6-Tribromophenol	118-79-6	0.5	%		56.5	49.9	58.2	----	55.7



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA1_0	HA1_0.5	HA2_0	HA3_0	HA3_0.5
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-001	ES1802402-002	ES1802402-003	ES1802402-004	ES1802402-005
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		76.3	77.6	84.2	----	84.4
Anthracene-d10	1719-06-8	0.5	%		76.9	78.6	84.0	----	84.6
4-Terphenyl-d14	1718-51-0	0.5	%		68.7	71.7	77.6	----	78.9
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		103	91.3	96.3	----	94.5
Toluene-D8	2037-26-5	0.2	%		99.3	90.7	95.4	----	94.2
4-Bromofluorobenzene	460-00-4	0.2	%		93.7	88.7	91.9	----	91.4



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA4_0	HA5_0	HA5_0.5	HA6_0	HA6_0.5
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-006	ES1802402-007	ES1802402-008	ES1802402-009	ES1802402-010
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		12.2	15.3	17.5	----	14.2
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos (Trace)	1332-21-4	5	Fibres		No	No	----	No	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		No	No	----	No	----
Asbestos Type	1332-21-4	-	--		-	-	----	-	----
Sample weight (dry)	----	0.01	g		144	187	----	32.6	----
APPROVED IDENTIFIER:	----	-	--		S.SPOONER	S.SPOONER	----	S.SPOONER	----
EG005T: 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		42	45	69	----	86
Copper	7440-50-8	5	mg/kg		21	23	24	----	24
Lead	7439-92-1	5	mg/kg		26	66	6	----	<5
Nickel	7440-02-0	2	mg/kg		33	61	44	----	75
Zinc	7440-66-6	5	mg/kg		90	41	24	----	24
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	----	<0.1
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		1.7	0.7	<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		2.3	1.2	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg		2.3	1.2	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		1.0	<0.5	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg		1.0	<0.5	<0.5	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		0.9	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		1.1	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



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA4_0	HA5_0	HA5_0.5	HA6_0	HA6_0.5
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-006	ES1802402-007	ES1802402-008	ES1802402-009	ES1802402-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
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		10.3	4.1	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		1.3	0.6	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		1.6	0.9	0.6	----	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.9	1.2	1.2	----	1.2
EP080/071: Total Petroleum Hydrocarbons									
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		710	<100	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg		290	<100	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		1000	<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		930	<100	<100	----	<100
>C34 - C40 Fraction	----	100	mg/kg		260	<100	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		1240	<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
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		75.2	74.8	71.5	----	76.5
2-Chlorophenol-D4	93951-73-6	0.5	%		78.4	77.9	73.9	----	79.4
2,4,6-Tribromophenol	118-79-6	0.5	%		70.0	61.5	52.8	----	52.1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA4_0	HA5_0	HA5_0.5	HA6_0	HA6_0.5
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1802402-006	ES1802402-007	ES1802402-008	ES1802402-009	ES1802402-010
				Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	86.3	85.1	80.4	----	86.5
Anthracene-d10	1719-06-8	0.5	%	84.9	86.8	81.7	----	87.4
4-Terphenyl-d14	1718-51-0	0.5	%	80.2	79.1	75.3	----	80.8
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.2	%	102	102	95.5	----	94.2
Toluene-D8	2037-26-5	0.2	%	103	97.1	91.7	----	87.8
4-Bromofluorobenzene	460-00-4	0.2	%	96.8	89.0	84.2	----	82.0



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA7_0	HA7_0.7	HA8_0	HA9_0	HA9_0.5
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-011	ES1802402-012	ES1802402-013	ES1802402-015	ES1802402-016
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		9.0	49.0	14.1	----	8.9
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos (Trace)	1332-21-4	5	Fibres		No	----	No	No	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		No	----	No	No	----
Asbestos Type	1332-21-4	-	--		-	----	-	-	----
Sample weight (dry)	----	0.01	g		118	----	129	121	----
APPROVED IDENTIFIER:	----	-	--		G.MORGAN	----	G.MORGAN	G.MORGAN	----
EG005T: 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		39	77	38	----	32
Copper	7440-50-8	5	mg/kg		12	27	13	----	5
Lead	7439-92-1	5	mg/kg		13	5	10	----	<5
Nickel	7440-02-0	2	mg/kg		23	98	26	----	7
Zinc	7440-66-6	5	mg/kg		25	25	31	----	<5
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	----	<0.1
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		0.8	<0.5	0.7	----	<0.5
Pyrene	129-00-0	0.5	mg/kg		0.8	<0.5	0.8	----	<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



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA7_0	HA7_0.7	HA8_0	HA9_0	HA9_0.5
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1802402-011	ES1802402-012	ES1802402-013	ES1802402-015	ES1802402-016
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
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	1.6	<0.5	1.5	----	<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								
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
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	76.2	71.5	70.4	----	73.0
2-Chlorophenol-D4	93951-73-6	0.5	%	79.9	72.9	70.8	----	73.2
2,4,6-Tribromophenol	118-79-6	0.5	%	64.9	44.3	48.9	----	45.6



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA7_0	HA7_0.7	HA8_0	HA9_0	HA9_0.5
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-011	ES1802402-012	ES1802402-013	ES1802402-015	ES1802402-016
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		86.0	80.0	78.1	----	81.5
Anthracene-d10	1719-06-8	0.5	%		86.1	81.1	77.6	----	85.6
4-Terphenyl-d14	1718-51-0	0.5	%		79.0	75.5	72.4	----	79.8
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		97.0	91.3	102	----	99.1
Toluene-D8	2037-26-5	0.2	%		92.4	89.0	100.0	----	96.3
4-Bromofluorobenzene	460-00-4	0.2	%		87.9	83.2	92.8	----	90.0



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA10_0	HA11_0	HA11_0.5	HA12_0	HA13_0
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-017	ES1802402-018	ES1802402-019	ES1802402-020	ES1802402-021
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		24.3	15.7	14.4	9.9	12.0
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos (Trace)	1332-21-4	5	Fibres		No	No	----	No	No
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		No	No	----	No	No
Asbestos Type	1332-21-4	-	--		-	-	----	-	-
Sample weight (dry)	----	0.01	g		155	158	----	156	223
APPROVED IDENTIFIER:	----	-	--		S.SPOONER	S.SPOONER	----	S.SPOONER	G.MORGAN
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		74	58	63	54	27
Copper	7440-50-8	5	mg/kg		16	17	14	12	8
Lead	7439-92-1	5	mg/kg		28	23	9	19	18
Nickel	7440-02-0	2	mg/kg		15	24	26	15	6
Zinc	7440-66-6	5	mg/kg		36	49	13	37	22
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		0.3	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	1.2	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		1.4	11.4	<0.5	4.3	0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	2.1	<0.5	0.6	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		2.2	16.8	<0.5	6.9	0.9
Pyrene	129-00-0	0.5	mg/kg		1.9	17.0	<0.5	6.5	0.9
Benz(a)anthracene	56-55-3	0.5	mg/kg		0.7	7.6	<0.5	2.3	<0.5
Chrysene	218-01-9	0.5	mg/kg		0.8	7.6	<0.5	2.6	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		0.8	8.0	<0.5	2.9	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	2.3	<0.5	1.1	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		0.8	7.9	<0.5	2.8	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	2.4	<0.5	0.9	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	0.7	<0.5	<0.5	<0.5



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA10_0	HA11_0	HA11_0.5	HA12_0	HA13_0
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-017	ES1802402-018	ES1802402-019	ES1802402-020	ES1802402-021
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg		<0.5	2.7	<0.5	1.1	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		8.6	87.7	<0.5	32.0	2.3
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		1.0	10.7	<0.5	3.6	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		1.3	10.7	0.6	3.8	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.6	10.7	1.2	4.0	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	280	<100	150	<100
C29 - C36 Fraction	----	100	mg/kg		<100	210	<100	110	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	490	<50	260	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	430	<100	200	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	170	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	600	<50	200	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<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	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		73.4	72.0	73.1	73.3	73.6
2-Chlorophenol-D4	93951-73-6	0.5	%		73.7	75.6	73.0	73.2	76.1
2,4,6-Tribromophenol	118-79-6	0.5	%		52.8	57.8	45.7	56.2	49.5



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA10_0	HA11_0	HA11_0.5	HA12_0	HA13_0
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-017	ES1802402-018	ES1802402-019	ES1802402-020	ES1802402-021
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		81.1	83.9	79.2	80.7	83.7
Anthracene-d10	1719-06-8	0.5	%		81.8	82.4	80.3	80.9	85.0
4-Terphenyl-d14	1718-51-0	0.5	%		75.7	77.8	74.8	74.1	78.8
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		93.5	99.3	94.3	97.2	97.3
Toluene-D8	2037-26-5	0.2	%		88.4	91.7	86.0	91.6	94.6
4-Bromofluorobenzene	460-00-4	0.2	%		82.6	84.3	80.7	86.8	87.3



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA14_0	HA14_0.5	HA15_0	HA16_0	HA17_0
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-022	ES1802402-023	ES1802402-024	ES1802402-025	ES1802402-027
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		----	21.9	19.2	16.2	13.6
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos (Trace)	1332-21-4	5	Fibres		No	----	No	No	No
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		No	----	No	No	No
Asbestos Type	1332-21-4	-	--		-	----	-	-	-
Sample weight (dry)	----	0.01	g		182	----	170	184	301
APPROVED IDENTIFIER:	----	-	--		G.MORGAN	----	G.MORGAN	S.SPOONER	S.SPOONER
EG005T: 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		----	76	93	45	44
Copper	7440-50-8	5	mg/kg		----	22	35	21	21
Lead	7439-92-1	5	mg/kg		----	10	10	20	13
Nickel	7440-02-0	2	mg/kg		----	29	55	32	24
Zinc	7440-66-6	5	mg/kg		----	22	58	43	39
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		----	<0.1	<0.1	<0.1	<0.1
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	1.6	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	2.7	0.8
Pyrene	129-00-0	0.5	mg/kg		----	<0.5	<0.5	2.7	0.8
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	<0.5	<0.5	1.1	<0.5
Chrysene	218-01-9	0.5	mg/kg		----	<0.5	<0.5	1.2	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	<0.5	<0.5	1.1	<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	1.3	<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



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA14_0	HA14_0.5	HA15_0	HA16_0	HA17_0
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-022	ES1802402-023	ES1802402-024	ES1802402-025	ES1802402-027
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	<0.5	<0.5	<0.5	11.7	2.1
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	<0.5	<0.5	<0.5	1.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	0.6	0.6	0.6	1.8	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	1.2	1.2	1.2	2.1	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg	----	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	----	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	----	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	----	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	----	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	----	<100	<100	<100	120	<100
>C34 - C40 Fraction	----	100	mg/kg	----	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	<50	<50	<50	120	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg	----	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	<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	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	----	<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%	----	75.8	73.0	74.2	74.2	81.8
2-Chlorophenol-D4	93951-73-6	0.5	%	----	79.3	76.5	77.9	77.9	83.0
2,4,6-Tribromophenol	118-79-6	0.5	%	----	44.6	53.6	60.8	60.8	65.1



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA14_0	HA14_0.5	HA15_0	HA16_0	HA17_0
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-022	ES1802402-023	ES1802402-024	ES1802402-025	ES1802402-027
				Result	Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%	----	86.2	83.9	85.5	79.6	
Anthracene-d10	1719-06-8	0.5	%	----	86.1	83.0	84.6	82.6	
4-Terphenyl-d14	1718-51-0	0.5	%	----	82.3	78.2	79.0	82.8	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	----	90.4	94.3	97.0	88.0	
Toluene-D8	2037-26-5	0.2	%	----	83.0	89.2	94.4	97.6	
4-Bromofluorobenzene	460-00-4	0.2	%	----	81.9	85.4	89.7	91.7	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA18_0	C1	C2	C3	C4
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-028	ES1802402-029	ES1802402-030	ES1802402-031	ES1802402-032
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		9.4	13.8	11.6	31.4	38.1
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos (Trace)	1332-21-4	5	Fibres		No	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		No	----	----	----	----
Asbestos Type	1332-21-4	-	--		-	----	----	----	----
Sample weight (dry)	----	0.01	g		363	----	----	----	----
APPROVED IDENTIFIER:	----	-	--		S.SPOONER	----	----	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		30	----	----	----	----
Copper	7440-50-8	5	mg/kg		15	----	----	----	----
Lead	7439-92-1	5	mg/kg		14	----	----	----	----
Nickel	7440-02-0	2	mg/kg		18	----	----	----	----
Zinc	7440-66-6	5	mg/kg		55	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<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
Dieldrin	60-57-1	0.05	mg/kg		----	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA18_0	C1	C2	C3	C4
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1802402-028	ES1802402-029	ES1802402-030	ES1802402-031	ES1802402-032
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA18_0	C1	C2	C3	C4
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1802402-028	ES1802402-029	ES1802402-030	ES1802402-031	ES1802402-032
				Result	Result	Result	Result	Result

EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued

Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	1.2	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	2.7	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	2.8	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	1.6	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	1.6	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	1.6	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	0.6	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	1.7	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	0.7	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	0.9	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	15.4	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	2.2	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	2.4	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	2.7	----	----	----	----

EP080/071: Total Petroleum Hydrocarbons

C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----

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	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	120	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	120	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA18_0	C1	C2	C3	C4
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802402-028	ES1802402-029	ES1802402-030	ES1802402-031	ES1802402-032
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
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	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	116	89.0	93.0	104
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		----	98.2	94.6	116	91.8
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		----	87.3	86.3	129	82.7
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		81.7	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		83.1	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%		66.2	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		79.9	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		84.6	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		94.1	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		94.6	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		104	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		104	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	QA1	QA2	----	----	----
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1802402-033	ES1802402-035	-----	-----	-----
					Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		15.6	17.2	----	----	----
EG005T: 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		31	62	----	----	----
Copper	7440-50-8	5	mg/kg		12	12	----	----	----
Lead	7439-92-1	5	mg/kg		15	10	----	----	----
Nickel	7440-02-0	2	mg/kg		19	17	----	----	----
Zinc	7440-66-6	5	mg/kg		39	15	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	----	----	----
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	0.6	----	----	----
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		2.3	4.9	----	----	----
Anthracene	120-12-7	0.5	mg/kg		0.6	1.3	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		4.9	6.8	----	----	----
Pyrene	129-00-0	0.5	mg/kg		4.9	6.7	----	----	----
Benzo(a)anthracene	56-55-3	0.5	mg/kg		2.8	3.4	----	----	----
Chrysene	218-01-9	0.5	mg/kg		2.7	3.4	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		2.5	2.9	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		1.0	1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		2.6	3.0	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		1.0	1.1	----	----	----
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		1.3	1.3	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		26.6	36.4	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		3.4	3.9	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		3.6	4.1	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		3.9	4.4	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	QA1	QA2	----	----	----
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1802402-033	ES1802402-035	-----	-----	-----
					Result	Result	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
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		110	150	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		110	150	----	----	----
^ >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	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		79.0	82.2	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		81.3	84.6	----	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%		64.2	65.8	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		79.8	83.1	----	----	----
Anthracene-d10	1719-06-8	0.5	%		84.1	86.1	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		96.7	98.2	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		97.9	93.0	----	----	----
Toluene-D8	2037-26-5	0.2	%		100	99.3	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	QA1	QA2	----	----	----
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1802402-033	ES1802402-035	-----	-----	-----
					Result	Result	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		102	98.9	----	----	----

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	HA1_0 - 18-Jan-2018 00:00	Mid brown sandy soil with several pieces of degraded asbestos fibre board approx 10 x 10 x 2 mm.
EA200: Description	HA2_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA3_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA4_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA5_0 - 18-Jan-2018 00:00	Mid brown clay soil.
EA200: Description	HA6_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA7_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA8_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA9_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA10_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA11_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA12_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA13_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA14_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA15_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA16_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA17_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA18_0 - 18-Jan-2018 00:00	Mid brown sandy soil.



