

EJE Architecture

Ballina High School Redevelopment

Burnet Street Ballina

Phase 1 Site Contamination Assessment Report

Report No. RGS306738.1 – AC

25 February 2016

REGIONAL
GEOTECHNICAL SOLUTIONS





Manning-Great Lakes

Port Macquarie

Coffs Harbour

RGS306738.1 – AC

25 February 2016

EJE Architecture
412 King Street
NEWCASTLE NSW 2300

Attention: Grant Schultz

Dear Grant

RE: Ballina High School Redevelopment – Burnett Street Ballina NSW
Phase 1 Site Contamination Assessment Report

Regional Geotechnical Solutions Pty Ltd (RGS) has completed a Phase 1 site contamination assessment (SCA) at Ballina High School which comprises four adjoining properties. It is proposed to demolish the existing buildings and redevelop the site as a new 1,200 student high school. This report presents the results of the assessment.

The Phase 1 site contamination assessment presented herein was undertaken in conjunction with the geotechnical assessment presented in report no. RGS30738.1–AB. A Hazardous Materials Risk Assessment has also been undertaken for the school by Greencap (Ref: C112985 : J141360 dated January 2016). RGS was provided with the first five pages of this document, for review in the preparation of this SCA report.

The existing school buildings and proposed new development will occupy the southern portion of the overall site which comprises an area of approximately 6 ha. The northern portion consists of vacant playing fields with mature trees and garden areas around the perimeter.

The site history indicates that the first school building was constructed on the southern portion of the site (Lot 392, DP755684) in 1915 and has developed and expanded as a school since that time. Prior to this the land was dedicated "as site for public market" from 1886. Lot 478, DP729251 was originally the continuation of Burnet Street from Cherry Street to Martin Street, bisecting the northern and southern parts of the site. Burnet Street was closed circa 1975 and transferred to the school. The northern portion of the site, Lot 477, DP729251 has been gazetted Crown Land "for public recreation" since 1880 and in 1990 transferred to the Minister for Education and Training.



The assessment has identified four areas of environmental concern (AEC) which generally relate to the site's past usage and building materials. The laboratory analysis has identified the following:

- No asbestos within any of the samples tested.
- Trace concentrations of heavy metals at near background levels and well below the adopted assessment criteria.
- Slightly elevated levels of Polynuclear Aromatic Hydrocarbons (PAH) in HA9 but well below the adopted assessment criteria.
- Slightly elevated levels of Total Recoverable Hydrocarbons (TRH - F3, C16 – C34 fraction) in HA4 but well below the adopted assessment criteria.
- All other analytes were below the limit of recording and therefore well below the adopted assessment criteria.

On the basis of the findings presented herein the following recommendation are made:

- Implement the recommendations as outlined in the Hazardous Materials Risk Assessment;
- Undertake further assessment, sampling and testing as required following demolition of buildings and hardstand areas if potential contamination is identified (soil staining, odours etc.);
- Undertake site validation and testing as required and prepare site validation report.

Following implementation of the above the site would be suitable for the proposed development.

If you have any questions regarding this project, or require any further assistance, please do not hesitate to contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Adam Holzhauser

Senior Geotechnical Engineer



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1 INTRODUCTION

Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a Phase 1 site contamination assessment (SCA) at Ballina High school where it is proposed to demolish the existing buildings and redevelop the site as a new 1,200 student high school. This report presents the results of the assessment.

The site comprises four adjoining lots approximately 6ha in size bound by Cherry, Swift, Martin and Bentinck Streets as identified below:

- Lot 392, DP755684;
- Lot 478, DP729251;
- Lot 1, DP083219; and
- Lot 477, DP729251.

The development will involve the demolition of the existing buildings and construction of a new 1,200 student high school facility. The development is still in the concept planning stages. As such specific details of the proposed building configurations and locations are yet to be determined. The proposed building layout is unknown, however, the majority of the buildings are likely to be constructed over the southern portion of the site (Lot 392, DP755684) in place of the existing buildings once demolished.

The purpose of the Phase 1 SCA as presented herein was to assess the potential for contamination as a result of current and past land uses. The assessment involved a brief review of site history to assess evidence of potentially contaminating past land uses, followed by observation of site conditions and sampling and analysis of soils for a broad suite of common contaminants.

2 ASSESSMENT METHODOLOGY

The site contamination assessment was undertaken in accordance with the relevant sections of the NSW EPA, *Guidelines for Consultants Reporting on Contaminated Sites*, and involved the following process:

- A brief study of site history, with the aim of identifying past activities on or near the site that might have the potential to cause contamination;
- Site walkover to assess visible surface conditions and identify evidence of contamination, or past activities that may cause contamination;
- Search of Environmental Protection Authority (EPA) website for any contamination notices for the site;
- Discussion with school principal and grounds staff to assess possible past land uses or activities that may present potential sources of contamination or contaminating activities; and
- Drilling of boreholes and collection of samples for analysis.



Samples were collected from the boreholes drilled around the site. Samples were then selected for laboratory analysis on the basis of the materials encountered and AECs, and analysed for a broad suite of potential contaminants associated with the past land use activities.

The results of the laboratory analysis were evaluated against the health investigation levels for Residential A land use as outlined in National Environmental Protection (Assessment of Site Contamination) Measure 1999, as updated in 2013 (NEPM 2013).

3 SITE DESCRIPTION

The site is located in Ballina CBD on a flat low lying estuarine spit associated with the Richmond River which lies approximately 600m to 700m to the north and south. The Google earth image below illustrates the site setting and features.

Diagram 1 Site Setting and Features



Ballina High School occupies an area of approximately 6ha comprising open playing fields over the northern portion and the existing school buildings and facilities over the southern portion. Burnet Street once bisected the site. Numerous garden beds, shrubs and large trees including eucalypt, Norfolk Pine and fig are scattered around the site. The existing buildings include some single but predominately double storey masonry with slab on ground and concrete and timber upper floor levels. The buildings vary in age with the earliest building dating from about 1915. Building materials include concrete and brick, weatherboards and fibro cladding. An internal assessment of the buildings was not undertaken, but the Hazardous Materials Risk Assessment undertaken by Greencap has identified a number of hazardous materials including asbestos, PCBs, lead paint etc.



The school is surrounded by residential development to the west, east and north. St Francis Xavier Primary School is located to the south. Hampton Park Tennis courts and Ballina Bowling and Recreation Club are located to the north west.

Selected site photographs are provided below.

Plate 1 Selected Site Photographs

	
1. Older style two storey buildings with lower level masonry and upper level timber.	2. Two storey full masonry with concrete floor slabs and reinforced concrete frames.
	
3. Playing field to the north of the school buildings.	4. Looking east along the old alignment of Burnet Street. Now occupied by carpark, buildings and concrete playing courts.

4 SITE HISTORY

4.1 NSW EPA Records

A search of the NSW EPA website (www.epa.nsw.gov.au) revealed that no notices have been issued for the site under the Contaminated Land Management Act (1997).



4.2 Land Title Search

A land title search was undertaken by Advanced Legal Searches Pty Ltd. A summary of the search results is presented below with the details of the search presented in Appendix D.

