Matthews Contracting

Stage 1 and 2 Environmental Site Assessment: 11 Addison Road, Ingleside, NSW.



ENVIRONMENTAL





WASTEWATER



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PROJECT MANAGEMENT



P1304106JR02V01 May 2014

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1 Introduction

1.1 Overview

This report prepared by Martens and Associates (MA), on behalf of Matthews Contracting ('the Client'), documents a Stage 1 and 2 Environmental Site Assessment (ESA) completed for 11 Addison Road, Ingleside, NSW ('the site').

1.2 Objectives

Investigation objectives included:

- Identification of historic and current contaminating site activities.
- Evaluation of potential areas of environmental concern (AEC) and associated chemicals of primary concern (COPC).
- Execute a programme of soil sampling and laboratory analysis to determine site contamination based on identified potential AEC and COPC.
- Determine suitability for continued use of the site for storage of building materials and construction plant.
- Provide recommendations for further works (if necessary).

1.3 Scope of Works

Scope of works included:

- Site history review using available records.
- Aerial photo interpretation.
- Site walkover to review current land use, potential contaminating activities and neighbouring land uses.
- Confirmation of potential AEC and COPC.
- o Intrusive soil investigation and laboratory analysis.
- Preparation of an ESA report in general accordance with the relevant sections of NSW OEH (2011) and NSW DEC (2006).



1.4 Reference Guidelines

This assessment is prepared in general accordance with the following guidelines:

- CRC Care (2011) Health screening levels for petroleum hydrocarbons in soil and groundwater Part 1: Technical development document.
- NEPC (1999, amended) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM).
- NSW DEC (2006) Contaminated Sites: Guidelines for the NSW Site Auditor Scheme.
- NSW EPA (1995) Sampling Design Guidelines.
- NSW OEH (2011) Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, 2nd edition.

1.5 Proposed Development

The site is proposed to be utilised for the continued storage of building materials and construction plant and as an office for the contracting business. This represents no change to the existing site use. However, as part of the continued use proposal, MA understands some alterations are proposed including demolition then replacement of a staff lunch room/shed and reconfiguration of the site's stormwater management system. It is also likely that the site's onsite wastewater management system shall be reconfigured based on recommendations provided by MA (2014).

1.6 Abbreviations

ACM – Asbestos containing material

AEC – Area of environmental concern

AST – Above ground storage tank

BGL – Below ground level

BTEX – Benzene, toluene, ethyl benzene, xylene

COPC – Chemical of primary concern

CRC CARE – Cooperative Research Centre for Contamination Assessment and Remediation of the Environment

DECCW – NSW Department of Environment, Climate Change and Water



DP – Deposited Plan

EPA – NSW Environmental Protection Authority

ESA – Environmental site assessment

ESL – Ecological screening levels

GSW – General solid waste

HIL- Health investigation levels

HSL- Heal screening levels

LGA – Local government area

LOR – Limit of reporting

MA – Martens and Associates

NATA - National Association of Testing Authorities

NEPC- National Environmental Protection Council

OCP – Organochloride pesticides

OEH – NSW Office of Environment and Heritage

OPP - Organophosphate pesticides

PAH – Polycyclic aromatic hydrocarbons

PCB – Polychlorinated biphenyl

RAP – Remedial action plan

RPD – Relative percentage difference – difference between two values divided by the average

SOP – Standard operating procedure

TRH – Total recoverable hydrocarbons



2 Location and Setting

Site information is summarised in Table 1.

 Table 1: Site background information.

Site address	11 Addison Road, Ingleside, NSW
Site area	Approximately 18,630 m ²
Local Government Area (LGA)	Pittwater Council
Lot and DP (Title Information)	Lot 1831 DP 812302
Zoning	1(a) – Non-Urban
Current land use	Site used by earthworks contracting firm to store and maintain vehicles, machinery and materials.
Proposed land use	No change from the current land use.
Surrounding land uses	Boarded by Addison Road to the east, rural residential allotments to the south, west and north.
Geology and soil landscapes	The Sydney 1:100,000 Geological Sheet 9130 (1983) describes geology underlying the site as Hawkesbury Sandstone.
Sensitive receptors	Residences to the south, west and north. Nearest environmental receptors is Wirreanda Creek 600 m west of the site.

Site location is shown in Figure 1 in Attachment A.



3 Stage 1 ESA

3.1 Bore Search

A review of the NSW Department of Natural Resources groundwater bore database revealed that there are six bores with available water level data located within approximately 300 m of the subject site and one bore located on the site. Results are summarised in Table 2 with bores shown in Figure 2.

Groundwater Bore Identification	Approx. Distance from Site (m)	Depth To Ground Water (mBGL)	Intended Use	Water Bearing Zone Substrate
GW051799	180	11	Domestic	Sandstone
GW051861	130	18, 38	Domestic	Sandstone
GW014464	180	6, 30	Irrigation	Sandstone
GW057745	200	25, 145	Irrigation	Sandstone
GW060293	240	29	Irrigation	Sandstone
GW064440	280	84	Domestic Stock	Sandstone
GW103160	On Site	15, 105	Domestic Stock	Sandstone

 Table 2: DNR groundwater details for seven bores within 300 m of the site.