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

QUALITY CONTROL REPORT

Work Order	: ES1802402	Page	: 1 of 15
Client	: WSP Australia Pty Ltd	Laboratory	: Environmental Division Sydney
Contact	: MS AMY VALENTINE	Contact	: Loren Schiavon
Address	: PO BOX 1162 NEWCASTLE NSW, AUSTRALIA 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8503
Project	: ARMIDALE HIGH SCHOOL	Date Samples Received	: 19-Jan-2018
Order number	: PS107410	Date Analysis Commenced	: 22-Jan-2018
C-O-C number	: ----	Issue Date	: 29-Jan-2018
Sampler	: WENDY CADELAGO		
Site	: ----		
Quote number	: EN/085/15 V8		
No. of samples received	: 38		
No. of samples analysed	: 32		



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>
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

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

Laboratory Duplicate (DUP) Report

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**

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: 1385311)									
ES1802042-007	Anonymous	EA055: Moisture Content	----	1	%	3.9	3.5	10.6	No Limit
ES1802204-012	Anonymous	EA055: Moisture Content	----	1	%	38.7	35.4	8.97	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1385312)									
ES1802402-010	HA6_0.5	EA055: Moisture Content	----	1	%	14.2	14.9	4.96	0% - 50%
ES1802402-024	HA15_0	EA055: Moisture Content	----	1	%	19.2	18.7	2.59	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1385313)									
ES1802402-035	QA2	EA055: Moisture Content	----	1	%	17.2	18.5	6.98	0% - 50%
ES1802527-001	Anonymous	EA055: Moisture Content	----	1	%	5.2	5.1	0.00	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 1389531)									
ES1802402-001	HA1_0	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	36	39	9.38	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	16	18	10.7	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	35	33	5.74	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	40	44	7.32	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	324	342	5.59	0% - 20%
ES1802402-013	HA8_0	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	38	34	12.6	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	26	26	0.00	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	13	12	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	10	11	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	31	31	0.00	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 1389533)									
ES1802402-027	HA17_0	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	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 (%)
EG005T: Total Metals by ICP-AES (QC Lot: 1389533) - continued									
ES1802402-027	HA17_0	EG005T: Chromium	7440-47-3	2	mg/kg	44	47	7.42	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	24	34	35.0	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	21	22	5.21	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	13	15	9.89	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	39	40	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1389532)									
ES1802402-001	HA1_0	EG035T: Mercury	7439-97-6	0.1	mg/kg	1.1	1.3	17.0	0% - 50%
ES1802402-013	HA8_0	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1389534)									
ES1802402-027	HA17_0	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 1382110)									
ES1802401-021	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1382108)									
ES1802401-021	Anonymous	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: 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: 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: 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: 1382108)									
ES1802401-021	Anonymous	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



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: 1382108) - continued											
ES1802401-021	Anonymous	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-methyl	298-00-0	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)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1381891)											
ES1802402-001	HA1_0	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	2.9	2.7	8.47	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	5.3	4.8	8.89	0% - 50%		
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	5.1	4.7	8.24	0% - 50%		
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	1.9	1.9	0.00	No Limit		
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	2.2	2.1	5.28	No Limit		
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	2.7	3.0	7.86	No Limit		
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	1.1	1.2	0.00	No Limit		
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	2.5	2.6	0.00	No Limit		
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	1.3	1.3	0.00	No Limit		
		EP075(SIM): Dibenzo(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	1.7	1.6	0.00	No Limit		
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	26.7	25.9	3.04	0% - 20%		
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	3.2	3.4	4.17	No Limit		
		ES1802402-013	HA8_0	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		



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: 1381891) - continued									
ES1802402-013	HA8_0	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	0.7	0.9	17.5	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	0.8	0.9	16.7	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): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	1.5	1.8	18.2	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1381978)									
ES1802401-001	Anonymous	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): Sum of polycyclic aromatic hydrocarbons	----	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
ES1802401-025	Anonymous	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

EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1381352)



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 (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1381352) - continued									
ES1802402-001	HA1_0	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1802402-013	HA8_0	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1381359)									
ES1802401-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1802401-025	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1381892)									
ES1802402-001	HA1_0	EP071: >C16 - C34 Fraction	----	100	mg/kg	130	130	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
ES1802402-013	HA8_0	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: 1381980)									
ES1802401-001	Anonymous	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
ES1802401-025	Anonymous	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: BTEXN (QC Lot: 1381352)									
ES1802402-001	HA1_0	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
ES1802402-013	HA8_0	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
		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
EP080: BTEXN (QC Lot: 1381359)									
ES1802401-001	Anonymous	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 : ES1802402
 Client : WSP Australia Pty Ltd
 Project : ARMIDALE HIGH SCHOOL



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: 1381359) - continued									
ES1802401-001	Anonymous	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
ES1802401-025	Anonymous	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



Method Blank (MB) and Laboratory Control Spike (LCS) Report

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**

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				
EG005T: Total Metals by ICP-AES (QCLot: 1389531)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	93.9	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	94.6	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	83.6	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	104	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	93.5	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	94.3	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	93.9	80	122
EG005T: Total Metals by ICP-AES (QCLot: 1389533)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	90.7	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	95.9	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	87.1	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	103	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	94.7	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	99.0	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	97.4	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1389532)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	84.4	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1389534)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	77.4	70	105
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1382110)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	88.0	62	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 1382108)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	76.2	69	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	91.6	65	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	74.3	67	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	80.1	68	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	76.7	65	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.1	67	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.0	69	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	82.0	62	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	76.7	63	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	105	66	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	79.3	64	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	89.8	66	116



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				
EP068A: Organochlorine Pesticides (OC) (QCLot: 1382108) - continued								
EP068: 4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.4	67	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.2	67	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	99.5	69	115
EP068: 4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.4	69	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	80.3	56	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.8	62	124
EP068: 4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	80.1	66	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	73.4	64	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	63.2	54	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1382108)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	85.5	59	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	94.0	62	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	93.0	54	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	82.3	67	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	86.7	70	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	97.6	72	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	94.6	68	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	82.0	68	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.4	69	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.6	76	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	85.8	64	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	83.9	70	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.7	69	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	86.4	66	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	104	68	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	89.1	62	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	105	68	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	86.6	65	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	72.5	41	123
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1381891)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	117	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	113	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	117	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	116	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	118	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	121	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	118	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	119	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	107	69	123



Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1381891) - continued								
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	114	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	107	68	116
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	110	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	112	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	94.3	61	121
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	97.0	62	118
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	89.1	63	121
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1381978)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	91.6	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	84.9	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	92.1	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	90.1	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	95.8	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	97.4	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	93.1	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	94.0	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	90.7	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	98.3	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	90.5	68	116
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	97.3	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	88.3	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	86.3	61	121
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	84.1	62	118
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	86.8	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381352)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	79.7	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381359)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	96.4	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381892)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	105	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	102	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	105	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381980)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	108	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	109	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	100	71	129



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				
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381352)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	78.8	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381359)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	94.5	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381892)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	98.9	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	104	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	97.3	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381980)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	110	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	103	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	93.7	63	131
EP080: BTEXN (QCLot: 1381352)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	97.9	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	96.4	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	92.0	65	117
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	93.5	66	118
	106-42-3							
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	93.3	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	103	63	119
EP080: BTEXN (QCLot: 1381359)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	93.9	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	98.4	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	96.3	65	117
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	103	66	118
	106-42-3							
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	99.6	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	97.5	63	119

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(%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1389531)							
ES1802402-001	HA1_0	EG005T: Arsenic	7440-38-2	50 mg/kg	100	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	98.8	70	130

Matrix Spike (MS) Report

<i>Spike</i>	<i>SpikeRecovery(%)</i>	<i>Recovery Limits (%)</i>	
<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>



Sub-Matrix: **SOIL**

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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1381978) - continued							
ES1802401-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	87.5	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	91.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381352)							
ES1802402-001	HA1_0	EP080: C6 - C9 Fraction	----	32.5 mg/kg	71.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381359)							
ES1802401-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	74.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381892)							
ES1802402-001	HA1_0	EP071: C10 - C14 Fraction	----	523 mg/kg	87.7	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	109	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	126	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381980)							
ES1802401-001	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	80.5	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	109	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	124	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381352)							
ES1802402-001	HA1_0	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	70.3	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381359)							
ES1802401-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	73.2	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381892)							
ES1802402-001	HA1_0	EP071: >C10 - C16 Fraction	----	860 mg/kg	92.2	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	122	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	117	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381980)							
ES1802401-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	87.8	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	122	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	115	52	132
EP080: BTEXN (QCLot: 1381352)							
ES1802402-001	HA1_0	EP080: Benzene	71-43-2	2.5 mg/kg	84.7	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	82.2	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	81.7	70	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	81.0	70	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	84.2	70	130
	EP080: Naphthalene	91-20-3	2.5 mg/kg	83.1	70	130	
EP080: BTEXN (QCLot: 1381359)							
ES1802401-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	72.7	70	130



Sub-Matrix: SOIL

Laboratory sample IDClient sample IDMethod: CompoundCAS Number				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EP080: BTEXN (QCLot: 1381359) - continued							
ES1802401-001	Anonymous	EP080: Toluene	108-88-3	2.5 mg/kg	75.2	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	78.2	70	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	79.3	70	130
		106-42-3					
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	82.9	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	84.2	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1802402	Page	: 1 of 9
Client	: WSP Australia Pty Ltd	Laboratory	: Environmental Division Sydney
Contact	: MS AMY VALENTINE	Telephone	: +61 2 8784 8503
Project	: ARMIDALE HIGH SCHOOL	Date Samples Received	: 19-Jan-2018
Site	: ----	Issue Date	: 29-Jan-2018
Sampler	: WENDY CADELAGO	No. of samples received	: 38
Order number	: PS107410	No. of samples analysed	: 32

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.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.

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.

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.

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	
EA055: Moisture Content (Dried @ 105-110°C)								
Soil Glass Jar - Unpreserved (EA055)	18-Jan-2018	----	----	----	23-Jan-2018	01-Feb-2018	✓	
HA1_0,								HA1_0.5,
HA2_0,								HA3_0.5,
HA4_0,								HA5_0,
HA5_0.5,								HA6_0.5,
HA7_0,								HA7_0.7,
HA8_0,								HA9_0.5,
HA10_0,								HA11_0,
HA11_0.5,								HA12_0,
HA13_0,								HA14_0.5,
HA15_0,								HA16_0,
HA17_0,								HA18_0,
C1,								C2,
C3,								C4,
QA1,								QA2
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Snap Lock Bag: Separate bag received (EA200)	18-Jan-2018	----	----	----	23-Jan-2018	17-Jul-2018	✓	
HA1_0,								HA2_0,
HA3_0,								HA4_0,
HA5_0,								HA6_0,
HA7_0,								HA8_0,
HA9_0,								HA10_0,
HA11_0,								HA12_0,
HA13_0,								HA14_0,
HA15_0,								HA16_0,
HA17_0,								HA18_0,

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
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag: Separate bag received (EA200)							
HA1_0, HA2_0, HA3_0, HA4_0, HA5_0, HA6_0, HA7_0, HA8_0, HA9_0, HA10_0, HA11_0, HA12_0, HA13_0, HA14_0, HA15_0, HA16_0, HA17_0, HA18_0	18-Jan-2018	----	----	----	23-Jan-2018	17-Jul-2018	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
HA1_0, HA2_0, HA4_0, HA5_0.5, HA7_0, HA8_0, HA10_0, HA11_0.5, HA13_0, HA15_0, HA17_0, QA1, HA1_0.5, HA3_0.5, HA5_0, HA6_0.5, HA7_0.7, HA9_0.5, HA11_0, HA12_0, HA14_0.5, HA16_0, HA18_0, QA2	18-Jan-2018	24-Jan-2018	17-Jul-2018	✓	24-Jan-2018	17-Jul-2018	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
HA1_0, HA2_0, HA4_0, HA5_0.5, HA7_0, HA8_0, HA10_0, HA11_0.5, HA13_0, HA15_0, HA17_0, QA1, HA1_0.5, HA3_0.5, HA5_0, HA6_0.5, HA7_0.7, HA9_0.5, HA11_0, HA12_0, HA14_0.5, HA16_0, HA18_0, QA2	18-Jan-2018	24-Jan-2018	15-Feb-2018	✓	25-Jan-2018	15-Feb-2018	✓



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) C1, C2, C3, C4		18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	24-Jan-2018	04-Mar-2018	✓
EP068A: Organochlorine Pesticides (OC)								
Soil Glass Jar - Unpreserved (EP068) C1, C2, C3, C4		18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	24-Jan-2018	04-Mar-2018	✓
EP068B: Organophosphorus Pesticides (OP)								
Soil Glass Jar - Unpreserved (EP068) C1, C2, C3, C4		18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	24-Jan-2018	04-Mar-2018	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM)) HA1_0, HA1_0.5, HA2_0, HA3_0.5, HA4_0, HA5_0, HA5_0.5, HA6_0.5, HA7_0, HA7_0.7, HA8_0, HA9_0.5, HA10_0, HA11_0, HA11_0.5, HA12_0, HA13_0, HA14_0.5, HA15_0, HA16_0		18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	23-Jan-2018	04-Mar-2018	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) HA17_0, HA18_0, QA1, QA2		18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	25-Jan-2018	04-Mar-2018	✓

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 Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080)		18-Jan-2018	22-Jan-2018	01-Feb-2018	✓	23-Jan-2018	01-Feb-2018	✓
HA1_0,	HA1_0.5,							
HA2_0,	HA3_0.5,							
HA4_0,	HA5_0,							
HA5_0.5,	HA6_0.5,							
HA7_0,	HA7_0.7,							
HA8_0,	HA9_0.5,							
HA10_0,	HA11_0,							
HA11_0.5,	HA12_0,							
HA13_0,	HA14_0.5,							
HA15_0,	HA16_0,							
HA17_0,	HA18_0,							
QA1,	QA2							
Soil Glass Jar - Unpreserved (EP071)								
HA1_0,	HA1_0.5,							
HA2_0,	HA3_0.5,							
HA4_0,	HA5_0,							
HA5_0.5,	HA6_0.5,							
HA7_0,	HA7_0.7,							
HA8_0,	HA9_0.5,							
HA10_0,	HA11_0,							
HA11_0.5,	HA12_0,							
HA13_0,	HA14_0.5,							
HA15_0,	HA16_0							
Soil Glass Jar - Unpreserved (EP071)		18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	25-Jan-2018	04-Mar-2018	✓
HA17_0,	HA18_0,							
QA1,	QA2							

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)		18-Jan-2018	22-Jan-2018	01-Feb-2018	✓	23-Jan-2018	01-Feb-2018	✓							
HA1_0,	HA1_0.5,														
HA2_0,	HA3_0.5,														
HA4_0,	HA5_0,														
HA5_0.5,	HA6_0.5,														
HA7_0,	HA7_0.7,														
HA8_0,	HA9_0.5,														
HA10_0,	HA11_0,														
HA11_0.5,	HA12_0,														
HA13_0,	HA14_0.5,														
HA15_0,	HA16_0,														
HA17_0,	HA18_0,														
QA1,	QA2														
Soil Glass Jar - Unpreserved (EP071)									18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	24-Jan-2018	04-Mar-2018	✓
HA1_0,	HA1_0.5,														
HA2_0,	HA3_0.5,														
HA4_0,	HA5_0,														
HA5_0.5,	HA6_0.5,														
HA7_0,	HA7_0.7,														
HA8_0,	HA9_0.5,														
HA10_0,	HA11_0,														
HA11_0.5,	HA12_0,														
HA13_0,	HA14_0.5,														
HA15_0,	HA16_0														
Soil Glass Jar - Unpreserved (EP071)		18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	25-Jan-2018	04-Mar-2018	✓							
HA17_0,	HA18_0,														
QA1,	QA2														
EP080: BTEXN															
Soil Glass Jar - Unpreserved (EP080)		18-Jan-2018	22-Jan-2018	01-Feb-2018	✓	23-Jan-2018	01-Feb-2018	✓							
HA1_0,	HA1_0.5,														
HA2_0,	HA3_0.5,														
HA4_0,	HA5_0,														
HA5_0.5,	HA6_0.5,														
HA7_0,	HA7_0.7,														
HA8_0,	HA9_0.5,														
HA10_0,	HA11_0,														
HA11_0.5,	HA12_0,														
HA13_0,	HA14_0.5,														
HA15_0,	HA16_0,														
HA17_0,	HA18_0,														
QA1,	QA2														



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)							
Moisture Content	EA055	6	60	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	24	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	24	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	38	5.26	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
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 7.1 and Table 1 (14 day holding time).
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
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)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D 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 - 8270D 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 - 8270D. 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 - 8260B. 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
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)
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.

Page : 9 of 9
Work Order : ES1802402
Client : WSP Australia Pty Ltd
Project : ARMIDALE HIGH SCHOOL



Preparation Methods	Method	Matrix	Method Descriptions
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.