Table 2 Summary of Title Search

Lot / DP	Year	Proprietor	Occupation / Site usage
Lot 477, DP 729251	1880 to 1975	Crown Land	Reserve NO. 606, for Public Recreation
	1975 to 1990	Crown Land	For Public School Purpose, in 16/12/1927
	1990 to present	Minister for Education and Training	School
Lot 478, DP 729251	prior to 1990	Crown Land	Road
	1990 to present	Minister for Education and Training	School
Lot 392, DP 755648	1886 - 1927	Crown Land	Dedicated as site for public market 26/3/1927
	1927 - 1990	Crown Land	Dedicated for public school purposes 16/12/1927
	1990 - present	Minister for Education and Training	School

4.3 Site History Summary

The site history indicates the majority of the site has been used for school purposes since circa 1915. Prior to this the area was used for public recreation or public markets. Burnet Street divided the northern and southern portion of the site until the mid -1970s when ownership was transferred to the Minister of Education and Training and the road was closed and converted for school usage which includes car parking areas, buildings, concrete playing courts and landscaped areas.

The surrounding areas have historically and are presently residential.

5 GEOLOGY

The 1:25,000 Coastal Quaternary Geology map of Tweed Heads indicates the site is underlain by Quaternary alluvial deposits comprising river gravels, sand and clay.

In summary the investigations have encountered a deep alluvial sand profile comprising:



Fill: Silty sand fill was encountered to depths of up to 0.6m but generally to about 0.3m depth. The fill was predominately encountered over the southern, developed portion of the site, and is likely to be associated with the past building works

Topsoil: Silty sand topsoil was encountered over the northern portion and parts of the southern portion of the site to a depth of up to 0.3m; overlying

Alluvial soils: Alluvial sand, loose to depths of between 2.5 to 3.5m, increasing to medium dense, then dense to very dense from depths of 10 to 12m. The testing indicates the dense sands extend to depths in excess of 25m (CPT-3).

Further details of the profile are provided in the engineering logs presented in Appendix A.

Groundwater

A groundwater bore search on the NSW Water Information website, <http://waterinfo.nsw.gov.au/gw/> indicates there are a number of licensed groundwater bores nearby as illustrated in Diagram 2 below.

Diagram 2 Groundwater Bore locations



Groundwater seepage was encountered during the drilling of the boreholes and CPT testing at depths varying between 0.9m to 2.0m. A summary of the groundwater observations within the standpipe piezometers installed at the site are presented in Table 1.

Table 1: Summary of Groundwater Observations

Borehole	Inflow Depth During Drilling (m)	Standing Water depth (mBGL) (28/1/16)
BH2 (GW1)	1.2 (18/1/2016)	1.45 (1230)
BH5 (GW2)	1.2 (20/1/2016)	1.40 (1400)
BH6 (GW3)	1.2 (21/1/2016)	1.30 (1415)



6 SITE CONTAMINATION ASSESSMENT

6.1 Guidelines and Assessment Criteria

The assessment was carried out in accordance with the National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013). The NEPM document provides a range of guidelines for assessment of contaminants for various land uses. It is proposed to redevelop the high school, which is considered a sensitive land use and therefore, as the most sensitive land use scenario in the NEPM Guidelines, the investigation levels for "Residential A" land use have been adopted as the primary investigation criteria. The use of these residential criteria for evaluation of a school site is conservative.

In accordance with the NEPM guidelines the following criteria were adopted for this assessment:

- Health Screening Levels (HSL) for Residential A land use were used to assess the potential human health impact of asbestos;
- Health Investigation Levels (HIL) for Residential A land use were used to assess the potential human health impact of heavy metals and PAH;
- Health Investigation Levels (HIL) for Residential A land use were used to assess the potential human health impact of Polychlorinated biphenyls (PCBs);
- Health Investigation Levels (HIL) for Residential A land use were used to assess the potential human health impact of Organochlorine Pesticides (OC) and Organophosphorus Pesticides (OP);
- Health Screening Levels (HSL) for coarse textured (sand) or fine textured (silt or clay) soils for Residential A land use were adopted as appropriate for the soils encountered to assess the potential human health impact of petroleum hydrocarbons and BTEX compounds;
- Ecological Investigation Levels (EIL) for Residential A land use were used for evaluation of the potential ecological / environmental impact of heavy metals and PAH;
- Ecological Screening Levels (ESL) for coarse textured (sand) or fine textured (silt or clay) soils for Residential A land use were adopted as appropriate for the soils encountered, to assess the potential ecological / environmental impact of petroleum hydrocarbons and BTEX compounds;

In accordance with NEPM 2013, exceedence of the criteria does not necessarily deem that remediation or clean-up is required, but is a trigger for further assessment of the extent of contamination and associated risks. The adopted criteria are presented in Table 2.



Table 2: Adopted Soil Investigation Criteria (mg/kg)

Analyte	Adopted Soil Investigation Criteria	Analyte	Adopted Soil Investigation Criteria
Benzene	0.5 ⁽¹⁾	Aldrin / Dieldrin	6
Toluene	160 ⁽¹⁾	Chlordane	50
Ethyl-benzene	55 ⁽¹⁾	Heptachlor	6
Xylene	40 ⁽¹⁾	Copper	6,000
TPH C ₆ – C ₁₀ (F1)	180 ⁽²⁾	Lead	300
TPH C ₁₀ – C ₁₆ (F2)	120 ⁽²⁾	Zinc	7,400
TPH C ₁₆ – C ₃₄ (F3)	300 ⁽²⁾	Cadmium	20
TPH C ₃₄ – C ₄₀ (F4)	2800 ⁽²⁾	Chromium (VI)	100
BaP TEQ	3	Arsenic	100
Total PAHs	300	Nickel	400
Phenol	3,000	Mercury	40
DDT+DDE+DDD	240	Asbestos	0.001%

NOTES:

1. Based on health screening levels for vapour intrusion 0m to <1m
2. Based on ecological screening levels (ESL).

6.2 Areas of Environmental Concern and Chemicals of Concern

On the basis of the assessment undertaken four areas of environmental concern have been identified. Table 3 outlines the areas of environmental concern and chemicals of concern.



Table 3: Areas of Environmental Concern and Chemicals of Concern

Area of Environmental Concern		Mode of potential contamination	Chemicals of Concern	Receptor
1	Fill	Fill up to about 0.6m was encountered over the site. The origins of the fill are unknown and may contain contaminants.	Heavy Metals, Asbestos, TPH, BTEX, PCB, PAH, Phenolic Compounds, OC/OPP	Fill material
2	Surface soils	Potential contamination from past uses such as oil, fuel and chemical spills and storage and building materials including asbestos, lead based paints etc. Possible spraying for pest / weed control.	Heavy Metals, Asbestos, TPH, BTEX, PCB, Phenolic Compounds, PAH, OC/OPP	Surface soils
3	Building Materials	Potential contaminating materials including asbestos, lead based paints etc.	Heavy Metals, Asbestos	Building materials and surface soils
4	Old Road Corridor	Potential contamination from past and current uses such as oil, fuel and chemical spills. Imported fill materials	Heavy Metals, Asbestos, TPH, BTEX, PCB, PAH, Phenolic Compounds, OC/OPP	Soils including fill and surrounding soils
Heavy Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc BTEX - Benzene, Toluene, Ethylbenzene and Xylene PCB – Polychlorinated Biphenyls TPH - Total Petroleum Hydrocarbons PAH – Polycyclic Aromatic Hydrocarbons OC/OPP – Organochlorine and Organophosphorus Pesticides				



6.3 Field Work

6.3.1 Investigations and Sampling

Fieldwork was carried out in January 2016 and included:

- Site walkover assessment, observation and mapping of surface features and existing structures with aim of identifying areas of potential contamination concern; and
- Drilling, logging and sampling of thirteen shallow hand auger boreholes and six deep drill rig boreholes.