CHAIN OF CUSTODY

Environmental

ALS Laboratory:
please tick →

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Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road, Springvale VIC 3171
Ph: 03 8549 9800 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road, Mudgee NSW 2850
Ph: 02 6372 8235 E: mudgee@mail@alsglobal.com

NEWCASTLE 5/5/05 Maitland Rd, Mayfield West NSW 2305
Ph: 02 4914 2500 E: samples.newcastle@alsglobal.com Ph: 02 8734 3535 E: samples.sydney@alsglobal.com

PERTH 4/13 Geary Place, North Perth NSW 2541 Ph: 02 4233 3125 E: perth@alsglobal.com
TOWNSVILLE 14-15 Desma Court, Bohle QLD 4818 Ph: 07 4799 0500 E: townsville@alsglobal.com

PERTH 13 Rod Way, Malaga WA 6060 Ph: 08 9200 7950 E: samples.perth@alsglobal.com Ph: 02 4233 3125 E: perth@alsglobal.com
WOLLONGONG 69 Kenny Street, Wollongong NSW 2500 Ph: 02 4233 3125 E: perth@alsglobal.com

CLIENT: WSP		TURNAROUND REQUIREMENTS: ☒ Standard TAT (List due date): (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		FOR LABORATORY USE ONLY (Circle): Custody Seal intact? Yes No N/A Seal not intact (ice bricks present upon receipt)? Yes No N/A Random Sample Temperature on Receipt: 19.0 °C Other comment:	
OFFICE: LEVEL 3, 55 Bolton Street, Newcastle, NSW 2300		ALS QUOTE NO.: EN-085-15 V7		COC SEQUENCE NUMBER (Circle): COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	
PROJECT: Armidale High School					
ORDER NUMBER: PS107410					
PROJECT MANAGER: Amy Valentine		CONTACT PH: +61292725139			
SAMPLER: Wendy Cadelago		SAMPLER MOBILE: 0421256834		RELINQUISHED BY: <i>Wendy Cadelago</i>	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		RECEIVED BY: <i>[Signature]</i>	
Email Reports to (will default to PM if no other addresses are listed): amy.valentine@wsp.com		DATE/TIME: 19/1/18		DATE/TIME: 19/1/18 16:50	
Email Invoice to (will default to PM if no other addresses are listed): AP Invoices		DATE/TIME: 19/1/18 17:00		DATE/TIME: 19/1/18 7:30	
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:					

ALS USE		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 bottle required) or Dissolved (field filtered bottle required).							Additional Information			
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below	(refer to)	TOTAL CONTAINERS	W4 (TRIM/TEXTN)	PAHs & metals	PCBs, OPPs & OCPs	asbestos					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	
1	HA1_0	18/01/2018	S	Asbestos / Newcastle Organised By / Date: Relinquished By / Date: Consolidate / Carrier: W4 No: Attach By PO / Internal Code:			X	X		X						
2	HA1_0.5	18/01/2018	S				X	X								
3	HA2_0	18/01/2018	S				X	X			X					
4	HA3_0	18/01/2018	S								X					
5	HA3_0.5	18/01/2018	S					X	X							
6	HA4_0	18/01/2018	S					X	X		X					
7	HA5_0	18/01/2018	S					X	X		X					
8	HA5_0.5	18/01/2018	S					X	X							
9	HA6_0	18/01/2018	S								X					
10	HA6_0.5	18/01/2018	S					X	X							
11	HA7_0	18/01/2018	S					X	X		X					
12	HA7_0.7	18/01/2018	S					X	X							
TOTAL																

Environmental Division
Sydney
Work Order Reference
ES1802402



Telephone : + 61-2-8784 8556

E-MAILED

Environmental Division
Sydney
Work Order Reference
ES1802402



Telephone : +61-2-8784 8555

E-MAILED

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial 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 Soils; B = Unpreserved Bag.



CHAIN OF CUSTODY

ALS Laboratory
please tick →

ADELAIDE 21 Burma Road Peoria SA 5095
Ph: 08 8359 0800 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053
Ph: 07 3243 7222 E: brisbane@alsglobal.com
GLADSTONE 40 Callamondah Drive Clinton QLD 4680
Ph: 07 7471 6000 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740
Ph: 07 4844 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8546 9800 E: melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850
Ph: 02 6372 6736 E: mudgee@alsglobal.com

NEWCASTLE 5/595 Maitland Rd Maitland NSW 2304
Ph: 02 4914 2500 E: samples.newcastle@alsglobal.com
NOWRA 4/10 Geary Place North Nowra NSW 2541
Ph: 02 4428 2063 E: nowra@alsglobal.com
PERTH 10 Hind Way Malaga WA 6009
Ph: 08 9209 7656 E: samples.perth@alsglobal.com
SYDNEY 277-286 Woodpark Road Smithfield NSW 2164
Ph: 02 8784 8658 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-16 Deema Court Bohle QLD 4818
Ph: 07 4796 0500 E: townsville@alsglobal.com
WOLLONGONG 98 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: WSP	TURNAROUND REQUIREMENTS: ☒ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: LEVEL 3, 55 Bolton Street, Newcastle, NSW 2300	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No	
PROJECT: Armidale High School	ALS QUOTE NO.: EN-085-15 V7	Freeze/Freeze Ice Bricks Present upon Receipt? Yes No N/A	
ORDER NUMBER: PS107410		Random Sample Temperature on Receipt: 19.00	
PROJECT MANAGER: Amy Valentine	CONTACT PH: +61292725139	Other Comment:	
SAMPLER: Wendy Cadelago	SAMPLER MOBILE: 0421256834	RELINQUISHED BY: <i>W Cadelago</i>	RECEIVED BY: <i>[Signature]</i>
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 19/1/18	DATE/TIME: 19/1/18 16:50
Email Reports to (will default to PM if no other addresses are listed): amy.valentine@wsp.com			DATE/TIME: 19/1/18 17:00
Email Invoice to (will default to PM if no other addresses are listed): AP Invoices			DATE/TIME: 19/1/18 7:30

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	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 bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below	(refer to)	TOTAL CONTAINERS	W4 (TRIBTEXN)	PAHs & metals	PCBs, OPPs & OCPs	asbestos				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
13	HA8_0	18/01/2018	S				X	X		X				
14	HA8_0.5	18/01/2018	S											
15	HA9_0	18/01/2018	S							X				
16	HA9_0.5	18/01/2018	S				X	X						
17	HA10_0	18/01/2018	S				X	X		X				
18	HA11_0	18/01/2018	S				X	X		X				
19	HA11_0.5	18/01/2018	S				X	X						
20	HA12_0	18/01/2018	S				X	X		X				
21	HA13_0	18/01/2018	S				X	X		X				
22	HA14_0	18/01/2018	S							X				
23	HA14_0.5	18/01/2018	S				X	X						
24	HA15_0	18/01/2018	S				X	X		X				
TOTAL														

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial 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 →

ADLAIDE 21 Burke Road Pooraka SA 5095
Ph: 08 8350 0800 E: adelaide@alsglobal.com
BRISBANE 32 Strand Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 48 Callomandah Drive Clifton QLD 4680
Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 18 Harbour Road Mackay QLD 4740
Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MURDOCH 27 Sydney Road Modjes NSW 2850
Ph: 02 5372 0735 E: murdoch@alsglobal.com

NEWCASTLE 5/555 Maitland Rd Mayfield West NSW 2304
Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164
Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 4/13 Geary Place North Nowra NSW 2541
Ph: 02 4423 2053 E: nowra@alsglobal.com
TOWNSVILLE 14-15 Desma Court Baffle QLD 4818
Ph: 07 4798 0600 E: townsville.environment@alsglobal.com
PERTH 10 Hop Way Maida WA 6000
Ph: 08 9209 7855 E: samples.perth@alsglobal.com
WOLLONGONG 59 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: portkemps@alsglobal.com

CLIENT: WSP	TURNAROUND REQUIREMENTS: ☒ Standard TAT (List due date): (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)		☐ Non Standard or urgent TAT (List due date):		FOR LABORATORY USE ONLY: (Circle)	
OFFICE: LEVEL 3, 55 Bolton Street, Newcastle, NSW 2300	ALS QUOTE NO.: EN-085-15 V7		COC SEQUENCE NUMBER (Circle)		Custody Seal intact? Yes No N/A	
PROJECT: Armidale High School			COC: 1 2 3 4 5 6 7		Free ice / Bozen ice bricks present upon receipt? Yes No N/A	
ORDER NUMBER: PS107410			DP: 1 2 3 4 5 6 7		Random Sample Temperature on Receipt: 19.0 °C	
PROJECT MANAGER: Amy Valentine	CONTACT PH: +61292725139		RELINQUISHED BY: Wendy Cadalago		RECEIVED BY: [Signature]	
SAMPLER: Wendy Cadalago	SAMPLER MOBILE: 0421256834		DATE/TIME: 19/1/18		DATE/TIME: 19/1/18 16:50	
COC emailed to ALS? (YES / NO)	EDO FORMAT (or default):		RELINQUISHED BY: [Signature]		RECEIVED BY: [Signature]	
Email Reports to (will default to PM if no other addresses are listed): amy.valentine@wsp.com			DATE/TIME: 19/1/18 17:00		DATE/TIME:	
Email Invoice to (will default to PM if no other addresses are listed): AP Invoices						

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	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 bottle required) or Dissolved (field filtered bottle required).						Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below	(refer to)	TOTAL CONTAINERS	W4 (TRH/BTEX)	PAHs & metals	PCBs, OPPs & OCPs	asbestos			Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
25	HA16_0	18/01/2018	S				X	X		X			
26	HA16_0.5	18/01/2018	S										
27	HA17_0	18/01/2018	S				X	X		X			
28	HA18_0	18/01/2018	S				X	X		X			
29	C1	18/01/2018	S						X				
30	C2	18/01/2018	S						X				
31	C3	18/01/2018	S						X				
32	C4	18/01/2018	S						X				
33	QA1	18/01/2018	S				X	X					
34	QA1A	18/01/2018	S										
35	QA2	18/01/2018	S				X	X					
36	QA2A	18/01/2018	S										

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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 Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Stimp Bottle; ASB = Plastic Bag for Acid Sulphate Solts; B = Unpreserved Bag.

37 RB

18/01/18 ETR

TAX INVOICE: L614430

WSP Australia Pty Ltd
 MS AMY VALENTINE
 PO BOX 1162
 NEWCASTLE
 NSW, AUSTRALIA 2300

Page : 1 of 1

Work Order	Project / Overall Description	Site	Order number	C-O-C number	Contact
ES1802402	ARMIDALE HIGH SCHOOL / ----	----	PS107410	----	MS AMY VALENTINE

Issue Date	: 29-Jan-2018	Taxable value	: AUD\$ 2,624.00
		Tax Incurred (GST)	: AUD\$ 262.40
Due Date	: 28-Feb-2018	Amount Payable	: AUD\$ 2,886.40

Work Order Breakdown

Method	Sale Item Descriptions	Quantity	Unit Value (AUD\$)	Value (AUD\$)	GST (AUD\$)	Line Total (AUD\$)
Work Order: ES1802402		Quote number: EN/085/15 V8		Submatrix summary: 37 SOILS, 1 WATER		
*Misc	Workorder Admin Fee	1.00	40.00	40.00	4.00	44.00
EA200	Asbestos Identification in Soils - Presence/Absence	18.00	28.00	504.00	50.40	554.40
S-13	OC/OP/PCB	4.00	70.00	280.00	28.00	308.00
S-26	8 metals/TRH/BTEXN/PAH	24.00	75.00	1,800.00	180.00	1,980.00

* denotes non-discountable item

• **Please direct all queries to Environmental Division Sydney on +61-2-8784 8555.**

REMITTANCE ADVICE

POST TO: Australian Laboratory Services Pty Ltd
 P.O. Box 66 Everton Park
 QLD 4053 Australia

EMAIL TO: remittances@alsglobal.com

Vendor bank details

Bank: **Commonwealth Bank**
 BSB: **064 000**
 Account: **12672843**
 Swift Code: **CTBAAU2S**

or

Cheque

Payable to Australian Laboratory Services Pty Ltd

or **Credit Card**

Visa

Mastercard

Amount Payable

AUD\$ 2,886.40

ALS Client Reference

PARBRINSW

TAX INVOICE

L614430



Environmental

CERTIFICATE OF ANALYSIS

Work Order : **ES1802401**
Client : **WSP Australia Pty Ltd**
Contact : **MS AMY VALENTINE**
Address : **PO BOX 1162**
NEWCASTLE NSW, AUSTRALIA 2300
Telephone : **----**
Project : **DUVAL HIGH SCHOOL**
Order number : **PS107410**
C-O-C number : **----**
Sampler : **WENDY CADELAGO**
Site : **----**
Quote number : **EN/085/17**
No. of samples received : **29**
No. of samples analysed : **18**

Page : 1 of 14
Laboratory : Environmental Division Sydney
Contact : Brenda Hong
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : (02) 8784 8504
Date Samples Received : 19-Jan-2018 16:46
Date Analysis Commenced : 22-Jan-2018
Issue Date : 29-Jan-2018 15:56



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>
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- EP071: Results of sample HA5_0 have been confirmed by re-extraction and re-analysis.
- EP080: The trip spike and its control have been analysed for volatile TPH and BTEX only. The trip spike and control were prepared in the lab using reagent grade sand spiked with petrol. The spike was dispatched from the lab and the control retained.
- 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: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) 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.
- 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
- 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	HA1_0	HA2_0	HA3_0	HA4_0	HA5_0
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802401-001	ES1802401-003	ES1802401-005	ES1802401-007	ES1802401-009
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		39.6	13.3	25.2	14.8	35.7
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos (Trace)	1332-21-4	5	Fibres		No	No	No	No	No
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		No	No	No	No	No
Asbestos Type	1332-21-4	-	--		-	-	-	-	-
Sample weight (dry)	----	0.01	g		102	121	83.3	48.3	113
APPROVED IDENTIFIER:	----	-	--		S.SPOONER	S.SPOONER	S.SPOONER	G.MORGAN	G.MORGAN
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		62	39	51	78	26
Copper	7440-50-8	5	mg/kg		44	19	26	40	16
Lead	7439-92-1	5	mg/kg		5	27	10	8	<5
Nickel	7440-02-0	2	mg/kg		83	31	52	79	34
Zinc	7440-66-6	5	mg/kg		63	45	79	51	68
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<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	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<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	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<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	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<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	<0.5



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA1_0	HA2_0	HA3_0	HA4_0	HA5_0
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1802401-001	ES1802401-003	ES1802401-005	ES1802401-007	ES1802401-009
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<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	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<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	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	70
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	130
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	200
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	60
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	190
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	250
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	60
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<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	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	86.3	84.1	85.4	82.7	85.3
2-Chlorophenol-D4	93951-73-6	0.5	%	87.8	84.5	85.0	83.3	85.4
2,4,6-Tribromophenol	118-79-6	0.5	%	68.4	70.5	72.0	68.5	73.2



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA1_0	HA2_0	HA3_0	HA4_0	HA5_0
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802401-001	ES1802401-003	ES1802401-005	ES1802401-007	ES1802401-009
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		85.2	81.2	81.3	80.2	81.0
Anthracene-d10	1719-06-8	0.5	%		90.5	87.2	87.1	86.3	88.5
4-Terphenyl-d14	1718-51-0	0.5	%		88.3	84.8	84.5	83.9	85.2
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		81.4	109	86.3	104	93.6
Toluene-D8	2037-26-5	0.2	%		78.5	106	85.6	96.7	91.4
4-Bromofluorobenzene	460-00-4	0.2	%		75.4	101	79.7	97.2	91.4



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA6_0	HA7_0	HA8_0	HA9_0	HA10_0
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802401-011	ES1802401-013	ES1802401-015	ES1802401-017	ES1802401-019
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		33.6	7.5	29.5	39.2	16.5
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos (Trace)	1332-21-4	5	Fibres		No	No	No	No	No
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		No	No	No	No	No
Asbestos Type	1332-21-4	-	--		-	-	-	-	-
Sample weight (dry)	----	0.01	g		87.7	56.9	70.2	64.7	73.8
APPROVED IDENTIFIER:	----	-	--		G.MORGAN	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		5	7	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		20	31	111	46	85
Copper	7440-50-8	5	mg/kg		9	18	55	23	50
Lead	7439-92-1	5	mg/kg		6	6	7	6	14
Nickel	7440-02-0	2	mg/kg		12	34	86	36	77
Zinc	7440-66-6	5	mg/kg		23	30	52	60	56
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<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	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<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	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<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	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<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	<0.5



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA6_0	HA7_0	HA8_0	HA9_0	HA10_0
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1802401-011	ES1802401-013	ES1802401-015	ES1802401-017	ES1802401-019
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<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	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<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	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<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	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	82.7	86.2	85.3	82.8	82.9
2-Chlorophenol-D4	93951-73-6	0.5	%	83.9	86.1	86.2	83.6	83.8
2,4,6-Tribromophenol	118-79-6	0.5	%	65.6	73.4	70.2	66.5	67.4



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	HA6_0	HA7_0	HA8_0	HA9_0	HA10_0
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802401-011	ES1802401-013	ES1802401-015	ES1802401-017	ES1802401-019
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		80.3	82.8	81.8	79.6	80.9
Anthracene-d10	1719-06-8	0.5	%		84.9	87.4	87.7	86.4	86.1
4-Terphenyl-d14	1718-51-0	0.5	%		83.2	86.1	85.5	84.5	84.5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		96.7	85.2	86.7	77.2	88.4
Toluene-D8	2037-26-5	0.2	%		92.3	91.6	75.0	81.6	107
4-Bromofluorobenzene	460-00-4	0.2	%		88.2	103	91.3	90.6	111



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				C_D1	C_D2	C_D3	C_D4	QA3
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1802401-021	ES1802401-022	ES1802401-023	ES1802401-024	ES1802401-025
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	14.9	13.8	7.4	18.5	29.2
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	----	----	----	<5
Cadmium	7440-43-9	1	mg/kg	----	----	----	----	<1
Chromium	7440-47-3	2	mg/kg	----	----	----	----	50
Copper	7440-50-8	5	mg/kg	----	----	----	----	26
Lead	7439-92-1	5	mg/kg	----	----	----	----	10
Nickel	7440-02-0	2	mg/kg	----	----	----	----	52
Zinc	7440-66-6	5	mg/kg	----	----	----	----	84
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	<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	----
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	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				C_D1	C_D2	C_D3	C_D4	QA3
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1802401-021	ES1802401-022	ES1802401-023	ES1802401-024	ES1802401-025
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	<0.5



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				C_D1	C_D2	C_D3	C_D4	QA3
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1802401-021	ES1802401-022	ES1802401-023	ES1802401-024	ES1802401-025
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	----	<10
C10 - C14 Fraction	----	50	mg/kg	----	----	----	----	<50
C15 - C28 Fraction	----	100	mg/kg	----	----	----	----	<100
C29 - C36 Fraction	----	100	mg/kg	----	----	----	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	----	<50
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
>C10 - C16 Fraction	----	50	mg/kg	----	----	----	----	<50
>C16 - C34 Fraction	----	100	mg/kg	----	----	----	----	<100
>C34 - C40 Fraction	----	100	mg/kg	----	----	----	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	----	----	----	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	----	----	<50
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



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	C_D1	C_D2	C_D3	C_D4	QA3
Client sampling date / time					18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		ES1802401-021	ES1802401-022	ES1802401-023	ES1802401-024	ES1802401-025
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ 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
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		83.0	84.0	78.0	124	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		92.8	85.0	79.9	103	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		93.0	80.9	84.0	82.7	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	----	----	85.2
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	----	86.1
2,4,6-Tribromophenol	118-79-6	0.5	%		----	----	----	----	67.2
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	----	82.0
Anthracene-d10	1719-06-8	0.5	%		----	----	----	----	88.1
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	----	85.9
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	----	----	82.7
Toluene-D8	2037-26-5	0.2	%		----	----	----	----	87.6
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	----	----	96.8



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TSPK	BLANK	TSC	----	----
Client sampling date / time					16-Jan-2018 00:00	16-Jan-2018 00:00	16-Jan-2018 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1802401-028	ES1802401-029	ES1802401-030	-----	-----
					Result	Result	Result	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		31	<10	44	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		38	<10	52	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		18	<10	28	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	0.3	----	----
Toluene	108-88-3	0.5	mg/kg		8.6	<0.5	11.3	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		1.4	<0.5	1.6	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		7.6	<0.5	8.4	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		3.0	<0.5	3.4	----	----
^ Sum of BTEX	----	0.2	mg/kg		20.6	<0.2	25.0	----	----
^ Total Xylenes	----	0.5	mg/kg		10.6	<0.5	11.8	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		89.6	80.4	90.1	----	----
Toluene-D8	2037-26-5	0.2	%		92.9	84.6	91.4	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		106	89.2	102	----	----

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	HA1_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA2_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA3_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA4_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA5_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA6_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA7_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA8_0 - 18-Jan-2018 00:00	Mid brown clay soil.
EA200: Description	HA9_0 - 18-Jan-2018 00:00	Mid brown sandy soil.
EA200: Description	HA10_0 - 18-Jan-2018 00:00	Mid brown sandy soil.



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

QUALITY CONTROL REPORT

Work Order	: ES1802401	Page	: 1 of 11
Client	: WSP Australia Pty Ltd	Laboratory	: Environmental Division Sydney
Contact	: MS AMY VALENTINE	Contact	: Brenda Hong
Address	: PO BOX 1162 NEWCASTLE NSW, AUSTRALIA 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: (02) 8784 8504
Project	: DUVAL HIGH SCHOOL	Date Samples Received	: 19-Jan-2018
Order number	: PS107410	Date Analysis Commenced	: 22-Jan-2018
C-O-C number	: ----	Issue Date	: 29-Jan-2018
Sampler	: WENDY CADELAGO		
Site	: ----		
Quote number	: EN/085/17		
No. of samples received	: 29		
No. of samples analysed	: 18		



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>
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

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

Laboratory Duplicate (DUP) Report

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**

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: 1383660)									
ES1802343-001	Anonymous	EA055: Moisture Content	----	1	%	19.4	20.0	3.19	0% - 50%
ES1802401-015	HA8_0	EA055: Moisture Content	----	1	%	29.5	31.2	5.57	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1383661)									
ES1802427-002	Anonymous	EA055: Moisture Content	----	1	%	8.1	8.4	4.10	No Limit
ES1802481-007	Anonymous	EA055: Moisture Content	----	1	%	28.4	27.7	2.39	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 1388921)									
ES1802253-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	19	19	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	15	15	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	8	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	36	23	45.7	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	72	67	7.34	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	120	129	7.90	0% - 20%
ES1802253-011	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	21	20	6.67	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	15	14	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	9	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	23	22	6.56	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	82	70	16.3	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	118	109	7.51	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 1388923)									
ES1802401-005	HA3_0	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	51	55	7.47	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	52	55	5.48	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 (%)
EG005T: Total Metals by ICP-AES (QC Lot: 1388923) - continued									
ES1802401-005	HA3_0	EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	26	27	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	10	11	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	79	86	8.78	0% - 50%
ES1802430-006	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	14	14	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	6	7	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	12	13	14.1	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	8	10	13.8	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	21	23	11.5	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1388922)									
ES1802253-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.2	0.1	0.00	No Limit
ES1802253-011	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1388924)									
ES1802401-005	HA3_0	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1802430-006	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 1382110)									
ES1802401-021	C_D1	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1382108)									
ES1802401-021	C_D1	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: 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: 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



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: 1382108) - continued									
ES1802401-021	C_D1	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: 1382108)									
ES1802401-021	C_D1	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-methyl	298-00-0	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)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1381978)									
ES1802401-001	HA1_0	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



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: 1381978) - continued									
ES1802401-001	HA1_0	EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	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
ES1802401-025	QA3	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): Sum of polycyclic aromatic hydrocarbons	----	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: 1381359)									
ES1802401-001	HA1_0	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1802401-025	QA3	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1381980)									
ES1802401-001	HA1_0	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
ES1802401-025	QA3	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 Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1381359)									
ES1802401-001	HA1_0	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1802401-025	QA3	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1381980)									
ES1802401-001	HA1_0	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

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 Work Order : ES1802401
 Client : WSP Australia Pty Ltd
 Project : DUVAL HIGH SCHOOL



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 (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1381980) - continued									
ES1802401-025	QA3	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: BTEXN (QC Lot: 1381359)									
ES1802401-001	HA1_0	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
ES1802401-025	QA3	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
		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		



Method Blank (MB) and Laboratory Control Spike (LCS) Report

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**

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				
EG005T: Total Metals by ICP-AES (QCLot: 1388921)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	96.6	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	94.9	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	99.9	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	93.9	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	98.4	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	102	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	101	80	122
EG005T: Total Metals by ICP-AES (QCLot: 1388923)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	102	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	101	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	107	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	102	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	105	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	112	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	106	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1388922)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	92.3	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1388924)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	87.3	70	105
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1382110)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	88.0	62	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 1382108)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	76.2	69	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	91.6	65	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	74.3	67	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	80.1	68	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	76.7	65	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.1	67	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.0	69	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	82.0	62	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	76.7	63	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	105	66	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	79.3	64	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	89.8	66	116



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				
EP068A: Organochlorine Pesticides (OC) (QCLot: 1382108) - continued								
EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.4	67	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.2	67	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	99.5	69	115
EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.4	69	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	80.3	56	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.8	62	124
EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	80.1	66	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	73.4	64	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	63.2	54	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1382108)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	85.5	59	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	94.0	62	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	93.0	54	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	82.3	67	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	86.7	70	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	97.6	72	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	94.6	68	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	82.0	68	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.4	69	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.6	76	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	85.8	64	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	83.9	70	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.7	69	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	86.4	66	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	104	68	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	89.1	62	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	105	68	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	86.6	65	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	72.5	41	123
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1381978)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	91.6	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	84.9	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	92.1	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	90.1	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	95.8	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	97.4	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	93.1	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	94.0	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	90.7	69	123



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				
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1381978) - continued								
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	98.3	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	90.5	68	116
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	97.3	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	88.3	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	86.3	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	84.1	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	86.8	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381359)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	96.4	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381980)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	108	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	109	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	100	71	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381359)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	94.5	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381980)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	110	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	103	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	93.7	63	131
EP080: BTEXN (QCLot: 1381359)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	93.9	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	98.4	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	96.3	65	117
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	103	66	118
	106-42-3							
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	99.6	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	97.5	63	119

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	SpikeRecovery(%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1388921)							
ES1802253-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	90.7	70	130



Sub-Matrix: **SOIL**

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
EG005T: Total Metals by ICP-AES (QCLot: 1388921) - continued							
ES1802253-001	Anonymous	EG005T: Cadmium	7440-43-9	50 mg/kg	99.6	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	100	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	94.6	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	92.8	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	99.6	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	93.1	70	130
EG005T: Total Metals by ICP-AES (QCLot: 1388923)							
ES1802401-005	HA3_0	EG005T: Arsenic	7440-38-2	50 mg/kg	85.7	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	99.9	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	102	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	99.4	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	99.0	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	106	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	106	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1388922)							
ES1802253-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	100	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1388924)							
ES1802401-005	HA3_0	EG035T: Mercury	7439-97-6	5 mg/kg	104	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1382110)							
ES1802401-021	C_D1	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	95.0	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1382108)							
ES1802401-021	C_D1	EP068: gamma-BHC	58-89-9	0.5 mg/kg	85.8	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	93.2	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	92.6	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	85.3	70	130
		EP068: Endrin	72-20-8	2 mg/kg	95.2	70	130
		EP068: 4,4'-DDT	50-29-3	2 mg/kg	93.2	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1382108)							
ES1802401-021	C_D1	EP068: Diazinon	333-41-5	0.5 mg/kg	83.3	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	80.0	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	74.8	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	75.9	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	99.9	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1381978)							
ES1802401-001	HA1_0	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	87.5	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	91.4	70	130

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Sub-Matrix: **SOIL**

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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381359)							
ES1802401-001	HA1_0	EP080: C6 - C9 Fraction	----	32.5 mg/kg	74.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1381980)							
ES1802401-001	HA1_0	EP071: C10 - C14 Fraction	----	523 mg/kg	80.5	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	109	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	124	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381359)							
ES1802401-001	HA1_0	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	73.2	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1381980)							
ES1802401-001	HA1_0	EP071: >C10 - C16 Fraction	----	860 mg/kg	87.8	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	122	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	115	52	132
EP080: BTEXN (QCLot: 1381359)							
ES1802401-001	HA1_0	EP080: Benzene	71-43-2	2.5 mg/kg	72.7	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	75.2	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	78.2	70	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	79.3	70	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	82.9	70	130
	EP080: Napthalene	91-20-3	2.5 mg/kg	84.2	70	130	

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1802401	Page	: 1 of 8
Client	: WSP Australia Pty Ltd	Laboratory	: Environmental Division Sydney
Contact	: MS AMY VALENTINE	Telephone	: (02) 8784 8504
Project	: DUVAL HIGH SCHOOL	Date Samples Received	: 19-Jan-2018
Site	: ----	Issue Date	: 29-Jan-2018
Sampler	: WENDY CADELAGO	No. of samples received	: 29
Order number	: PS107410	No. of samples analysed	: 18

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.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.

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.

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.

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
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
HA1_0, HA2_0, HA3_0, HA4_0, HA5_0, HA6_0, HA7_0, HA8_0, HA9_0, HA10_0, C_D1, C_D2, C_D3, C_D4, QA3	18-Jan-2018	----	----	----	22-Jan-2018	01-Feb-2018	✓
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples							
Snap Lock Bag: Separate bag received (EA200)							
HA1_0, HA2_0, HA3_0, HA4_0, HA5_0, HA6_0, HA7_0, HA8_0, HA9_0, HA10_0	18-Jan-2018	----	----	----	23-Jan-2018	17-Jul-2018	✓
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag: Separate bag received (EA200)							
HA1_0, HA2_0, HA3_0, HA4_0, HA5_0, HA6_0, HA7_0, HA8_0, HA9_0, HA10_0	18-Jan-2018	----	----	----	23-Jan-2018	17-Jul-2018	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
HA1_0, HA2_0, HA3_0, HA4_0, HA5_0, HA6_0, HA7_0, HA8_0, HA9_0, HA10_0, QA3	18-Jan-2018	24-Jan-2018	17-Jul-2018	✓	24-Jan-2018	17-Jul-2018	✓

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
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
HA1_0, HA2_0, HA3_0, HA4_0, HA5_0, HA6_0, HA7_0, HA8_0, HA9_0, HA10_0, QA3	18-Jan-2018	24-Jan-2018	15-Feb-2018	✓	25-Jan-2018	15-Feb-2018	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066)							
C_D1, C_D2, C_D3, C_D4	18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	24-Jan-2018	04-Mar-2018	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
C_D1, C_D2, C_D3, C_D4	18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	24-Jan-2018	04-Mar-2018	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
C_D1, C_D2, C_D3, C_D4	18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	24-Jan-2018	04-Mar-2018	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
HA1_0, HA2_0, HA3_0, HA4_0, HA5_0, HA6_0, HA7_0, HA8_0, HA9_0, HA10_0, QA3	18-Jan-2018	23-Jan-2018	01-Feb-2018	✓	25-Jan-2018	04-Mar-2018	✓



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 Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080)								
TSPK, TSC	BLANK,	16-Jan-2018	22-Jan-2018	30-Jan-2018	✔	23-Jan-2018	30-Jan-2018	✔
Soil Glass Jar - Unpreserved (EP080)								
HA1_0, HA3_0, HA5_0, HA7_0, HA9_0, QA3	HA2_0, HA4_0, HA6_0, HA8_0, HA10_0,	18-Jan-2018	22-Jan-2018	01-Feb-2018	✔	23-Jan-2018	01-Feb-2018	✔
Soil Glass Jar - Unpreserved (EP071)								
HA1_0, HA3_0, HA5_0, HA7_0, HA9_0, QA3	HA2_0, HA4_0, HA6_0, HA8_0, HA10_0,	18-Jan-2018	23-Jan-2018	01-Feb-2018	✔	25-Jan-2018	04-Mar-2018	✔
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Soil Glass Jar - Unpreserved (EP080)								
TSPK, TSC	BLANK,	16-Jan-2018	22-Jan-2018	30-Jan-2018	✔	23-Jan-2018	30-Jan-2018	✔
Soil Glass Jar - Unpreserved (EP080)								
HA1_0, HA3_0, HA5_0, HA7_0, HA9_0, QA3	HA2_0, HA4_0, HA6_0, HA8_0, HA10_0,	18-Jan-2018	22-Jan-2018	01-Feb-2018	✔	23-Jan-2018	01-Feb-2018	✔
Soil Glass Jar - Unpreserved (EP071)								
HA1_0, HA3_0, HA5_0, HA7_0, HA9_0, QA3	HA2_0, HA4_0, HA6_0, HA8_0, HA10_0,	18-Jan-2018	23-Jan-2018	01-Feb-2018	✔	25-Jan-2018	04-Mar-2018	✔

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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: BTEXN								
Soil Glass Jar - Unpreserved (EP080)		16-Jan-2018	22-Jan-2018	30-Jan-2018	✔	23-Jan-2018	30-Jan-2018	✔
TSPK,	BLANK,							
TSC								
Soil Glass Jar - Unpreserved (EP080)		18-Jan-2018	22-Jan-2018	01-Feb-2018	✔	23-Jan-2018	01-Feb-2018	✔
HA1_0,	HA2_0,							
HA3_0,	HA4_0,							
HA5_0,	HA6_0,							
HA7_0,	HA8_0,							
HA9_0,	HA10_0,							
QA3								



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)							
Moisture Content	EA055	4	38	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	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
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 7.1 and Table 1 (14 day holding time).
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
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)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D 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 - 8270D 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 - 8270D. 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 - 8260B. 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
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)
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.