Samples were collected from the boreholes at various depths and from the surface for subsequent laboratory analysis as detailed in Section 6.4. The samples were collected in laboratory supplied acid-rinsed glass jars and placed in an ice-chilled cooler while on site and during transit to the laboratory where the samples were refrigerated.

Samples were then selected for analysis based on a combination of sample location and field observations (i.e. material type and proximity to areas of environmental concern).

The fieldwork was undertaken by a Senior Geotechnical Engineer from RGS. Engineering logs of the boreholes are presented in Appendix B. The approximate location of the boreholes are shown on Figure 1.

6.4 Laboratory Analysis

Thirteen soil samples were transported under chain-of-custody to ALS Laboratory Group, a NATA accredited specialist chemical testing laboratory. The samples were analysed for the following suite of contaminants;

- Asbestos (absence / presence)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH)
- Benzene, Toluene, Ethyl-benzene, Xylenes (BTEX)
- Polychlorinated Biphenyls (PCB)
- Organochlorine and Organophosphorus Pesticides (OCPs and OPPs)
- Heavy metals (arsenic, cadmium, chromium, cobalt, copper, lead, mercury, and zinc).

The results are presented in Appendix B.

6.5 Quality Control

Samples were obtained using industry accepted protocols for sample treatment, preservation, and equipment decontamination. One duplicate sample was submitted to the laboratory for analysis. Comparison of the test results on the primary and duplicate sample generally show good correlation. The primary and corresponding duplicate sample are identified below.



- Primary HA3 – 0.3 to 0.4, duplicate - D1

In addition to the field QC procedures, the laboratory conducted internal quality control testing including surrogates, blanks, and laboratory duplicate samples. The results are presented with the laboratory test results in Appendix B.

All laboratory quality control data is within acceptable limits for the tests carried out. Therefore on the basis of the results of the field and laboratory quality control procedures and testing the data is considered to reasonably represent the concentrations of contaminants in the soils at the sample locations at the time of sampling and the results can be adopted for this assessment.

6.6 Soil Sampling

In consideration of the site conditions and assessed areas of environmental concern a sampling plan was prepared with the aim of targeting these areas of concern. Thirteen soil samples were collected for analysis. Approximate sampling locations are shown on Figure 1. A summary of the soils present at the sampled locations is presented below in Table 4.

Table 4: Soil Sampling Summary

Sample Location	Depth (m)	Area of Environmental Concern	Sample Description
HA1	0.0 – 0.1	1,2,3	Fill, sand
HA2	0.0 – 0.1	1,2,3	Fill, sand
HA3	0.0 – 0.1	1,2,3	Fill, sand
HA3	0.3 – 0.4	1,2,3	Sand – old topsoil
HA4	0.0 – 0.1	1,2,3	Fill, sand
HA5	0.1 – 0.2	1,2,3	Fill, sand
HA5	0.2 – 0.3	1,2,3	Fill, sand
HA6	0.1 – 0.2	1,2,3	Fill, sand
HA7	0.1 – 0.2	1,2,3	Fill, sand
HA8	0.2 – 0.3	1,2,3	Fill, sand
HA9	0.1 – 0.2	1,2,3	Fill, sand
HA10	0.1 – 0.2	1,2,3	Fill, sand
D1	Duplicate (HA3 0.3 – 0.4)	- -	Sand – old topsoil

6.7 Results of Analysis

An evaluation of the laboratory test results against the adopted soil assessment criteria as presented in Table 2 is provided below:

- No asbestos was detected in any of the samples tested.



- Results of heavy metal analysis revealed some elevated levels, however, the concentrations encountered were below the adopted soil investigation criteria.
- Results of BTEX analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria for BTEX compounds.
- Results of PCB analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria for PCB compounds.
- Results of TRH C6-C10 (F1) analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria.
- Results of TRH C10-C16 (F2) analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria.
- Results of TRH C16-C34 (F3) analysis revealed elevated concentrations in sample HA4 0.0 – 0.1 (110mg/kg), all other samples tested were below the level of reporting. However the values are below the adopted assessment criteria of 300mg/kg.
- Results of TRH C34-C40 (F4) analysis revealed concentrations below the level of reporting in all samples tested and therefore below the adopted assessment criteria.
- Results of PAH analysis revealed detectable concentrations of various analytes in sample HA9 0.1 – 0.2. However, the values are below the adopted assessment criteria.
- Results of organochlorine and organophosphorus pesticide analysis recorded values below level of recording for all samples tested.

7 ASSESSMENT AND CONCLUSIONS REGARDING SITE CONTAMINATION

The site has historically been used for 'Public Recreation' and 'Public Market' with the school originally established circa 1915. Burnet Street bisected the northern and southern portions of the site up until circa 1975 when it was transferred to the school connecting the northern and southern parts. There is no historical evidence of past development of the northern portion of the site currently occupied by grassed playing fields. The southern portion of the site has continued to expand with additional school buildings being constructed at various times since 1915. The site assessment identified four areas of environmental concern.

The Hazardous Materials Risk Assessment completed by Greencap has identified several hazardous materials within the existing buildings, including asbestos (friable and Non Friable). The recommendations with regard to treatment of these materials prior to and during demolition should be strictly adhered to.

The assessment as presented herein did not identify any wide spread or significant levels of contamination that would trigger the need for further assessment or the development and implementation of a Remedial Action Plan (RAP).

Large areas of the site have not been assessed as they were not accessible at the time of the assessment including areas below the buildings and concrete paved areas. If, during demolition potential contaminating sources or contaminated materials are identified (staining, odours) then work should cease and further assessment should be sought.



Following the implementation of the recommendations presented herein and within the Hazardous Materials Risk Assessment report prepared by Greencap redevelopment of the site would be feasible from a site contamination perspective.

8 MATERIAL DISPOSAL

Material disposal requirements are at this point unknown. All material disposal should be undertaken in accordance with the relevant regulatory requirements. Asbestos removal and disposal should only be undertaken by contractors with appropriate licences to do so for the materials encountered. In this case it is recommended that only those contractors licenced for friable asbestos removal (Class A licence) be engaged given the identification of friable asbestos on the site.

Any soil to be disposed of must be assessed in accordance with the NSW EPA Waste Classification Guidelines Part 1: Classifying Waste.

9 LIMITATIONS

The sampling and testing regime has broadly covered the site however the potential for isolated areas of contamination remains.

The findings of this assessment are the result of sampling and analysis at specific locations using methodologies adopted in accordance with accepted industry practices and standards. It is considered that the results represent a reasonable interpretation of the conditions at the site in relation to contamination resulting from past site activities. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.

Should conditions that differ from those described in this report be encountered during construction such as areas exhibiting signs of possible contamination, staining, odours or foreign material then RGS should be contacted immediately.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Adam Holzhauser

Senior Geotechnical Engineer



Figures



Client	EJE Architecture	Job No.	RGS30738.1
Project:	Ballina High School Redevelopment	Drawn By:	Adam Holzhauser
	Ballina NSW	Date:	18-Feb-16
Title:	Test Location Plan	Drawing No.	FIGURE 1



Appendix A

Engineering Logs



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment
LOCATION: Refer to Figure 1

BOREHOLE NO: BH-HA2
PAGE: 1 OF 1
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

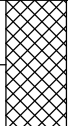
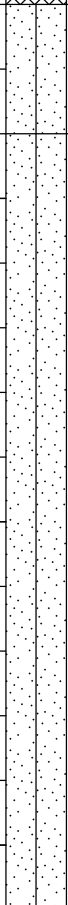
DRILL TYPE: Hand Auger
BOREHOLE DIAMETER: 100 mm
SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA		ASb ES 0.10m					FILL/TOPSOIL: Silty SAND, dark grey, contains roots and a trace of fine gravel in upper 100-200mm					FILL/TOPSOIL: GRASS
				0.5			Silty SAND: Fine, dark grey	M	L			ALLUVIAL
				1.0			SAND: Fine, pale grey brown					
				1.25m			Hole Terminated at 1.25 m Borehole collapsing below water table	W				
				1.5								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density		V	Very Loose	Density Index <15%
		HP Hand Penetrometer test (UCS kPa)		L		L	Loose	Density Index 15 - 35%
				MD		MD	Medium Dense	Density Index 35 - 65%
				D		D	Dense	Density Index 65 - 85%
				VD		VD	Very Dense	Density Index 85 - 100%

DRILL TYPE: Hand Auger
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA		ASb ES 0.10m					FILL: Silty SAND, fine, dark brown, contains rootlets and a trace of medium to coarse gravel	M				FILL: GRASS
						0.20m	Silty SAND: Fine, dark grey					OLD TOPSOIL
		ASb ES 0.40m				0.40m	Silty SAND: Fine, pale grey mottled brown, contains a trace of roots and cemented sand nodules					ALLUVIAL
				0.5		SP			L			
				1.0		SP						
				1.5				W				
				1.60m								
							Hole Terminated at 1.60 m Borehole collapsing below water table					

LEGEND:

Water

-  Water Level
 (Date and time shown)
-  Water Inflow
-  Water Outflow

Strata Changes

- — Gradational or transitional strata
—— Definitive or distinct strata change

Notes, Samples and Tests

- | | |
|-----------------|--|
| U ₅₀ | 50mm Diameter tube sample |
| CBR | Bulk sample for CBR testing |
| E | Environmental sample
(Glass jar, sealed and chilled on site) |
| ASS | Acid Sulfate Soil Sample
(Plastic bag, air expelled, chilled) |
| B | Bulk Sample |

Field Tests

- | | |
|----------|---|
| PID | Photoionisation detector reading (ppm) |
| DCP(x-y) | Dynamic penetrometer test (test depth interval shown) |
| HP | Hand Penetrometer test (UCS kPa) |

Consistency

- | | | |
|-----|------------|-----------|
| VS | Very Soft | <25 |
| S | Soft | 25 - 50 |
| F | Firm | 50 - 100 |
| St | Stiff | 100 - 200 |
| VSt | Very Stiff | 200 - 400 |
| H | Hard | >400 |
| Fb | Friable | |

UCS (kPa)

- <25
25 - 50
50 - 100
100 - 200
200 - 400
>400

Moisture Condition

- | | |
|-------|---------------|
| D | Dry |
| M | Moist |
| W | Wet |
| W_p | Plastic Limit |
| W_l | Liquid Limit |

Density

- | <u>Density</u> | | | |
|----------------|--------------|---------------|-----------|
| V | Very Loose | Density Index | <15% |
| L | Loose | Density Index | 15 - 35% |
| MD | Medium Dense | Density Index | 35 - 65% |
| D | Dense | Density Index | 65 - 85% |
| VD | Very Dense | Density Index | 85 - 100% |



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment
LOCATION: Refer to Figure 1

BOREHOLE NO: BH-HA4
PAGE: 1 OF 1
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Hand Auger
BOREHOLE DIAMETER: 100 mm
SURFACE RL: AHD
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA		ASb ES 0.10m					FILL: Silty SAND, fine grained, brown, contains rootlets					FILL: GRASS
							0.25m SAND: Fine, pale grey	D				ALLUVIAL
				0.5		SP	0.50m Silty SAND: Fine, dark grey					
						SP	0.80m SAND: Fine, pale brown	M	L			
				1.0		SP	1.20m	W				
							Hole Terminated at 1.20 m Borehole collapsing below water table					
				1.5								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density	V	Very Loose	Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)			L	Loose	Density Index 15 - 35%	
					MD	Medium Dense	Density Index 35 - 65%	
					D	Dense	Density Index 65 - 85%	
					VD	Very Dense	Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH-HA5**
PAGE: 1 OF 1
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Hand Auger
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA	Not Encountered						WOODCHIP MULCH: Pale brown	M				GARDEN BED
		0.20m					FILL: Silty SAND, fine, contains clay fines, gravel, organic matter and brick/concrete fragments					
		ASb ES 0.30m					0.30m	Hole Terminated at 0.30 m Refusal on brick/concrete fragments				
				0.5								
				1.0								
				1.5								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density		V	Very Loose	Density Index <15%
		HP Hand Penetrometer test (UCS kPa)		L	Loose	MD	Medium Dense	Density Index 15 - 35%
				D	Dense	D	Dense	Density Index 35 - 65%
				VD	Very Dense			Density Index 65 - 85%
								Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment
LOCATION: Refer to Figure 1

BOREHOLE NO: BH-HA6
PAGE: 1 OF 1
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Hand Auger
BOREHOLE DIAMETER: 100 mm
SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result		
HA		0.10m					FILL/TOPSOIL: Silty SAND, fine, dark grey, contains rootlets	M				FILL/TOPSOIL: GRASS	
		ASb ES 0.20m					SAND: Fine, grey brown						ALLUVIAL
						SP					L		
				1.0									
												</	

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density	V	Very Loose	Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)			L	Loose	Density Index 15 - 35%	
					MD	Medium Dense	Density Index 35 - 65%	
					D	Dense	Density Index 65 - 85%	
					VD	Very Dense	Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment
LOCATION: Refer to Figure 1

BOREHOLE NO: BH-HA7
PAGE: 1 OF 1
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Hand Auger
BOREHOLE DIAMETER: 100 mm
SURFACE RL: AHD
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA		0.10m ASb ES 0.20m					FILL/TOPSOIL: Silty SAND, fine, dark brown, contains rootlets and trace of plastic					FILL/TOPSOIL: GRASS
							0.25m Clayey SAND: Fine, dark brown					ALLUVIAL
							0.65m SAND: Fine, pale grey					
							1.10m Hole Terminated at 1.10 m Borehole collapsing below water table					

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change		Notes, Samples and Tests U ₅₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)		Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense		UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400 Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	
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ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment
LOCATION: Refer to Figure 1

BOREHOLE NO: BH-HA8
PAGE: 1 OF 1
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Hand Auger
BOREHOLE DIAMETER: 100 mm
SURFACE RL: AHD
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA		0.20m ASb ES 0.30m					FILL: Silty SAND, fine to medium grained, dark brown, contains clay fines and a trace of fine gravel					FILL: GRASS
				0.5		SP	Clayey SAND: Fine, pale grey brown mottled orange brown		L - MD			ALLUVIAL
				1.0		SP	SAND: Fine, pale brown	M	L			
				1.25m			Hole Terminated at 1.25 m Borehole collapsing below water table	W				
				1.5								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density	V	Very Loose	Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)			L	Loose	Density Index 15 - 35%	
					MD	Medium Dense	Density Index 35 - 65%	
					D	Dense	Density Index 65 - 85%	
					VD	Very Dense	Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment
LOCATION: Refer to Figure 1