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Preparation Methods	Method	Matrix	Method Descriptions
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.



CHAIN OF CUSTODY

ALS Laboratory
please tick →

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WOLLONGONG 99 Kerry Street Wollongong NSW 2500
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CLIENT: WSP	TURNAROUND REQUIREMENTS: ☒ Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)	
OFFICE: LEVEL 3, 55 Bolton Street, Newcastle, NSW 2300	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		Custody Seal Intact? ☒ Yes ☐ No ☐ N/A	
PROJECT: Duval High School	ALS QUOTE NO.: EN-085-15 V7	COC SEQUENCE NUMBER (Circle)		Notes for / broken (see broken present upon receipt) ☒ Yes ☐ No ☐ N/A
ORDER NUMBER: PS107410		COC: 1 2 3 4 5 6 7		Random Sample Temperature on Receipt: 19.0
PROJECT MANAGER: Amy Valentine	CONTACT PH: +61292725139	OF: 1 2 3 4 5 6 7		Other comments:
SAMPLER: Wendy Cadelago	SAMPLER MOBILE: 0421256834	RELINQUISHED BY: <i>W Cadelago</i>	RECEIVED BY: <i>[Signature]</i>	RELINQUISHED BY: <i>[Signature]</i>
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 19/1/18	DATE/TIME: 19/1/18 16:50	DATE/TIME: 19/1/18 17:00
Email Reports to (will default to PM if no other addresses are listed): amy.valentine@wsp.com				DATE/TIME: 19/1/18 7:55
Email Invoice to (will default to PM if no other addresses are listed): AP Invoices				

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	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 bottle required) or Dissolved (field filtered bottle required).							Additional Information			
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below	(refer to)	TOTAL CONTAINERS	W4 (TRI/BTEXN)	PAHs & metals	PCBs, OPPs & OCPS	asbestos					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	
1	HA1_0	18/01/2018	S	ASBESTOS / Newcastle Organic / Date: Relinquished By / Date: Control / Counter: WO No: Attach to CO / Internal Shipment:			X	X		X						
2	HA1_0.5	18/01/2018	S													
3	HA2_0	18/01/2018	S					X	X		X					
4	HA2_0.5	18/01/2018	S													
5	HA3_0	18/01/2018	S					X	X		X					
6	HA3_0.5	18/01/2018	S													
7	HA4_0	18/01/2018	S					X	X		X					
8	HA4_0.5	18/01/2018	S													
9	HA5_0	18/01/2018	S					X	X		X					
10	HA5_0.5	18/01/2018	S													
11	HA6_0	18/01/2018	S					X	X		X					
12	HA6_0.25	18/01/2018	S													
TOTAL																

Environmental Division
Sydney
Work Order Reference
ES1802401



Telephone : + 61-2-8784 8555

E-MAILED

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial 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 Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag

Environmental Division
Sydney
Work Order Reference
ES1802401



Telephone : + 61-2-8784 8555

E-MAILED



CHAIN OF CUSTODY

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please tick →

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Ph: 02 4314 2900 E: samples.newcastle@alsglobal.com

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Ph: 024423 2053 E: nowra@alsglobal.com

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SYDNEY 277-268 Woodpark Road Smithfield NSW 2104

Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Desma Court Bohra QLD 4815

Ph: 07 4736 0800 E: townsville.enquiries@alsglobal.com

WOLLONGONG 96 Kenny Street Wollongong NSW 2500

Ph: 02 4225 3125 E: perth@alsglobal.com

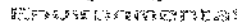
CLIENT: WSP		TURNAROUND REQUIREMENTS: ☒ Standard TAT (List due date): (Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		FOR LABORATORY USE ONLY (Circle)	
OFFICE: LEVEL 3, 55 Bolton Street, Newcastle, NSW 2300		ALS QUOTE NO.: EN-085-15 V7		COC SEQUENCE NUMBER (Circle)	
PROJECT: Duval High School		ORDER NUMBER: PS107410		COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	
PROJECT MANAGER: Amy Valentine		CONTACT PH: +61292725139		RECEIVED BY: <i>[Signature]</i> DATE/TIME: 19/1/18 16:50	
SAMPLER: Wendy Cadalago		SAMPLER MOBILE: 0421256834		RELINQUISHED BY: <i>[Signature]</i> DATE/TIME: 19/1/18 17:00	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		RECEIVED BY:	
Email Reports to (will default to PM if no other addresses are listed): amy.valentine@wsp.com		Email Invoice to (will default to PM if no other addresses are listed): AP Invoices		DATE/TIME:	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	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 bottle required) or Dissolved (field filtered bottle required).								Additional Information	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <i>(codes below)</i>	(refer to)	TOTAL CONTAINERS	W4 (TRH/TEXN)	PAHs & metals	PCBs, OPPs & OCPs	asbestos					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
13	HA7_0	18/01/2018	S				X	X		X					
14	HA7_0.5	18/01/2018	S												
15	HA8_0	18/01/2018	S				X	X		X					
16	HA8_0.5	18/01/2018	S												
17	HA9_0	18/01/2018	S				X	X		X					
18	HA9_0.5	18/01/2018	S												
19	HA10_0	18/01/2018	S				X	X		X					
20	HA10_0.5	18/01/2018	S												
21	C_D1	18/01/2018	S						X						
22	C_D2	18/01/2018	S						X						
23	C_D3	18/01/2018	S						X						
24	C_D4	18/01/2018	S						X						
TOTAL															

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic

V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial 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 Soils; B = Unpreserved Bag.



ALS Laboratory:
please click →

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UPERTH 10 Hind Way Malaga WA 5090

27001.ONGONG 90 Kenny Street WaiSengang NSW 2501

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulfate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial 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.

CERTIFICATE OF ANALYSIS

Work Order	: ES1804634	Page	: 1 of 8
Client	: WSP Australia Pty Ltd	Laboratory	: Environmental Division Sydney
Contact	: MS WENDY CADELAGO	Contact	: Loren Schiavon
Address	: PO BOX 1162 NEWCASTLE NSW, AUSTRALIA 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8503
Project	: Rebatch of ES1802401 and ES1802402	Date Samples Received	: 12-Feb-2018 14:08
Order number	: ----	Date Analysis Commenced	: 13-Feb-2018
C-O-C number	: ----	Issue Date	: 23-Feb-2018 11:15
Sampler	: ----		
Site	: ----		
Quote number	: EN/085/15 V8		
No. of samples received	: 12		
No. of samples analysed	: 12		



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
- 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>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- ED006 (Exchangeable Cations on Alkaline Soils): It is recognised that the Exchangeable Potassium LCS biases low, however this is deemed acceptable as the target concentration is at LOR and the Cation Exchange Capacity LCS is within acceptable limits.
- ED006 (Exchangeable Cations on Alkaline Soils): Samples ES1804965-011 (Comp 1) shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) 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.



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA3_0.5 Armidale	HA5_0 Armidale	HA6_0.5 Armidale	HA7_0.7 Armidale	HA11_0 Armidale
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1804634-001	ES1804634-002	ES1804634-003	ES1804634-004	ES1804634-005
				Result	Result	Result	Result	Result
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	8.2	8.1	8.1	8.0	9.3
After HCl pH	----	0.1	pH Unit	1.5	1.6	1.6	1.5	1.6
Extraction Fluid Number	----	1	-	1	1	1	1	1
Final pH	----	0.1	pH Unit	4.9	4.9	4.9	5.0	5.0



Analytical Results

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

Client sample ID

				HA12_0 Armidale	HA1_0 Duval	HA5_0 Duval	HA8_0 Duval	QA1 Armidale
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1804634-006	ES1804634-007	ES1804634-008	ES1804634-009	ES1804634-010
				Result	Result	Result	Result	Result
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	8.6	7.7	7.6	7.5	7.2
After HCl pH	----	0.1	pH Unit	1.6	1.6	1.6	1.6	1.5
Extraction Fluid Number	----	1	-	1	1	1	1	1
Final pH	----	0.1	pH Unit	5.1	4.9	4.9	5.0	4.9



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				Comp 1 HA8_0.5 & HA1_0.5: Duval	Comp 2 HA16_0.5 & HA8_0.5: Armidale	----	----	----
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1804634-011	ES1804634-012	-----	-----	-----
				Result	Result	----	----	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	7.6	7.8	----	----	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	64	68	----	----	----
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.58	2.50	----	----	----
ED006: Exchangeable Cations on Alkaline Soils								
Exchangeable Calcium	----	0.2	meq/100g	6.0	3.1	----	----	----
Exchangeable Magnesium	----	0.2	meq/100g	4.8	2.2	----	----	----
Exchangeable Potassium	----	0.2	meq/100g	<0.2	<0.2	----	----	----
Exchangeable Sodium	----	0.2	meq/100g	0.3	<0.2	----	----	----
Cation Exchange Capacity	----	0.2	meq/100g	11.0	5.4	----	----	----
Exchangeable Sodium Percent	----	0.2	%	2.7	<0.2	----	----	----



Analytical Results

Sub-Matrix: TCLP LEACHATE
 (Matrix: WATER)

Client sample ID

				HA3_0.5 Armidale	HA5_0 Armidale	HA6_0.5 Armidale	HA7_0.7 Armidale	HA11_0 Armidale
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1804634-001	ES1804634-002	ES1804634-003	ES1804634-004	ES1804634-005
				Result	Result	Result	Result	Result
EG005C: Leachable Metals by ICPAES								
Chromium	7440-47-3	0.1	mg/L	<0.1	----	----	----	----
Nickel	7440-02-0	0.1	mg/L	----	<0.1	<0.1	<0.1	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Benzo(a)pyrene	50-32-8	0.5	µg/L	----	----	----	----	<0.5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1.0	%	----	----	----	----	40.9
2-Chlorophenol-D4	93951-73-6	1.0	%	----	----	----	----	66.4
2,4,6-Tribromophenol	118-79-6	1.0	%	----	----	----	----	56.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	----	----	----	----	90.1
Anthracene-d10	1719-06-8	1.0	%	----	----	----	----	109
4-Terphenyl-d14	1718-51-0	1.0	%	----	----	----	----	101



Analytical Results

Sub-Matrix: TCLP LEACHATE
 (Matrix: WATER)

Client sample ID

				HA12_0 Armidale	HA1_0 Duval	HA5_0 Duval	HA8_0 Duval	QA1 Armidale
Client sampling date / time				18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00	18-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	ES1804634-006	ES1804634-007	ES1804634-008	ES1804634-009	ES1804634-010
				Result	Result	Result	Result	Result
EG005C: Leachable Metals by ICPAES								
Chromium	7440-47-3	0.1	mg/L	----	----	----	<0.1	----
Nickel	7440-02-0	0.1	mg/L	----	<0.1	<0.1	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	<0.5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1.0	%	54.5	----	----	----	36.6
2-Chlorophenol-D4	93951-73-6	1.0	%	93.5	----	----	----	61.4
2,4,6-Tribromophenol	118-79-6	1.0	%	58.8	----	----	----	54.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	120	----	----	----	82.9
Anthracene-d10	1719-06-8	1.0	%	124	----	----	----	106
4-Terphenyl-d14	1718-51-0	1.0	%	109	----	----	----	98.7

Page : 8 of 8
Work Order : ES1804634
Client : WSP Australia Pty Ltd
Project : Rebatch of ES1802401 and ES1802402



Surrogate Control Limits

Sub-Matrix: TCLP LEACHATE

		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112



Environmental

QUALITY CONTROL REPORT

Work Order : ES1804634

Page : 1 of 3

Client : WSP Australia Pty Ltd
Contact : MS WENDY CADELAGO
Address : PO BOX 1162
 NEWCASTLE NSW, AUSTRALIA 2300
Telephone : ----
Project : Rebatch of ES1802401 and ES1802402
Order number : ----
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : EN/085/15 V8
No. of samples received : 12
No. of samples analysed : 12

Laboratory : Environmental Division Sydney
Contact : Loren Schiavon
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61 2 8784 8503
Date Samples Received : 12-Feb-2018
Date Analysis Commenced : 13-Feb-2018
Issue Date : 23-Feb-2018



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.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

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

Laboratory Duplicate (DUP) Report

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 (%)
EA002 : pH (Soils) (QC Lot: 1430454)									
ES1804674-002	Anonymous	EA002: pH Value	----	0.1	pH Unit	9.2	9.1	0.00	0% - 20%
ES1804572-002	Anonymous	EA002: pH Value	----	0.1	pH Unit	11.5	11.5	0.00	0% - 20%
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 1450026)									
ES1804634-011	Comp 1 HA8_0.5 & HA1_0.5: Duval	ED006: Exchangeable Calcium	----	0.2	meq/100g	6.0	# 4.4	30.1	0% - 20%
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	4.8	# 3.6	28.9	0% - 20%
		ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	0.3	0.2	0.00	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	11.0	# 8.2	29.5	0% - 20%
Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005C: Leachable Metals by ICPAES (QC Lot: 1435730)									
ES1804124-001	Anonymous	EG005C: Chromium	7440-47-3	0.1	mg/L	2.4	2.4	0.00	0% - 20%
		EG005C: Nickel	7440-02-0	0.1	mg/L	4.2	4.2	0.00	0% - 20%
ES1804643-001	Anonymous	EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Nickel	7440-02-0	0.1	mg/L	17.9	17.8	0.00	0% - 20%
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1436060)									
ES1804904-001	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

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**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) LowHigh	
Method: Compound	CAS Number	LOR	Unit	Result				
ED006: Exchangeable Cations on Alkaline Soils (QCLot: 1450026)								
ED006: Exchangeable Calcium	----	0.2	meq/100g	<0.2	0.5312 meq/100g	93.7	70	130
ED006: Exchangeable Magnesium	----	0.2	meq/100g	<0.2	1.7971 meq/100g	75.3	70	130
ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	0.0276 meq/100g	# 0.00	70	130
ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	2.721 meq/100g	103	70	130
ED006: Cation Exchange Capacity	----	0.2	meq/100g	<0.2	5.0768 meq/100g	91.6	70	130
EN33: TCLP Leach (QCLot: 1432434)								
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33: TCLP Leach (QCLot: 1432435)								
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----

Sub-Matrix: **WATER**

Sub-Matrix: WATER				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				
EG005C: Leachable Metals by ICPAES (QCLot: 1435730)								
EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	0.1 mg/L	103	88	114
EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	0.1 mg/L	102	83	115
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1436060)								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	71.8	63	117

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: **WATER**

				Matrix Spike (MS) Report			
				Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
EG005C: Leachable Metals by ICPAES (QCLot: 1435730)							
ES1804124-002	Anonymous	EG005C: Chromium	7440-47-3	1 mg/L	96.8	70	130
		EG005C: Nickel	7440-02-0	1 mg/L	91.2	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1804634	Page	: 1 of 6
Client	: WSP Australia Pty Ltd	Laboratory	: Environmental Division Sydney
Contact	: MS WENDY CADELAGO	Telephone	: +61 2 8784 8503
Project	: Rebatch of ES1802401 and ES1802402	Date Samples Received	: 12-Feb-2018
Site	: ----	Issue Date	: 23-Feb-2018
Sampler	: ----	No. of samples received	: 12
Order number	: ----	No. of samples analysed	: 12

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** Matrix Spike outliers occur.
- Duplicate outliers exist - please see following pages for full details.
- Laboratory Control 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

- **NO** Quality Control Sample Frequency Outliers exist.