BOREHOLE NO: **BH-HA9**
PAGE: 1 OF 1
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Hand Auger
BOREHOLE DIAMETER: 100 mm
SURFACE RL: AHD
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA		0.10m					TOPSOIL: Silty SAND, fine, dark grey, contains roots and rootlets					TOPSOIL: GRASS
		ASb ES 0.20m					0.25m					ALLUVIAL
							Silty SAND: Fine, dark grey					
				0.5		SP	0.60m	M	L			
				1.0		SP	Clayey SAND: Fine, pale grey brown mottled orange brown	W				
				1.05m			Hole Terminated at 1.05 m Borehole collapsing below water table					
				1.5								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density	V	Very Loose	Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)			L	Loose	Density Index 15 - 35%	
					MD	Medium Dense	Density Index 35 - 65%	
					D	Dense	Density Index 65 - 85%	
					VD	Very Dense	Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH-HA10**
PAGE: 1 OF 1
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Hand Auger

BOREHOLE DIAMETER: 100 mm

SURFACE RL:

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA	Not Encountered	0.10m					FILL/TOPSOIL: Silty SAND, fine, dark grey, contains roots, rootlets and fine gravel	M				FILL/TOPSOIL: GRASS
		ASb ES 0.20m					FILL: Sandy GRAVEL, medium to coarse grained angular basalt, pale brown					FILL
				0.5			Hole Terminated at 0.35 m Refusal on Gravel					
				1.0								
				1.5								

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change		Notes, Samples and Tests U ₅₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)		Consistency VS Very Soft <25 S Soft 25 - 50 F Firm 50 - 100 St Stiff 100 - 200 VSt Very Stiff 200 - 400 H Hard >400 Fb Friable Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense		UCS (kPa) Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%
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ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH-HA11**
PAGE: 1 OF 1
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Hand Auger

BOREHOLE DIAMETER: 100 mm

SURFACE RL:

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA	Not Encountered			0.5			FILL: Silty SAND, fine, brown, contains fine to medium gravel and rootlets 0.20m	M				FILL: GRASS
							SAND: Fine, pale grey 0.35m	D	L			ALLUVIAL
							Silty SAND: Fine, dark grey 0.50m					
							Clayey SAND: Fine, pale grey brown and orange brown 0.65m	M	L - MD			
							SAND: Fine, pale grey 1.00m					
				1.0			Hole Terminated at 1.00 m					
				1.5								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density	V	Very Loose	Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)			L	Loose	Density Index 15 - 35%	
					MD	Medium Dense	Density Index 35 - 65%	
					D	Dense	Density Index 65 - 85%	
					VD	Very Dense	Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH-HA12**
PAGE: 1 OF 1
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Hand Auger

BOREHOLE DIAMETER: 100 mm

SURFACE RL:

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA	Not Encountered			0.5		SP	TOPSOIL: Silty SAND, fine, dark grey, contains rootlets	M	MD			TOPSOIL: GRASS
							0.30m					ALLUVIAL
							0.45m					
							0.70m					
							1.10m					
				1.5			Hole Terminated at 1.10 m					

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density		V	Very Loose	Density Index <15%
		HP Hand Penetrometer test (UCS kPa)		L	Loose			Density Index 15 - 35%
				MD	Medium Dense			Density Index 35 - 65%
				D	Dense			Density Index 65 - 85%
				VD	Very Dense			Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment
LOCATION: Refer to Figure 1

BOREHOLE NO: BH-HA13
PAGE: 1 OF 1
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Hand Auger
BOREHOLE DIAMETER: 100 mm
SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA	Not Encountered			0.30m			TOPSOIL: Silty SAND, fine, dark grey, contains rootlets					TOPSOIL: GRASS
							Clayey SAND: Fine, pale grey brown mottled orange brown					ALLUVIAL 0.35: Roots 20mm
							SAND: Fine, pale grey					
							SAND: Fine, pale grey orange brown mottle					
				1.0			Hole Terminated at 1.00 m					

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₅₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400 Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%
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ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH1**
PAGE: 1 OF 2
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result		
ADTC							0.30m TOPSOIL: Silty SAND, fine, dark grey, contains rootlets	M				TOPSOIL: GRASS	
						SP	0.60m Clayey SAND: Fine, pale grey brown mottled orange brown						ALLUVIAL
							SAND: Fine, pale grey						

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₅₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400 Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%
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RG LIB 1.02 GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS30738.1 BH1-BH6.GPJ <<DrawingFile>> 02/02/2016 14:30 8.30.004 Dargel Lab and In Situ Tool



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH1**
PAGE: 2 OF 2
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 18/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information						Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result		
ADTC		SPT 12,14,13 N=27		11.0		SP	SAND: Fine, pale grey (<i>continued</i>)	W	MD				
		11.50m SPT 11,14,14 N=28	12.0										
		13.00m SPT 12,15,16 N=31	13.0										
		14.50m SPT 12,17,17 N=34	14.0										
				15.0			14.95m						
				16.0			Hole Terminated at 14.95 m						
				17.0									
				18.0									
				19.0									
LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change				Notes, Samples and Tests U ₅₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)				Consistency		UCS (kPa)	Moisture Condition		
								VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable		<25 25 - 50 50 - 100 100 - 200 200 - 400 >400	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit		
								Density		Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%			



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment
LOCATION: Refer to Figure 1

BOREHOLE NO: **BH2**
PAGE: 1 OF 2
JOB NO: RGS30738.1
LOGGED BY: LD
DATE: 18/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result			
ADTC		1.00m SPT 2,2,1 N=3		1.0		CL	TOPSOIL: Sandy SILT, low plasticity, black	M < w _p	F			TOPSOIL: GRASS		
							0.50m 0.65m CLAY: Medium plasticity, grey SAND: Fine, grey					ALLUVIAL		
WB		2.50m SPT 1,2,1 N=3		2.0		SP		M	L			6.00: Standpipe installed		
WB		4.00m SPT 6,9,12 N=21		4.0		SP	SAND: Fine, grey, with trace of gravel, fine, rounded	W	MD					
WB		5.50m SPT 0,0,0 N=0		5.0		CH	Silty CLAY: Medium to high plasticity, dark grey	M > w _p	S					
WB		7.00m SPT 6,8,9 N=17		7.0		SP	SAND: Fine, grey		L					
WB		8.50m SPT 7,12,12 N=24		8.0		SP	SAND: Fine, grey, with trace of gravel, fine, rounded	W	MD					
WB		10.00m		9.0		SP	SAND: Fine, grey							
LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes --- Gradational or transitional strata — Definitive or distinct strata change					Notes, Samples and Tests U ₅₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)					Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400 Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense			Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	

RG LIB 1.02 GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS30738.1 BH1-BH6.GPJ <<DrawingFile>> 02/02/2016 14:31 8.30.004 Dargel Lab and In Situ Tool