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
Duplicate (DUP) RPDs							
ED006: Exchangeable Cations on Alkaline Soils	ES1804634--011	Comp 1 HA8_0.5 & HA1_0.5:	Exchangeable Calcium	----	30.1 %	0% - 20%	RPD exceeds LOR based limits
ED006: Exchangeable Cations on Alkaline Soils	ES1804634--011	Comp 1 HA8_0.5 & HA1_0.5:	Exchangeable Magnesium	----	28.9 %	0% - 20%	RPD exceeds LOR based limits
ED006: Exchangeable Cations on Alkaline Soils	ES1804634--011	Comp 1 HA8_0.5 & HA1_0.5:	Cation Exchange Capacity	----	29.5 %	0% - 20%	RPD exceeds LOR based limits
Laboratory Control Spike (LCS) Recoveries							
ED006: Exchangeable Cations on Alkaline Soils	QC-1450026-003	----	Exchangeable Potassium	----	0.00 %	70-130%	Recovery less than lower control limit

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075(SIM)S: Phenolic Compound Surrogates	ES1804634-006	HA12_0 Armidale	Phenol-d6	13127-88-3	54.5 %	10-44 %	Recovery greater than upper data quality objective
EP075(SIM)T: PAH Surrogates	ES1804634-006	HA12_0 Armidale	2-Fluorobiphenyl	321-60-8	120 %	20-104 %	Recovery greater than upper data quality objective
EP075(SIM)T: PAH Surrogates	ES1804634-006	HA12_0 Armidale	Anthracene-d10	1719-06-8	124 %	27-113 %	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved							
Comp 1 - HA8_0.5 & HA1_0.5: Duval,	Comp 2 - HA16_0.5 & HA8_0.5: Armidale	13-Feb-2018	25-Jan-2018	19	----	----	----
ED006: Exchangeable Cations on Alkaline Soils							
Soil Glass Jar - Unpreserved							
Comp 1 - HA8_0.5 & HA1_0.5: Duval,	Comp 2 - HA16_0.5 & HA8_0.5: Armidale	22-Feb-2018	15-Feb-2018	7	22-Feb-2018	15-Feb-2018	7
EN33: TCLP Leach							
Non-Volatile Leach: 14 day HT(e.g. SV organics)							
HA11_0 - Armidale, QA1 - Armidale	HA12_0 - Armidale,	14-Feb-2018	01-Feb-2018	13	----	----	----



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	
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved (EA002) Comp 1 - HA8_0.5 & HA1_0.5: Duval, Comp 2 - HA16_0.5 & HA8_0.5: Armidale	18-Jan-2018	13-Feb-2018	25-Jan-2018	✖	13-Feb-2018	13-Feb-2018	✔	
EA150: Soil Classification based on Particle Size								
Soil Glass Jar - Unpreserved (EA150H) Comp 1 - HA8_0.5 & HA1_0.5: Duval, Comp 2 - HA16_0.5 & HA8_0.5: Armidale	18-Jan-2018	----	----	----	16-Feb-2018	17-Jul-2018	✔	
EA152: Soil Particle Density								
Soil Glass Jar - Unpreserved (EA152) Comp 1 - HA8_0.5 & HA1_0.5: Duval, Comp 2 - HA16_0.5 & HA8_0.5: Armidale	18-Jan-2018	----	----	----	16-Feb-2018	17-Jul-2018	✔	
ED006: Exchangeable Cations on Alkaline Soils								
Soil Glass Jar - Unpreserved (ED006) Comp 1 - HA8_0.5 & HA1_0.5: Duval, Comp 2 - HA16_0.5 & HA8_0.5: Armidale	18-Jan-2018	22-Feb-2018	15-Feb-2018	✖	22-Feb-2018	15-Feb-2018	✖	
EN33: TCLP Leach								
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN33a) HA11_0 - Armidale, HA12_0 - Armidale, QA1 - Armidale	18-Jan-2018	14-Feb-2018	01-Feb-2018	✖	----	----	----	
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN33a) HA3_0.5 - Armidale, HA5_0 - Armidale, HA6_0.5 - Armidale, HA7_0.7 - Armidale, HA1_0 - Duval, HA5_0 - Duval, HA8_0 - Duval	18-Jan-2018	14-Feb-2018	17-Jul-2018	✔	----	----	----	

Matrix: **WATER**

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	
EG005C: Leachable Metals by ICPAES								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C)								
HA3_0.5 - Armidale, HA6_0.5 - Armidale, HA1_0 - Duval, HA8_0 - Duval	HA5_0 - Armidale, HA7_0.7 - Armidale, HA5_0 - Duval,	14-Feb-2018	15-Feb-2018	13-Aug-2018	✔	15-Feb-2018	13-Aug-2018	✔



Matrix: **WATER**

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								
Amber Glass Bottle - Unpreserved (EP075(SIM))								
HA11_0 - Armidale, QA1 - Armidale	HA12_0 - Armidale,	14-Feb-2018	15-Feb-2018	21-Feb-2018	✔	16-Feb-2018	27-Mar-2018	✔



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)							
Exchangeable Cations on Alkaline Soils	ED006	1	4	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Exchangeable Cations on Alkaline Soils	ED006	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Exchangeable Cations on Alkaline Soils	ED006	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TCLP for Non & Semivolatile Analytes	EN33a	2	20	10.00	9.09	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: WATER

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)							
Leachable Metals by ICPAES	EG005C	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Leachable Metals by ICPAES	EG005C	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Leachable Metals by ICPAES	EG005C	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Leachable Metals by ICPAES	EG005C	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	10	10.00	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 (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)
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
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.
Leachable Metals by ICPAES	EG005C	SOIL	In house: referenced to APHA 3120; USEPA SW 846 - 6010: The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method (Alkaline Soils)	ED006PR	SOIL	In house: Referenced to Rayment and Lyons 2011 method 15C1.
Digestion for Total Recoverable Metals in TCLP Leachate	EN25C	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.
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.
Separatory Funnel Extraction of Liquids	ORG14	SOIL	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES1804634

Client : WSP Australia Pty Ltd Contact : MS WENDY CADELAGO Address : PO BOX 1162 NEWCASTLE NSW, AUSTRALIA 2300 E-mail : wendy.cadelago@wsp.com Telephone : ---- Facsimile : ---- Project : Rebatch of ES1802401 and ES1802402 Order number : ---- C-O-C number : ---- Site : ---- Sampler : ----	Laboratory : Environmental Division Sydney Contact : Loren Schiavon Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 E-mail : loren.schiavon@alsglobal.com Telephone : +61 2 8784 8503 Facsimile : +61-2-8784 8500 Page : 1 of 3 Quote number : ES2016PARBRINSW0009 (EN/085/15 V8) QC Level : NEPM 2013 B3 & ALS QC Standard
---	--

Dates

Date Samples Received : 12-Feb-2018 14:08	Issue Date : 12-Feb-2018
Client Requested Due Date : 19-Feb-2018	Scheduled Reporting Date : 19-Feb-2018

Delivery Details

Mode of Delivery : Undefined	Security Seal : Not Available
No. of coolers/boxes : ----	Temperature : 4.1
Receipt Detail : Rebatch of ES1802401 and ES1802402	No. of samples received / analysed : 12 / 12

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
- **Rebatch of ES1802401 and ES1802402**
- **Comp 1 is a composite sample of HA8_0.5 & HA1_0.5: ES1802401**
- **Comp 2 is a composite of HA16_0.5 & HA8_0.5: ES1802402**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

ES1804634-011 : [18-Jan-2018] : Comp 1 - HA8_0.5 & HA1_0.5: Duval
ES1804634-012 : [18-Jan-2018] : Comp 2 - HA16_0.5 & HA8_0.5: Armidale

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	SOIL - EA002 pH (1:5)	SOIL - EA150H-C Clay Content by Hydrometer	SOIL - ED008 Def Exchangeable Cations with pre-treatment -	SOIL - EG005C Leachable Metals by ICPAES	SOIL - EN33a TCLP Leachate	SOIL - EP075 SIM PAH only
ES1804634-001	18-Jan-2018 00:00	HA3_0.5 Armidale				✓	✓	
ES1804634-002	18-Jan-2018 00:00	HA5_0 Armidale				✓	✓	
ES1804634-003	18-Jan-2018 00:00	HA6_0.5 Armidale				✓	✓	
ES1804634-004	18-Jan-2018 00:00	HA7_0.7 Armidale				✓	✓	
ES1804634-005	18-Jan-2018 00:00	HA11_0 Armidale					✓	✓
ES1804634-006	18-Jan-2018 00:00	HA12_0 Armidale					✓	✓
ES1804634-007	18-Jan-2018 00:00	HA1_0 Duval				✓	✓	
ES1804634-008	18-Jan-2018 00:00	HA5_0 Duval				✓	✓	
ES1804634-009	18-Jan-2018 00:00	HA8_0 Duval				✓	✓	
ES1804634-010	18-Jan-2018 00:00	QA1 Armidale					✓	✓
ES1804634-011	18-Jan-2018 00:00	Comp 1 HA8_0.5 & HA...	✓	✓	✓			
ES1804634-012	18-Jan-2018 00:00	Comp 2 HA16_0.5 & H...	✓	✓	✓			

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: SOIL

Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.

Method	Container	Due for extraction	Due for analysis	Samples Received		Instructions Received	
Client Sample ID(s)				Date	Evaluation	Date	Evaluation
EA002: pH (1:5)							
Comp 1	Soil Glass Jar - Unpreserved	25-Jan-2018	25-Jan-2018	12-Feb-2018	✗	----	----
Comp 2	Soil Glass Jar - Unpreserved	25-Jan-2018	25-Jan-2018	12-Feb-2018	✗	----	----
EN33a: TCLP for Non & Semivolatile Analytes							
HA11_0	Non-Volatile Leach: 14 day HT(€	01-Feb-2018	----	12-Feb-2018	✗	----	----
HA12_0	Non-Volatile Leach: 14 day HT(€	01-Feb-2018	----	12-Feb-2018	✗	----	----
QA1	Non-Volatile Leach: 14 day HT(€	01-Feb-2018	----	12-Feb-2018	✗	----	----

ACCOUNTS PAYABLE

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- EDI Format - ESDAT (ESDAT)

Fadi Soro

Final

From: Chloe Leong on behalf of ALS Enviro Sydney
Sent: Monday, 12 February 2018 10:22 AM
To: Fadi Soro
Subject: FW: Work orders ES1802402 & ES1802401 - additional analyses

Hi Fadi, can you please arrange the rebatch below? Thanks!

Kind regards,
Chloe Leong
Client Services Officer, Environmental
Sydney



T +61 2 8784 8555 **D** +61 2 8784 8501
F +61 2 8784 8500
chloe.leong@alsglobal.com
277-289 Woodpark Road
Smithfield, NSW, 2154

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New ALS office at Crows Nest is now open to receive samples!

We are keen for your feedback! Please click here for your 1 question survey

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Telephone : + 61-2-8784 8555

Environmental Division
Sydney
Work Order Reference
ES1804634

12/12/18
124

informed Amy not
enough volume for
sample HAI-O to
do TCLP Pb.
c.c. 12/2

Wendy Cadelago
Graduate Environmental Engineer, Contaminated Land Management



T:
M: +61 421 256834
Wendy.Cadelago@wsp.com

WSP Australia Pty Limited
Level 3
55 Bolton St
Newcastle
NSW 2300 Australia

wsp.com

Fadi Soro

From: Chloe Leong
Sent: Monday, 12 February 2018 2:08 PM
To: Fadi Soro
Subject: FW: Work orders ES1802402 & ES1802401 - additional analyses

Hi Fadi, with the re-batch request there are a few things to note on top of the original request:

- ✗ Please go ahead with testing for only lead on sample HA1_0
- TCLP for benzo(a)pyrene on sample QA1 (10)
- Composite the below samples for CEC, Clay Content and pH
 - Batch ES1802402 - HA16_0.5 and HA8_0.5 (10) ← Comp Z
 - Batch ES1802401 - HA8_0.5 and HA1_0.5 (10) ← Comp 1

Can you please have this arranged? Thanks!

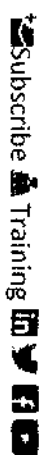
Kind regards,

Chloe Leong
Client Services Officer, Environmental
Sydney



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From: Valentine, Amy [mailto:Amy.Valentine@wsp.com]
Sent: Monday, 12 February 2018 1:12 PM
To: Chloe Leong <Chloe.Leong@ALSGlobal.com>; ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>; Cadellago, Wendy <Wendy.Cadellago@wsp.com>
Cc: Trahair, Josh <Josh.Trahair@wsp.com>
Subject: RE: Work orders ES1802402 & ES1802401 - additional analyses

Oh, sorry, I missed the part about clay content. Please go ahead with the lead if possible on sample HA1_0. For the other analyses, please composite the following samples for CEC, clay content and pH:

- Batch ES1802402 - HA16_0.5 and HA8_0.5
- Batch ES1802401 - HA8_0.5 and HA1_0.5

Will this allow enough sample for the clay content?

Amy Valentine
Principal Environmental Engineer, Contaminated Land Management



T: +61 2 92725139

Amy.Valentine@wsp.com

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Level 27, 680 George Street
Sydney, NSW
2000 Australia

wsp.com

From: Chloe Leong [<mailto:Chloe.Leong@ALSGlobal.com>]

Sent: Monday, 12 February 2018 12:59 PM

To: Valentine, Amy <Amy.Valentine@wsp.com>; ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>; Cadelago, Wendy <Wendy.Cadelago@wsp.com>

Cc: Trahair, Josh <Josh.Trahair@wsp.com>

Subject: RE: Work orders ES1802402 & ES1802401 - additional analyses

Hi Amy,

Sample receipt advised there is hardly any volume left to proceed with a TCLP tumble approximately < 10g (let me know if you'd like us to weigh this). We may be able to proceed by reducing the ratio to yield enough TCLP fluid for Pb only. Please confirm if you're happy for this and I'll consult the lab.

I'll arrange for TCLP for benzo(a)pyrene on sample QA1, and we will be testing all other parameters except for clay content on the natural soils.

Kind regards,

Chloe Leong
Client Services Officer, Environmental
Sydney



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From: Valentine, Amy [<mailto:Amy.Valentine@wsp.com>]

Sent: Monday, 12 February 2018 12:46 PM

To: Chloe Leong <Chloe.Leong@ALSGlobal.com>; ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>; Cadelago, Wendy <Wendy.Cadelago@wsp.com>
Cc: Trahair, Josh <Josh.Trahair@wsp.com>

Subject: RE: Work orders ES1802402 & ES1802401 - additional analyses

Hi Chloe, is there enough sample to run one TCLP? If so, please run lead. Can we also schedule TCLP for benzo(a)pyrene on sample QA1?

Please analyse the natural soils separately, one per batch.

Amy Valentine
Principal Environmental Engineer, Contaminated Land Management



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Amy.Valentine@wsp.com

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From: Chloe Leong [<mailto:Chloe.Leong@ALSGlobal.com>]

Sent: Monday, 12 February 2018 12:35 PM

To: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>; Cadelago, Wendy <Wendy.Cadelago@wsp.com>

Cc: Trahair, Josh <Josh.Trahair@wsp.com>; Valentine, Amy <Amy.Valentine@wsp.com>

Subject: RE: Work orders ES1802402 & ES1802401 - additional analyses

Hi Wendy,

I've tried to call you in regards to this re-batch request. Sample receipt have informed me that there is insufficient volume to proceed with TCLP for the sample below:

Amidale, batch ES1802402

HA1_0 – TCLP lead and benzo(a)pyrene

On another note, in your last paragraph where you mentioned 'one natural sample from each site' did you want us to analyse them individually or composite them? If we are to analyse them individually we will not have enough sample to conduct Clay Content as we've only received a small soil jar. Please confirm.

Kind regards,

Chloe Leong
Client Services Officer, Environmental
Sydney



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From: Chloe Leong **On Behalf Of** ALSEnviro Sydney
Sent: Monday, 12 February 2018 10:22 AM
To: 'Cadelago, Wendy' <Wendy.Cadelago@wsp.com>; ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>
Cc: Trahair, Josh <Josh.Trahair@wsp.com>; Valentine, Amy <Amy.Valentine@wsp.com>
Subject: RE: Work orders ES1802402 & ES1802401 - additional analyses

Thanks Wendy - I've arranged your request below for re-batching.

Kind regards,

Chloe Leong
Client Services Officer, Environmental
Sydney



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From: Cadelago, Wendy [mailto:Wendy.Cadelago@wsp.com]

Sent: Monday, 12 February 2018 10:20 AM

To: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>

Cc: Trahair, Josh <Josh.Trahair@wsp.com>; Valentine, Amy <Amy.Valentine@wsp.com>

Subject: Work orders ES1802402 & ES1802401 - additional analyses

Morning,

We would like to have additional samples analysed for TCLP for the work orders ES1802402 & ES1802401.

Armidade, batch ES1802402

H41_0 – TCLP lead and benzo(a)pyrene

HA3_0.5 – TCLP chromium
HA5_0 – TCLP nickel
HA6_0.5 – TCLP nickel
HA7_0.7 – TCLP nickel
HA11_0 – TCLP benzo(a)pyrene
HA12_0 – TCLP benzo(a)pyrene

Duval batch ES1802401

HA1_0 – TCLP nickel
HA5_0 – TCLP nickel
HA8_0 – TCLP chromium and nickel

We also need to analyse one natural sample from each site for pH, clay content and CEC. For this, HA16_0.5 for Armidale(ES1802402) and HA8_0.5 for Duval (ES1802401).