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH2**
PAGE: 2 OF 2
JOB NO: RGS30738.1
LOGGED BY: LD
DATE: 18/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
WB		SPT 12, 14, 14 N=28		11.0		SP	SAND: Fine, grey (<i>continued</i>)	W	MD			
		11.50m SPT 10, 12, 17 N=29		12.0								
		13.00m SPT 10, 16, 19 N=35		13.0								
		14.50m SPT 10, 14, 19 N=33		14.0								
				15.0			Hole Terminated at 15.00 m					
				16.0								
				17.0								
				18.0								
				19.0								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density	V	Very Loose	Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)			L	Loose	Density Index 15 - 35%	
					MD	Medium Dense	Density Index 35 - 65%	
					D	Dense	Density Index 65 - 85%	
					VD	Very Dense	Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH3**
PAGE: 1 OF 2
JOB NO: RGS30738.1
LOGGED BY: LD
DATE: 19/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result		
ADTC	0.10m 0.20m E	0.80m 0.90m SPT 2,2,3 N=5					TOPSOIL: Sandy SILT, low plasticity, dark brown	$M < w_p$	F			TOPSOIL	
						CL	CLAY: Medium plasticity, grey	$M > w_p$	F			ALLUVIAL	
WB	2.50m SPT 2,2,2 N=4	4.00m SPT 5,6,7 N=13				SP	SAND: Fine, grey	M	L				
						CL	Sandy CLAY: Medium plasticity, grey	$M > w_p$	F				
	5.50m SPT 1,1,2 N=3	7.00m SPT 7,10,13 N=23					SAND: Fine, grey			HP HP	50 35	5.60: SPT sunk on addition	
						CL	Silty CLAY: Medium to high plasticity, dark grey	$M > w_p$	S				
	8.50m SPT 8,11,15 N=26	10.00m				SP		W	MD				
							SAND: Fine, grey						
LEGEND:					Notes, Samples and Tests					Consistency		UCS (kPa)	Moisture Condition
Water					U ₅₀ 50mm Diameter tube sample					VS Very Soft		<25	D Dry
Water Level					CBR Bulk sample for CBR testing					S Soft		25 - 50	M Moist
(Date and time shown)					E Environmental sample					F Firm		50 - 100	W Wet
Water Inflow					(Glass jar, sealed and chilled on site)					St Stiff		100 - 200	W _p Plastic Limit
Water Outflow					ASS Acid Sulfate Soil Sample					VSt Very Stiff		200 - 400	W _L Liquid Limit
Strata Changes					(Plastic bag, air expelled, chilled)					H Hard		>400	
Gradational or transitional strata					B Bulk Sample					Fb Friable			
Definitive or distinct strata change					Field Tests					Density		V Very Loose	Density Index <15%
					PID Photoionisation detector reading (ppm)					L Loose			Density Index 15 - 35%
					DCP(x-y) Dynamic penetrometer test (test depth interval shown)					MD Medium Dense			Density Index 35 - 65%
					HP Hand Penetrometer test (UCS kPa)					D Dense			Density Index 65 - 85%
										VD Very Dense			Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH3**
PAGE: 2 OF 2
JOB NO: RGS30738.1
LOGGED BY: LD
DATE: 19/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
WB		SPT 8,14,15 N=29				SP	SAND: Fine, grey (<i>continued</i>)	W	MD			
		11.50m SPT 10,14,13 N=27		11.0								
		13.00m SPT 8,12,14 N=26		12.0								
		14.50m SPT 6,11,11 N=22		13.0								
				14.0								
				15.0		14.95m	Hole Terminated at 14.95 m					

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density	V	Very Loose	Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)			L	Loose	Density Index 15 - 35%	
					MD	Medium Dense	Density Index 35 - 65%	
					D	Dense	Density Index 65 - 85%	
					VD	Very Dense	Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH4**
PAGE: 1 OF 2
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 20/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
ADTC		1.00m SPT 2,3,2 N=5		1.0		SP	0.10m TOPSOIL: Silty SAND, fine, dark grey, contains rootlets 0.50m Silty SAND: Fine, dark grey SAND: Fine, grey	M	L			TOPSOIL: GRASS ALLUVIAL
WB		2.50m SPT 2,2,3 N=5		2.0		SP		W	MD			
		4.00m SPT 6,9,13 N=22		4.0								
		5.50m SPT 8,11,17 N=28		6.0								
		7.00m SPT 6,7,9 N=16		7.0								
		8.50m SPT 10,19,19 N=38		9.0								
		10.00m										

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
--- Gradational or transitional strata		Field Tests		H	Hard	>400		
— Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density		V	Very Loose	Density Index <15%
		HP Hand Penetrometer test (UCS kPa)		L		L	Loose	Density Index 15 - 35%
				MD		MD	Medium Dense	Density Index 35 - 65%
				D		D	Dense	Density Index 65 - 85%
				VD		VD	Very Dense	Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH4**
PAGE: 2 OF 2
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 20/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
WB		SPT 10, 14, 19 N=33		11.0		SP	SAND: Fine, grey (<i>continued</i>)		D			
		11.50m SPT 16, 25, 25 N=50		12.0					D - VD			
		13.00m SPT 9, 17, 16 N=33		13.0								
		14.50m SPT 10, 18, 27 N=45		14.0					D			
				15.0			14.95m Hole Terminated at 14.95 m					
				16.0								
				17.0								
				18.0								
				19.0								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density	V	Very Loose	Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)			L	Loose	Density Index 15 - 35%	
					MD	Medium Dense	Density Index 35 - 65%	
					D	Dense	Density Index 65 - 85%	
					VD	Very Dense	Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH5**
PAGE: 1 OF 2
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 20/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
ADTC	WB	1.00m SPT 2,3,3 N=6		1.0		0.45m	FILL: Silty SAND, fine, dark grey, contains a trace of fine to medium gravel and brick fragments	D				FILL: GRASS
							SAND: Fine, pale grey	M				ALLUVIAL
WB		2.50m SPT 2,2,2 N=4		2.0					L - MD			6.00: Standpipe installed
				3.0								
				4.0								
				5.0								
				6.0								
WB		4.00m SPT 2,4,6 N=10		7.0				W	MD			
				8.0								
				9.0								
WB		5.50m SPT 7,9,12 N=21		10.0					D			
WB		7.00m SPT 5,12,20 N=32										
WB		8.50m SPT 9,13,13 N=26										
WB		10.00m										

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)		Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS Very Soft		<25		D Dry	
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S Soft		25 - 50		M Moist	
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F Firm		50 - 100		W Wet	
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St Stiff		100 - 200		W _p Plastic Limit	
Strata Changes		B Bulk Sample		VSt Very Stiff		200 - 400		W _L Liquid Limit	
Gradational or transitional strata		Field Tests		H Hard		>400			
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb Friable					
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density		V Very Loose		Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)		L Loose		Loose		Density Index 15 - 35%	
				MD Medium Dense		Medium Dense		Density Index 35 - 65%	
				D Dense		Dense		Density Index 65 - 85%	
				VD Very Dense		Very Dense		Density Index 85 - 100%	

RG LIB 1.02 GLB Log RG NON-CORED BOREHOLE - TEST PIT RGS30738.1 BH1-BH6.GPJ <<DrawingFile>> 02/02/2016 14:31 8.30.004 Dargel Lab and In Situ Tool



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH5**
PAGE: 2 OF 2
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 20/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL: AHD
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
WB		SPT 8,17,21 N=38		11.0		SP	SAND: Fine, pale grey (<i>continued</i>)		D			ALLUVIAL
		11.50m SPT 12,14,27 N=41		12.0								
		13.00m SPT 15,23,29 N=52		13.0			Trace of fine shell fragments		VD			
		14.50m SPT 12,30/150 N=R		14.0								
				15.0		14.95m	Hole Terminated at 14.95 m					
				16.0								
				17.0								
				18.0								
				19.0								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀	50mm Diameter tube sample	VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR	Bulk sample for CBR testing	S	Soft	25 - 50	M	Moist
Water Inflow		E	Environmental sample (Glass jar, sealed and chilled on site)	F	Firm	50 - 100	W	Wet
Water Outflow		ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)	St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B	Bulk Sample	VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID	Photoionisation detector reading (ppm)	Fb	Friable			
		DCP(x-y)	Dynamic penetrometer test (test depth interval shown)	Density	V	Very Loose	Density Index <15%	
		HP	Hand Penetrometer test (UCS kPa)		L	Loose	Density Index 15 - 35%	
					MD	Medium Dense	Density Index 35 - 65%	
					D	Dense	Density Index 65 - 85%	
					VD	Very Dense	Density Index 85 - 100%	



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH6**
PAGE: 1 OF 2
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 21/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations					
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result						
ADTC		1.00m SPT 3,4,4 N=8		1.0		SP	0.30m TOPSOIL: Silty SAND, fine, dark grey, contains rootlets	M				TOPSOIL: GRASS					
							0.50m Silty SAND: Fine, dark grey					ALLUVIAL					
WB		2.50m SPT 1,1,1 N=2		2.0		SP	SAND: Fine, pale grey	W	L			6.00: Standpipe installed					
													4.00m SPT 6,9,10 N=19	5.50m SPT 4,10,9 N=19	7.00m SPT 8,10,10 N=20	8.50m SPT 6,7,11 N=18	10.00m

LEGEND:

Water Level
(Date and time shown)

Water Inflow

Water Outflow

Strata Changes

Gradational or transitional strata

Definitive or distinct strata change

Notes, Samples and Tests

U₅₀ 50mm Diameter tube sample

CBR Bulk sample for CBR testing

E Environmental sample
(Glass jar, sealed and chilled on site)

ASS Acid Sulfate Soil Sample
(Plastic bag, air expelled, chilled)

B Bulk Sample

Field Tests

PID Photoionisation detector reading (ppm)

DCP(x-y) Dynamic penetrometer test (test depth interval shown)

HP Hand Penetrometer test (UCS kPa)

Consistency

VS Very Soft <25

S Soft 25 - 50

F Firm 50 - 100

St Stiff 100 - 200

VSt Very Stiff 200 - 400

H Hard >400

Fb Friable

Density

V Very Loose

L Loose

MD Medium Dense

D Dense

VD Very Dense

UCS (kPa)

<25

25 - 50

50 - 100

100 - 200

200 - 400

>400

Moisture Condition

D Dry

M Moist

W Wet

W_p Plastic Limit

W_L Liquid Limit

Density Index <15%

Density Index 15 - 35%

Density Index 35 - 65%

Density Index 65 - 85%

Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

CLIENT: EJE Architects
PROJECT NAME: Ballina High School Redevelopment

LOCATION: Refer to Figure 1

BOREHOLE NO: **BH6**
PAGE: 2 OF 2
JOB NO: RGS30738.1
LOGGED BY: AH
DATE: 21/1/16

DRILL TYPE: Truck Mounted Drill Rig
BOREHOLE DIAMETER: 100 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
WB		SPT 12, 14, 30 N=44		11.0		SP	SAND: Fine, pale grey (<i>continued</i>)	W	D			
		11.50m SPT 12, 20, 20 N=40		12.0								
		13.00m SPT 14, 25/150 N=R		13.0								
				14.0								
				14.50m								
				15.0			Hole Terminated at 14.50 m					
				16.0								
				17.0								
				18.0								
				19.0								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
Water		U ₅₀ 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200	W _p	Plastic Limit
Strata Changes		B Bulk Sample		VSt	Very Stiff	200 - 400	W _L	Liquid Limit
Gradational or transitional strata		Field Tests		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density	V	Very Loose	Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)			L	Loose	Density Index 15 - 35%	
					MD	Medium Dense	Density Index 35 - 65%	
					D	Dense	Density Index 65 - 85%	
					VD	Very Dense	Density Index 85 - 100%	



Appendix B

Laboratory Test results

CERTIFICATE OF ANALYSIS

Work Order : **ES1602172**
Client : **REGIONAL GEOTECHNICAL SOLUTION**
Contact : MR ADAM HOLZHAUSER
Address : 44 BENT STREET
 WINGHAM NSW, AUSTRALIA 2429
E-mail : adam.h@regionalgeotech.com.au
Telephone : +61 02 6553 5641
Facsimile : ----
Project : RGS30738.1 Ballina High School Redevelopment
Order number : ----
C-O-C number : ----
Sampler : ADAM HOLZHAUSER
Site : BALLINA

Quote number : ----

Page : 1 of 15
Laboratory : Environmental Division Sydney
Contact :
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

E-mail :
Telephone : +61-2-8784 8555
Facsimile : +61-2-8784 8500
QC Level : NEPM 2013 B3 & ALS QC Standard
Date Samples Received : 02-Feb-2016 09:20
Date Analysis Commenced : 03-Feb-2016
Issue Date : 09-Feb-2016 10:43

No. of samples received : 13
No. of samples analysed : 13

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

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

Signatories

Celine Conceicao
Christopher Owler

Edwandy Fadjar
Pabi Subba
Shobhna Chandra

Position

Senior Spectroscopist
Team Leader - Asbestos

Organic Coordinator
Senior Organic Chemist
Metals Coordinator

Accreditation Category

Sydney Inorganics, Smithfield, NSW
Newcastle - Asbestos, Mayfield West, NSW
Sydney Organics, Smithfield, NSW
Sydney Organics, Smithfield, NSW
Sydney Inorganics, Smithfield, 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.

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.

- 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



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA1 0.0-0.1	HA2 0.0-0.1	HA3 0.3-0.4	HA3 0.0-0.1	HA4 0.0-0.1
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]
Compound	CAS Number	LOR	Unit	ES1602172-001	ES1602172-002	ES1602172-003	ES1602172-004	ES1602172-005
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	25.2	14.9	9.9	----	5.0
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	66.8	62.5	----	82.4	71.5
APPROVED IDENTIFIER:	----	-	--	C.OWLER	C.OWLER	----	C.OWLER	C.OWLER
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	6	5	6	----	4
Copper	7440-50-8	5	mg/kg	6	9	6	----	10
Lead	7439-92-1	5	mg/kg	13	14	8	----	25
Nickel	7440-02-0	2	mg/kg	4	4	3	----	2
Zinc	7440-66-6	5	mg/kg	78	104	23	----	77
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	0.2	0.1	----	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	<0.05
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



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA1 0.0-0.1	HA2 0.0-0.1	HA3 0.3-0.4	HA3 0.0-0.1	HA4 0.0-0.1
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]
Compound	CAS Number	LOR	Unit	ES1602172-001	ES1602172-002	ES1602172-003	ES1602172-004	ES1602172-005
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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	72-54-8/72-55-9/5 0-2	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	<0.5	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA1 0.0-0.1	HA2 0.0-0.1	HA3 0.3-0.4	HA3 0.0-0.1	HA4 0.0-0.1
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]
Compound	CAS Number	LOR	Unit	ES1602172-001	ES1602172-002	ES1602172-003	ES1602172-004	ES1602172-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Benzo(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	----	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	----	1.2
EP080/071: Total Petroleum Hydrocarbons								
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	----	110
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	----	110
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	----	<50