Kind regards,

Wendy Cadelago

Graduate Environmental Engineer, Contaminated Land Management



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Telephone 02 9272 5100
Facsimile 02 9272 5101
Email amy.valentine@wsp.com
Project **PS107410 Armidale High School**
Order Number **PS107410**
Samples 2

LABORATORY DETAILS

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Alexandria NSW 2015

Telephone +61 2 8594 0400
Facsimile +61 2 8594 0499
Email au.environmental.sydney@sgs.com
SGS Reference **SE174604 R0**
Date Received 22/1/2018
Date Reported 30/1/2018

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES



Akheequear Beniamdeen
Chemist



Bennet Lo
Senior Organic Chemist/Metals Chemist



Huong Crawford
Production Manager



Ly Kim Ha
Organic Section Head



ANALYTICAL RESULTS

SE174604 R0

VOC's in Soil [AN433] Tested: 24/1/2018

			QA1A	QA2A
			SOIL	SOIL
			-	-
			18/1/2018	18/1/2018
			SE174604.001	SE174604.002
PARAMETER	UOM	LOR		
Benzene	mg/kg	0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1



ANALYTICAL RESULTS

SE174604 R0

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 24/1/2018

			QA1A	QA2A
			SOIL	SOIL
			-	-
			18/1/2018	18/1/2018
PARAMETER	UOM	LOR	SE174604.001	SE174604.002
TRH C6-C9	mg/kg	20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25



ANALYTICAL RESULTS

SE174604 R0

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 24/1/2018

PARAMETER	UOM	LOR	QA1A	QA2A
			SOIL - 18/1/2018 SE174604.001	SOIL - 18/1/2018 SE174604.002
TRH C10-C14	mg/kg	20	<20	<20
TRH C15-C28	mg/kg	45	50	170
TRH C29-C36	mg/kg	45	46	110
TRH C37-C40	mg/kg	100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	240
TRH >C34-C40 (F4)	mg/kg	120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	270
TRH C10-C40 Total (F bands)	mg/kg	210	<210	240

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 24/1/2018

PARAMETER	UOM	LOR	QA1A	QA2A
			SOIL - 18/1/2018 SE174604.001	SOIL - 18/1/2018 SE174604.002
Naphthalene	mg/kg	0.1	<0.1	0.2
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	0.4	1.0
Acenaphthene	mg/kg	0.1	<0.1	0.3
Fluorene	mg/kg	0.1	<0.1	0.6
Phenanthrene	mg/kg	0.1	1.7	6.8
Anthracene	mg/kg	0.1	0.3	1.7
Fluoranthene	mg/kg	0.1	3.3	11
Pyrene	mg/kg	0.1	3.7	11
Benzo(a)anthracene	mg/kg	0.1	2.3	6.5
Chrysene	mg/kg	0.1	1.8	4.4
Benzo(b&j)fluoranthene	mg/kg	0.1	2.7	6.4
Benzo(k)fluoranthene	mg/kg	0.1	1.1	2.8
Benzo(a)pyrene	mg/kg	0.1	2.5	6.2
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1.5	3.4
Dibenzo(ah)anthracene	mg/kg	0.1	0.2	0.4
Benzo(ghi)perylene	mg/kg	0.1	1.1	2.5
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	3.5	8.6
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	3.5	8.6
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	3.5	8.6
Total PAH (18)	mg/kg	0.8	23	65
Total PAH (NEPM/WHO 16)	mg/kg	0.8	23	65



ANALYTICAL RESULTS

SE174604 R0

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 29/1/2018

PARAMETER	UOM	LOR	QA1A	QA2A
			SOIL - 18/1/2018 SE174604.001	SOIL - 18/1/2018 SE174604.002
Arsenic, As	mg/kg	3	4	<3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	38	70
Copper, Cu	mg/kg	0.5	15	25
Lead, Pb	mg/kg	1	16	23
Nickel, Ni	mg/kg	0.5	22	28
Zinc, Zn	mg/kg	0.5	54	67



ANALYTICAL RESULTS

SE174604 R0

Mercury in Soil [AN312] Tested: 29/1/2018

			QA1A	QA2A
			SOIL	SOIL
			-	-
			18/1/2018	18/1/2018
PARAMETER	UOM	LOR	SE174604.001	SE174604.002
Mercury	mg/kg	0.05	<0.05	<0.05



ANALYTICAL RESULTS

SE174604 R0

Moisture Content [AN002] Tested: 25/1/2018

			QA1A	QA2A
			SOIL	SOIL
			-	-
			18/1/2018	18/1/2018
			SE174604.001	SE174604.002
PARAMETER	UOM	LOR		
% Moisture	%w/w	0.5	8.1	22

METHOD

METHODOLOGY SUMMARY

AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	Carcinogenic PAHs may be expressed as Benzo(a)pyrene equivalents by applying the BaP toxicity equivalence factor (NEPM 1999, June 2013, B7). These can be reported as the individual PAHs and as a sum of carcinogenic PAHs. The sum is reported three ways, the first assuming all <LOR results are zero, the second assuming all <LOR results are half the LOR and the third assuming all <LOR results are the LOR.
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
		IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- 1 Bq is equivalent to 27 pCi
- 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : <http://www.sgs.com.au/~media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf>

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STATEMENT OF QA/QC PERFORMANCE

SE174604 R0

CLIENT DETAILS

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Facsimile 02 9272 5101
Email amy.valentine@wsp.com

Project **PS107410 Armidale High School**
Order Number **PS107410**
Samples 2

LABORATORY DETAILS

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Facsimile +61 2 8594 0499
Email au.environmental.sydney@sgs.com

SGS Reference **SE174604 R0**
Date Received 22 Jan 2018
Date Reported 30 Jan 2018

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	Other Lab	Sample cooling method	Ice
Samples received in correct containers	Yes	Sample counts by matrix	2 Soil
Date documentation received	22/1/2018	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	5.3°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Mercury in Soil

Method: ME-(AU)-ENVJAN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QA1A	SE174604.001	LB140377	18 Jan 2018	22 Jan 2018	15 Feb 2018	29 Jan 2018	15 Feb 2018	30 Jan 2018
QA2A	SE174604.002	LB140377	18 Jan 2018	22 Jan 2018	15 Feb 2018	29 Jan 2018	15 Feb 2018	30 Jan 2018

Moisture Content

Method: ME-(AU)-ENVJAN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QA1A	SE174604.001	LB140271	18 Jan 2018	22 Jan 2018	01 Feb 2018	25 Jan 2018	30 Jan 2018	30 Jan 2018
QA2A	SE174604.002	LB140271	18 Jan 2018	22 Jan 2018	01 Feb 2018	25 Jan 2018	30 Jan 2018	30 Jan 2018

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-ENVJAN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QA1A	SE174604.001	LB140100	18 Jan 2018	22 Jan 2018	01 Feb 2018	24 Jan 2018	05 Mar 2018	29 Jan 2018
QA2A	SE174604.002	LB140100	18 Jan 2018	22 Jan 2018	01 Feb 2018	24 Jan 2018	05 Mar 2018	29 Jan 2018

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-ENVJAN040-AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QA1A	SE174604.001	LB140354	18 Jan 2018	22 Jan 2018	17 Jul 2018	29 Jan 2018	17 Jul 2018	30 Jan 2018
QA2A	SE174604.002	LB140354	18 Jan 2018	22 Jan 2018	17 Jul 2018	29 Jan 2018	17 Jul 2018	30 Jan 2018

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-ENVJAN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QA1A	SE174604.001	LB140100	18 Jan 2018	22 Jan 2018	01 Feb 2018	24 Jan 2018	05 Mar 2018	30 Jan 2018
QA2A	SE174604.002	LB140100	18 Jan 2018	22 Jan 2018	01 Feb 2018	24 Jan 2018	05 Mar 2018	30 Jan 2018

VOC s in Soil

Method: ME-(AU)-ENVJAN133

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QA1A	SE174604.001	LB140167	18 Jan 2018	22 Jan 2018	01 Feb 2018	24 Jan 2018	05 Mar 2018	30 Jan 2018
QA2A	SE174604.002	LB140167	18 Jan 2018	22 Jan 2018	01 Feb 2018	24 Jan 2018	05 Mar 2018	30 Jan 2018

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-ENVJAN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QA1A	SE174604.001	LB140167	18 Jan 2018	22 Jan 2018	01 Feb 2018	24 Jan 2018	05 Mar 2018	30 Jan 2018
QA2A	SE174604.002	LB140167	18 Jan 2018	22 Jan 2018	01 Feb 2018	24 Jan 2018	05 Mar 2018	30 Jan 2018

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]JAN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	QA1A	SE174604.001	%	70 - 130%	98
	QA2A	SE174604.002	%	70 - 130%	106
d14-p-terphenyl (Surrogate)	QA1A	SE174604.001	%	70 - 130%	74
	QA2A	SE174604.002	%	70 - 130%	96
d5-nitrobenzene (Surrogate)	QA1A	SE174604.001	%	70 - 130%	94
	QA2A	SE174604.002	%	70 - 130%	104

VOC's in Soil

Method: ME-(AU)-[ENV]JAN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	QA1A	SE174604.001	%	60 - 130%	75
	QA2A	SE174604.002	%	60 - 130%	87
d4-1,2-dichloroethane (Surrogate)	QA1A	SE174604.001	%	60 - 130%	101
	QA2A	SE174604.002	%	60 - 130%	98
d8-toluene (Surrogate)	QA1A	SE174604.001	%	60 - 130%	100
	QA2A	SE174604.002	%	60 - 130%	93
Dibromofluoromethane (Surrogate)	QA1A	SE174604.001	%	60 - 130%	109
	QA2A	SE174604.002	%	60 - 130%	117

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]JAN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	QA1A	SE174604.001	%	60 - 130%	75
	QA2A	SE174604.002	%	60 - 130%	87
d4-1,2-dichloroethane (Surrogate)	QA1A	SE174604.001	%	60 - 130%	101
	QA2A	SE174604.002	%	60 - 130%	98
d8-toluene (Surrogate)	QA1A	SE174604.001	%	60 - 130%	100
	QA2A	SE174604.002	%	60 - 130%	93
Dibromofluoromethane (Surrogate)	QA1A	SE174604.001	%	60 - 130%	109
	QA2A	SE174604.002	%	60 - 130%	117



METHOD BLANKS

SE174604 R0

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB140377.001	Mercury	mg/kg	0.05	<0.05

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB140100.001	Naphthalene	mg/kg	0.1	<0.1
	2-methylnaphthalene	mg/kg	0.1	<0.1
	1-methylnaphthalene	mg/kg	0.1	<0.1
	Acenaphthylene	mg/kg	0.1	<0.1
	Acenaphthene	mg/kg	0.1	<0.1
	Fluorene	mg/kg	0.1	<0.1
	Phenanthrene	mg/kg	0.1	<0.1
	Anthracene	mg/kg	0.1	<0.1
	Fluoranthene	mg/kg	0.1	<0.1
	Pyrene	mg/kg	0.1	<0.1
	Benzo(a)anthracene	mg/kg	0.1	<0.1
	Chrysene	mg/kg	0.1	<0.1
	Benzo(a)pyrene	mg/kg	0.1	<0.1
	Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
	Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
	Benzo(ghi)perylene	mg/kg	0.1	<0.1
	Total PAH (18)	mg/kg	0.8	<0.8
Surrogates	d5-nitrobenzene (Surrogate)	%	-	76
	2-fluorobiphenyl (Surrogate)	%	-	76
	d14-p-terphenyl (Surrogate)	%	-	80

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040-AN320

Sample Number	Parameter	Units	LOR	Result
LB140354.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB140100.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB140167.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	72
		d4-1,2-dichloroethane (Surrogate)	%	-	89
		d8-toluene (Surrogate)	%	-	87
		Bromofluorobenzene (Surrogate)	%	-	87
	Totals	Total BTEX	mg/kg	0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR
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Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Volatile Petroleum Hydrocarbons in Soil (continued) Method: ME-(AU)-(ENV)AN433

Sample Number	Parameter	Units	LOR	Result
LB140167.001	TRH C6-C9	mg/kg	20	<20
	Surrogates			
	Dibromofluoromethane (Surrogate)	%	-	72
	d4-1,2-dichloroethane (Surrogate)	%	-	89
	d8-toluene (Surrogate)	%	-	87

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE174628.001	LB140271.011	% Moisture	%w/w	0.5	2.02952029522.2292993630		77	9
SE174683.001	LB140271.022	% Moisture	%w/w	0.5	5.28800755425.9219380888		48	11
SE174717.002	LB140271.033	% Moisture	%w/w	0.5	16.57223796035.6763590391		36	6
SE174726.003	LB140271.043	% Moisture	%w/w	0.5	1.6150740242	1.7	90	5

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE174604.001	LB140100.025	Naphthalene	mg/kg	0.1	<0.1	0.06	197	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	0.02	200	0
		1-methylnaphthalene	mg/kg	0.1	<0.1	0.03	200	0
		Acenaphthylene	mg/kg	0.1	0.4	0.41	54	5
		Acenaphthene	mg/kg	0.1	<0.1	0.05	200	0
		Fluorene	mg/kg	0.1	<0.1	0.1	135	0
		Phenanthrene	mg/kg	0.1	1.7	1.79	36	8
		Anthracene	mg/kg	0.1	0.3	0.43	57	32
		Fluoranthene	mg/kg	0.1	3.3	3.83	33	15
		Pyrene	mg/kg	0.1	3.7	3.4	33	9
		Benzo(a)anthracene	mg/kg	0.1	2.3	2.65	34	14
		Chrysene	mg/kg	0.1	1.8	2	35	9
		Benzo(b&j)fluoranthene	mg/kg	0.1	2.7	2.87	34	6
		Benzo(k)fluoranthene	mg/kg	0.1	1.1	1.24	39	13
		Benzo(a)pyrene	mg/kg	0.1	2.5	2.62	34	4
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1.5	1.76	36	14
		Dibenzo(ah)anthracene	mg/kg	0.1	0.2	0.22	83	32
		Benzo(ghi)perylene	mg/kg	0.1	1.1	1.28	39	19
		Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	3.5	3.7208	16	7
		Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	3.5	3.7208	18	7
		Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	3.5	3.7208	16	7
		Total PAH (18)	mg/kg	0.8	23	24.56	33	8
		Surrogates						
		d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.48	30	2
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.49	30	0
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.41	30	10

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE174584.002	LB140354.024	Arsenic, As	mg/kg	3	1.92038477282.2710691666		78	17
		Cadmium, Cd	mg/kg	0.3	-0.00513471860.0050920833		200	0
		Chromium, Cr	mg/kg	0.3	1.52501143721.4410595833		64	6
		Copper, Cu	mg/kg	0.5	0.1129638101	0.12221	200	0
		Lead, Pb	mg/kg	1	0.35943030500.8351016666		197	0
		Nickel, Ni	mg/kg	0.5	0.56995376940.5448529166		120	5
		Zinc, Zn	mg/kg	0.5	1.4890684067	1.54290125	162	0
SE174721.009	LB140354.014	Arsenic, As	mg/kg	3	2.37707314941.3074368421		84	58
		Cadmium, Cd	mg/kg	0.3	0.0288713337-0.0216105263		200	0
		Chromium, Cr	mg/kg	0.3	9.56122337637.2611368421		36	27
		Copper, Cu	mg/kg	0.5	6.90506066685.7862184210		38	18
		Lead, Pb	mg/kg	1	6.44311932614.4247552631		48	37
		Nickel, Ni	mg/kg	0.5	0.63998123250.4268078947		124	25
		Zinc, Zn	mg/kg	0.5	2.36744937151.8314921052		125	17

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE174513.036	LB140100.025	TRH C10-C14	mg/kg	20	<20	<20	200	0
		TRH C15-C28	mg/kg	45	<45	<45	200	0
		TRH C29-C36	mg/kg	45	<45	52	129	14
		TRH C37-C40	mg/kg	100	<100	<100	200	0
		TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
		TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands						
		TRH >C10-C16 (F2)	mg/kg	25	<25	<25	200	0
		TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	200	0
		TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
		TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %	
SE174604.001	LB140100.026	TRH C10-C14	mg/kg	20	<20	0	200	0	
		TRH C15-C28	mg/kg	45	50	56	115	11	
		TRH C29-C36	mg/kg	45	46	58	117	23	
		TRH C37-C40	mg/kg	100	<100	0	200	0	
		TRH C10-C36 Total	mg/kg	110	<110	114	135	4	
		TRH C10-C40 Total (F bands)	mg/kg	210	<210	98	200	0	
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	0	200	0
		TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	0	200	0	
		TRH >C16-C34 (F3)	mg/kg	90	<90	98	129	9	
		TRH >C34-C40 (F4)	mg/kg	120	<120	0	200	0	