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA1 0.0-0.1	HA2 0.0-0.1	HA3 0.3-0.4	HA3 0.0-0.1	HA4 0.0-0.1
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]
Compound	CAS Number	LOR	Unit	ES1602172-001	ES1602172-002	ES1602172-003	ES1602172-004	ES1602172-005
				Result	Result	Result	Result	Result
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	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	----	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	87.2	111	77.4	----	78.2
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	120	111	91.0	----	106
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	112	119	64.6	----	87.6
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	75.9	74.3	77.5	----	73.9
2-Chlorophenol-D4	93951-73-6	0.5	%	77.6	76.8	79.3	----	77.9
2,4,6-Tribromophenol	118-79-6	0.5	%	48.6	49.6	46.9	----	47.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	103	103	102	----	99.4
Anthracene-d10	1719-06-8	0.5	%	74.5	75.3	72.2	----	74.6
4-Terphenyl-d14	1718-51-0	0.5	%	88.9	110	95.1	----	89.0
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.2	%	79.0	92.4	97.3	----	90.3
Toluene-D8	2037-26-5	0.2	%	107	86.0	95.2	----	97.4
4-Bromofluorobenzene	460-00-4	0.2	%	113	104	111	----	111



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA5 0.2-0.3	HA5 0.1-0.2	HA6 0.1-0.2	HA7 0.1-0.2	HA8 0.2-0.3
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]
Compound	CAS Number	LOR	Unit	ES1602172-006	ES1602172-007	ES1602172-008	ES1602172-009	ES1602172-010
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	19.2	----	12.9	18.1	18.0
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	----	70.3	73.0	88.8	75.2
APPROVED IDENTIFIER:	----	-	--	----	C.OWLER	C.OWLER	C.OWLER	C.OWLER
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	14	----	6	8	11
Copper	7440-50-8	5	mg/kg	8	----	12	8	26
Lead	7439-92-1	5	mg/kg	13	----	16	18	31
Nickel	7440-02-0	2	mg/kg	7	----	3	4	7
Zinc	7440-66-6	5	mg/kg	59	----	39	80	159
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	<0.05	<0.05	<0.05
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



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA5 0.2-0.3	HA5 0.1-0.2	HA6 0.1-0.2	HA7 0.1-0.2	HA8 0.2-0.3
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]
Compound	CAS Number	LOR	Unit	ES1602172-006	ES1602172-007	ES1602172-008	ES1602172-009	ES1602172-010
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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	72-54-8/72-55-9/5 0-2	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	----	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA5 0.2-0.3	HA5 0.1-0.2	HA6 0.1-0.2	HA7 0.1-0.2	HA8 0.2-0.3
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]
Compound	CAS Number	LOR	Unit	ES1602172-006	ES1602172-007	ES1602172-008	ES1602172-009	ES1602172-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	----	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	----	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
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



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA5 0.2-0.3	HA5 0.1-0.2	HA6 0.1-0.2	HA7 0.1-0.2	HA8 0.2-0.3
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]
Compound	CAS Number	LOR	Unit	ES1602172-006	ES1602172-007	ES1602172-008	ES1602172-009	ES1602172-010
				Result	Result	Result	Result	Result
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	1330-20-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	----	<1	<1	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	68.4	----	72.0	89.2	117
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	78.3	----	77.1	85.0	106
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	69.4	----	70.3	81.8	82.1
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	75.0	----	74.0	75.2	75.9
2-Chlorophenol-D4	93951-73-6	0.5	%	75.9	----	74.3	74.4	76.3
2,4,6-Tribromophenol	118-79-6	0.5	%	46.4	----	40.5	35.7	43.3
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	97.8	----	95.2	93.5	98.2
Anthracene-d10	1719-06-8	0.5	%	76.4	----	71.8	73.2	74.9
4-Terphenyl-d14	1718-51-0	0.5	%	92.0	----	85.2	103	95.9
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.2	%	94.6	----	81.9	88.9	81.9
Toluene-D8	2037-26-5	0.2	%	103	----	95.9	97.6	91.9
4-Bromofluorobenzene	460-00-4	0.2	%	114	----	104	107	99.8



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA9 0.1-0.2	HA10 0.1-0.2	D1	----	----
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	----	----
Compound	CAS Number	LOR	Unit	ES1602172-011	ES1602172-012	ES1602172-013	-----	-----
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	12.2	13.1	9.8	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	----	----	----
Asbestos Type	1332-21-4	-	--	-	-	----	----	----
Sample weight (dry)	----	0.01	g	72.4	84.3	----	----	----
APPROVED IDENTIFIER:	----	-	--	C.OWLER	C.OWLER	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	9	<5	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	5	6	7	----	----
Copper	7440-50-8	5	mg/kg	8	32	8	----	----
Lead	7439-92-1	5	mg/kg	28	27	8	----	----
Nickel	7440-02-0	2	mg/kg	3	18	3	----	----
Zinc	7440-66-6	5	mg/kg	76	88	30	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.6	<0.1	0.2	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA9 0.1-0.2	HA10 0.1-0.2	D1	----	----
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	----	----
Compound	CAS Number	LOR	Unit	ES1602172-011	ES1602172-012	ES1602172-013	-----	-----
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5-0-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA9 0.1-0.2	HA10 0.1-0.2	D1	----	----
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	----	----
Compound	CAS Number	LOR	Unit	ES1602172-011	ES1602172-012	ES1602172-013	-----	-----
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg	0.8	<0.5	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg	1.1	<0.5	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg	1.0	<0.5	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	0.5	<0.5	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	3.4	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				HA9 0.1-0.2	HA10 0.1-0.2	D1	----	----
Client sampling date / time				[18-Jan-2016]	[18-Jan-2016]	[18-Jan-2016]	----	----
Compound	CAS Number	LOR	Unit	ES1602172-011	ES1602172-012	ES1602172-013	-----	-----
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	98.6	79.2	114	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	108	73.9	97.3	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	79.5	64.4	73.8	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	77.8	73.1	76.5	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	76.9	76.1	76.3	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%	43.6	40.6	43.1	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	99.4	102	99.1	----	----
Anthracene-d10	1719-06-8	0.5	%	68.7	73.2	75.7	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	104	90.9	93.5	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.2	%	78.2	86.5	85.0	----	----
Toluene-D8	2037-26-5	0.2	%	90.9	96.8	93.9	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	101	110	104	----	----



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	HA10.0-0.1 - [18-Jan-2016]	Mid grey sandy soil
EA200: Description	HA20.0-0.1 - [18-Jan-2016]	Mid grey sandy soil
EA200: Description	HA30.0-0.1 - [18-Jan-2016]	Mid grey sandy soil
EA200: Description	HA40.0-0.1 - [18-Jan-2016]	Mid grey sandy soil
EA200: Description	HA50.1-0.2 - [18-Jan-2016]	Mid grey sandy soil
EA200: Description	HA60.1-0.2 - [18-Jan-2016]	Mid grey sandy soil
EA200: Description	HA70.1-0.2 - [18-Jan-2016]	Mid grey sandy soil
EA200: Description	HA80.2-0.3 - [18-Jan-2016]	Mid grey sandy soil
EA200: Description	HA90.1-0.2 - [18-Jan-2016]	Mid grey sandy soil
EA200: Description	HA100.1-0.2 - [18-Jan-2016]	Pale brown sandy soil with grey rocks