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE174683.009	LB140167.025	Monocyclic	Benzene	mg/kg	0.1	0	0	200	0
			Aromatic	Toluene	mg/kg	0.1	0	0	200
			Ethylbenzene	mg/kg	0.1	0	0	200	0
			m/p-xylene	mg/kg	0.2	0	0	200	0
			o-xylene	mg/kg	0.1	0	0	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	0.01	0.01	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.4	4.95	50	12
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.04	4.4	50	9
			d8-toluene (Surrogate)	mg/kg	-	3.51	3.76	50	7
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.09	3.62	50	12
		Totals	Total Xylenes	mg/kg	0.3	0	0	200	0
			Total BTEX	mg/kg	0.6	0	0	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE174683.009	LB140167.025	TRH C6-C10	mg/kg	25	0.97	6.14	200	0
		TRH C6-C9	mg/kg	20	1.01	6.13	200	0
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.4	4.95	30	12
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.04	4.4	30	9
		d8-toluene (Surrogate)	mg/kg	-	3.51	3.76	30	7
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.09	3.62	30	12
	VPH F Bands	Benzene (F0)	mg/kg	0.1	0	0	200	0
		TRH C6-C10 minus BTEX (F1)	mg/kg	25	0.97	6.14	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB140377.002	Mercury	mg/kg	0.05	0.20	0.2	70 - 130	102

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB140100.002	Naphthalene	mg/kg	0.1	4.1	4	60 - 140	104
	Acenaphthylene	mg/kg	0.1	4.7	4	60 - 140	118
	Acenaphthene	mg/kg	0.1	4.0	4	60 - 140	100
	Phenanthrene	mg/kg	0.1	3.7	4	60 - 140	93
	Anthracene	mg/kg	0.1	3.5	4	60 - 140	87
	Fluoranthene	mg/kg	0.1	3.7	4	60 - 140	94
	Pyrene	mg/kg	0.1	4.1	4	60 - 140	102
	Benzo(a)pyrene	mg/kg	0.1	4.8	4	60 - 140	119
	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	76
	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	72
	d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	72

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040-AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB140354.002	Arsenic, As	mg/kg	3	56	50	80 - 120	112
	Cadmium, Cd	mg/kg	0.3	59	50	80 - 120	117
	Chromium, Cr	mg/kg	0.3	60	50	80 - 120	119
	Copper, Cu	mg/kg	0.5	59	50	80 - 120	118
	Lead, Pb	mg/kg	1	60	50	80 - 120	119
	Nickel, Ni	mg/kg	0.5	59	50	80 - 120	119
	Zinc, Zn	mg/kg	0.5	59	50	80 - 120	117

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB140100.002	TRH C10-C14	mg/kg	20	33	40	60 - 140	83
	TRH C15-C28	mg/kg	45	<45	40	60 - 140	85
	TRH C29-C36	mg/kg	45	<45	40	60 - 140	88
	TRH F Bands	mg/kg	25	33	40	60 - 140	83
	TRH >C10-C16 (F2)	mg/kg	90	<90	40	60 - 140	85
	TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	95

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB140167.002	Monocyclic	Benzene	mg/kg	0.1	2.1	2.9	60 - 140	72
		Aromatic	Toluene	mg/kg	0.1	2.3	2.9	60 - 140
		Ethylbenzene	mg/kg	0.1	2.2	2.9	60 - 140	74
		m/p-xylene	mg/kg	0.2	4.2	5.8	60 - 140	72
		o-xylene	mg/kg	0.1	2.0	2.9	60 - 140	70
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.6	5	60 - 140	71
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.4	5	60 - 140	88
		d8-toluene (Surrogate)	mg/kg	-	4.2	5	60 - 140	85
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.3	5	60 - 140	85

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %	
LB140167.002	TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	91	
	TRH C6-C9	mg/kg	20	22	23.2	60 - 140	94	
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.6	5	60 - 140	71
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.4	5	60 - 140	88
		d8-toluene (Surrogate)	mg/kg	-	4.2	5	60 - 140	85
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.3	5	60 - 140	85
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	135



MATRIX SPIKES

SE174604 R0

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE174816.001	LB140377.004	Mercury	mg/kg	0.05	0.27	0.10037104402	0.2	86

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE174707.017	LB140354.004	Arsenic, As	mg/kg	3	61	9.07326264690	50	104
		Cadmium, Cd	mg/kg	0.3	57	0.09495826946	50	113
		Chromium, Cr	mg/kg	0.3	77	20.12640521205	50	113
		Copper, Cu	mg/kg	0.5	83	25.05473939705	50	116
		Lead, Pb	mg/kg	1	90	35.82775506727	50	109
		Nickel, Ni	mg/kg	0.5	63	7.97649463464	50	109
		Zinc, Zn	mg/kg	0.5	140	36.19272696305	50	97

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE174513.031	LB140100.024	TRH C10-C14	mg/kg	20	29	<20	40	73
		TRH C15-C28	mg/kg	45	<45	<45	40	78
		TRH C29-C36	mg/kg	45	<45	<45	40	100
		TRH C37-C40	mg/kg	100	<100	<100	-	-
		TRH C10-C36 Total	mg/kg	110	<110	<110	-	-
		TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	-	-
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	40	73
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	40	98
			TRH >C34-C40 (F4)	mg/kg	120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE174603.001	LB140167.004	Monocyclic	Benzene	mg/kg	0.1	2.0	<0.1	2.9	69
			Aromatic	Toluene	mg/kg	0.1	2.0	<0.1	2.9
			Ethylbenzene	mg/kg	0.1	2.2	<0.1	2.9	77
			m/p-xylene	mg/kg	0.2	4.2	<0.2	5.8	73
			o-xylene	mg/kg	0.1	2.1	<0.1	2.9	71
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.3	4.1	-	86
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.8	3.6	-	75
			d8-toluene (Surrogate)	mg/kg	-	3.8	3.6	-	76
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.1	4.2	-	83
		Totals	Total Xylenes	mg/kg	0.3	6.3	<0.3	-	-
			Total BTEX	mg/kg	0.6	13	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%	
SE174603.001	LB140167.004	TRH C6-C10	mg/kg	25	<25	<25	24.65	88	
		TRH C6-C9	mg/kg	20	<20	<20	23.2	85	
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.3	4.1	-	86
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.8	3.6	-	75
			d8-toluene (Surrogate)	mg/kg	-	3.8	3.6	-	76
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.1	4.2	-	83
		VPH F	Benzene (F0)	mg/kg	0.1	2.0	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	127



MATRIX SPIKE DUPLICATES

SE174604 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here : <http://www.sgs.com.au/~media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf>

- * NATA accreditation does not cover the performance of this service .
 - ** Indicative data, theoretical holding time exceeded.
 - Sample not analysed for this analyte.
 - IS Insufficient sample for analysis.
 - LNR Sample listed, but not received.
 - LOR Limit of reporting.
 - QFH QC result is above the upper tolerance.
 - QFL QC result is below the lower tolerance.
-
- ① At least 2 of 3 surrogates are within acceptance criteria.
 - ② RPD failed acceptance criteria due to sample heterogeneity.
 - ③ Results less than 5 times LOR preclude acceptance criteria for RPD.
 - ④ Recovery failed acceptance criteria due to matrix interference.
 - ⑤ Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
 - ⑥ LOR was raised due to sample matrix interference.
 - ⑦ LOR was raised due to dilution of significantly high concentration of analyte in sample.
 - ⑧ Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
 - ⑨ Recovery failed acceptance criteria due to sample heterogeneity.
 - ⑩ LOR was raised due to high conductivity of the sample (required dilution).
 - † Refer to Analytical Report comments for further information.

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SAMPLE RECEIPT ADVICE

SE174604

CLIENT DETAILS

Contact Amy Valentine
Client WSP AUSTRALIA PTY LIMITED
Address GPO Box 5394
SYDNEY NSW 2001

Telephone 02 9272 5100
Facsimile 02 9272 5101
Email amy.valentine@wsp.com

Project **PS107410 Armidale High School**
Order Number **PS107410**
Samples 2

LABORATORY DETAILS

Manager Huong Crawford
Laboratory SGS Alexandria Environmental
Address Unit 16, 33 Maddox St
Alexandria NSW 2015

Telephone +61 2 8594 0400
Facsimile +61 2 8594 0499
Email au.environmental.sydney@sgs.com

Samples Received Mon 22/1/2018
Report Due Tue 30/1/2018
SGS Reference **SE174604**

SUBMISSION DETAILS

This is to confirm that 2 samples were received on Monday 22/1/2018. Results are expected to be ready by COB Tuesday 30/1/2018. Please quote SGS reference SE174604 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provided	Other Lab	Sample cooling method	Ice
Samples received in correct containers	Yes	Sample counts by matrix	2 Soil
Date documentation received	22/1/2018	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	5.3°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

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SAMPLE RECEIPT ADVICE

SE174604

CLIENT DETAILS

Client WSP AUSTRALIA PTY LIMITED

Project PS107410 Armidale High School

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	Total Recoverable Elements in Soil/Waste	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	QA1A	1	26	7	10	12	8
002	QA2A	1	26	7	10	12	8

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.

The numbers shown in the table indicate the number of results requested in each package.

Please indicate as soon as possible should your request differ from these details .

Testing as per this table shall commence immediately unless the client intervenes with a correction .



SAMPLE RECEIPT ADVICE

SE174604

CLIENT DETAILS

Client WSP AUSTRALIA PTY LIMITED

Project PS107410 Armidale High School

SUMMARY OF ANALYSIS

No.	Sample ID	Moisture Content
001	QA1A	1
002	QA2A	1

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SGS #59,36 3606-607



CHAIN OF CUSTODY
ALS Laboratory
please tick

GADELSIDE 21 Isura Road Thornaby SA 5035
Ph: 08 8354 0600 E: als@als.com.au

GERROLDANE 32 Strand Street Salford QLD 4050
Ph: 07 3243 7222 E: samples@als.com.au

GOULDSBORO 45 Callenbach Drive Glenview QLD 4850
Ph: 07 7471 5900 E: als@als.com.au

GRACKAY 18 Harbour Road Mackay QLD 4740
Ph: 07 4944 5177 E: mackay@als.com.au

IMBOLDURNE 2-4 Wood Road Springvale VIC 3171
Ph: 03 8542 2500 E: samples.melbourne@als.com.au

IMBOLDURNE 27 Sydney Road Mulvey NSW 2860
Ph: 02 6272 8730 E: madgno.mel@als.com.au

NEWCASTLE 5455 Melton Rd Mayfield West NSW 1585
Ph: 02 4014 2500 E: als@als.com.au

UNSW 4113 Geary Place North Sydney NSW 2058
Ph: 02 9423 2063 E: renew@als.com.au

PERTH 10 Hod Way Malaga WA 6060
Ph: 08 9205 7655 E: samples.perth@als.com.au

CLIENT: WSP

OFFICE: LEVEL 3, 55 Bolton Street, Newcastle, NSW 2300

PROJECT: Armidale High School

ORDER NUMBER: PS107410

PROJECT MANAGER: Amy Valentine

SAMPLER: Wendy Cadelago

COC emailed to ALS? (YES / NO)

Email Reports to (will default to PM if no other addresses are listed): amy.valentine@wsp.com

Email Invoice to (will default to PM if no other addresses are listed): AP Invoices

TURNAROUND REQUIREMENTS: ☒ Standard TAT (List due date):
(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)

ALC QUOTE NO.: EN-005-15 V7

RELINQUISHED BY: *Wendy Cadelago*

DATE/TIME: 19/1/18

FOR LABORATORY USE ONLY (Circle)

COB: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

RECEIVED BY: *[Signature]*

DATE/TIME: 19/1/18 16:50

RECEIVED BY: *[Signature]*

DATE/TIME: 19/1/18 17:00

RECEIVED BY: *P. Tran*

DATE/TIME: 19/1/18 7:39

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS		CONTAINER INFORMATION		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		
	MATRIX: SOLID (S) WATER (W)										
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (codes below)	(refer to)	TOTAL CONTAINERS	W4 (TRIMTEXN)	PAHs & metals	PCBs, OPPs & OCPs	asbestos	
1	HA1_0	18/01/2018	S				X	X		X	
2	HA1_0.5	18/01/2018	S				X	X			
3	HA2_0	18/01/2018	S				X	X		X	
4	HA3_0	18/01/2018	S				X	X		X	
5	HA3_0.5	18/01/2018	S				X	X			
6	HA4_0	18/01/2018	S				X	X		X	
7	HA5_0	18/01/2018	S				X	X		X	
8	HA5_0.5	18/01/2018	S				X	X			
9	HA6_0	18/01/2018	S				X	X		X	
10	HA6_0.5	18/01/2018	S				X	X			
11	HA7_0	18/01/2018	S				X	X		X	
12	HA7_0.7	18/01/2018	S				X	X			
TOTAL											

Asbestos / Newcastle
 Organised By / Date:
 Relinquished By / Date:
 Console / Courier:
 WO No:
 Attach By PO / Internal Job No.

Environmental Division
 Sydney
 Work Order Reference
ES1802402

SGS EHS Alexandria Laboratory

SE174604 COC
 Received: 22-Jan-2018

Water Centrifuge Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
 V = VOA Vial HCl Preserved; VD = VOA Vial Sodium Bisulfate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial 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 Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solids; S = Unpreserved Bag



CHAIN OF CUSTODY

ALS Laboratory
please tick →

CHICAGO 24 Sussex Road Potts Point NSW 2011
Ph: 02 9330 8800 E: adelaide@alsglobal.com

CHICAGO 32 Strand Street St Leonards NSW 1585
Ph: 02 9439 7222 E: samples@alsglobal.com

CHICAGO 48 Calverley Drive Crows Nest NSW 1585
Ph: 02 9439 7222 E: giedrone@alsglobal.com

CHICAGO 18 Harbour Road Mackay QLD 4740
Ph: 07 4644 9177 E: mackay@alsglobal.com

CHICAGO 2-4 Westall Road Springvale VIC 3171
Ph: 03 9549 9600 E: samples.melbourne@alsglobal.com

CHICAGO 27 Sydney Road Melbourne VIC 3000
Ph: 02 8272 8735 E: melbourne@alsglobal.com

CHICAGO 5685 Maitland Rd Mayfield NSW 1570
Ph: 02 4214 2500 E: samples.newcastle@alsglobal.com

CHICAGO 613 Geary Place North Sydney NSW 1585
Ph: 02 4383 3053 E: north@alsglobal.com

CHICAGO 10 Haslemere Way WA 6000
Ph: 08 9209 7655 E: samples.perth@alsglobal.com

CLIENT: WSP

OFFICE: LEVEL 3, 55 Bolton Street, Newcastle, NSW 2300

PROJECT: Armidale High School

ORDER NUMBER: PS107410

PROJECT MANAGER: Amy Valentine

SAMPLER: Wendy Cadalago

COC emailed to ALS? (YES / NO)

Email Reports to (will default to PM if no other addresses are listed): amy.valentine@wsp.com

Email Invoice to (will default to PM if no other addresses are listed): AP Invoices

TURNAROUND REQUIREMENTS:

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

ALS QUOTE NO.: EN-085-15 V7

CONTACT PH: +61292725139

SAMPLER MOBILE: 0421256834

EDD FORMAT (or default):

Standard TAT (List due date):

Non Standard or urgent TAT (List due date):

RELINQUISHED BY:

DATE/TIME:

19/1/18

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

RECEIVED BY:

DATE/TIME:

19/1/18 16:50

FOR LABORATORY USE ONLY: (Circle)

Custody Seal Intact? Yes No

Page 1 of 2: Ice bricks present upon receipt? Yes No

Random Sample Temperature on Receipt: 19.0

Other comment:

RELINQUISHED BY:

DATE/TIME:

19/1/18 17:00

RECEIVED BY:

DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	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 bottle required) or Dissolved (field filtered bottle required).								Additional Information	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (codes below)	(refer to)	TOTAL CONTAINERS	W4 (TRUBITEKN)	PAHs & metals	PCBs, OPPs & OCPs	asbestos					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
25	HA16_0	18/01/2018	S				X	X		X					
26	HA16_0.5	18/01/2018	S												
27	HA17_0	18/01/2018	S				X	X		X					
28	HA18_0	18/01/2018	S				X	X		X					
29	C1	18/01/2018	S						X						
30	C2	18/01/2018	S						X						
31	C3	18/01/2018	S						X						
32	C4	18/01/2018	S						X						
33	QA1	18/01/2018	S				X	X							
34	QA1A	18/01/2018	S												
35	QA2	18/01/2018	S				X	X							
36	QA2A	18/01/2018	S												
TOTAL															

Water Container Codes: P = Unpreserved Plastic; R = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airtight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulfate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airtight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Ferric chloride Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sigma Bottle; AS = Plastic Bag for Acid Sulfate Solids; B = Unpreserved Bag.

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18/01/18 Extra