3.2 Site Walkover

A site inspection was undertaken by a Martens & Associates environmental engineer on February 5, 2014. Site walkover observations included:

- Above ground storage tank (AST) within concrete block bund and associated refuelling area. Tank is 20 KL and used for storage of diesel.
- Concrete pad used for storage of machinery and excavation equipment.
- $\circ\,$ Storage area for building waste such as metal and wiring on bare earth.
- Mechanical garage workshop and forecourt area used to service earth moving machinery.



- Truck wash down area consisting of a concrete slab surrounded by bare earth.
- Stockpile area consisting of spoil (Client advised it was VENMN however no certification provided) from various building sites Mathews Contracting had worked on.
- Miscellaneous storage area of building materials such as metal, wood, plastics and old excavation equipment.
- Truck turning/parking/offloading area.
- General area of site used for office, car park and general storage of mechanical equipment.

Photos are provided in Figures 3 – 7 in Attachment A.



3.3 Historical Site Records Review

Information derived from review of historical site records is presented in Table 3.

 Table 3: Site history information.

Information Source		Available Information	
NSW OEH Records	No notices for the site or areas surrounding the site are currently listed under the Contaminated Land Management Act (1997) or the Environmentally Hazardous Chemicals Act (1985).		
Pittwater Council Records ¹	Application Description		
	DA B0700/2000	Construction of an attached dual occupancy and swimming pool – Withdrawn	
	CC 0661/2002	Construction of an attached dual occupancy and swimming pool – Certificate Issued	
	BC 0148/2004	As built variations to approved plan as per Drawings A.05-C, A.01-F, A.03-C, A.02-B – Certificate Issued	
	DA N0700/00/S96/3/ 2011	Construction of an attached dual occupancy and swimming pool. Modifications are listed in the Statement of Environmental Effects which is available on Councils website – Modification Approved	
	DA N0440/2011	Occupation of existing site for the purpose of an industry associated directly to an extractive industry, to store and maintain vehicles, machinery and materials – Withdrawn/Cancelled	
	DA N0263/2013	Occupation of existing site for the purpose of an industry associated directly to an extractive industry, to store and maintain vehicles, machinery and materials – Withdrawn/Cancelled	

Note:

¹ See Attachment B for detailed records.



3.4 Aerial Photograph Interpretation

Results of aerial photograph interpretation are summarised in Table 4 with aerial photographs provided in Figures 8 - 13 in Attachment A.

 Table 4: Observations from selected aerial photographs.

Year	Site	Surrounding Land Use	Reference
1930	Natural bushland	Natural bushland surrounding the site. Agricultural farms to the north east. Mona Vale Road to the south.	Sydney Survey Run: 1 - 12, Photo: Unknown Scale: Unknown
1947	Natural bushland	Little change from 1930.	Broken Bay Run: 39, Photo: Unknown Scale: 1:12,200
1965	Natural bushland Site partially cleared in south west corner Formation of Addison Rd	Increased clearing to the north, east and west for rural residential. Bahai Temple to the east. Dwelling constructed adjacent to southern boundary	Cumberland Run 13 E, Photo: Unknown Scale: Unknown
1982	Natural bushland Site partially cleared in south west corner No change from 1965	Increased clearing to the north, east and west for rural residential. Construction of dam and dwelling on lot adjacent to western boundary	Sydney Run 14, Photo: 2560 M ASL Scale: 1:16000
2002	Majority of site cleared in the east and west Construction of a dam, fuel tank, workshop, dwelling and sheds at the rear (west) of the site	Dwelling constructed to the south in eastern portion of the site Increased rural residential development to the north, east and west. Addison Road is sealed.	Sydney Run: 5, Photo: Unknown Scale: 1:25,000
Present	Dam has been filled Construction of current dwelling in eastern portion of the site and sheds near north west boundary	Little change from 2002.	Six maps



3.5 Site History Summary

Properties surrounding the site were largely native bushland until at least 1947. After 1965, increased clearing occurred in the area for rural residential purposes. The site's use has been limited to rural residential with sheds and unsealed yards used to run a commercial earthworks/civil contracting business. Sometime after 2002, the current dwelling was constructed.

3.6 Discussion with Land Owner

Discussions were held with Steve Mathews (site owner) during the site walkover. Mr Mathews provided the following information.

- Lower portion of the site used for storage of earth moving machinery and associated equipment, materials and plant for the last 20 years.
- Area used for storage of plant, stockpiles and truck turning area has been levelled and filled with material from the site. Area had approximately 300 mm of bitumen and road base placed on surface to act as a 'seal' and hardstand pavement. This layer had worn through in several areas where truck movements were high.
- Stockpile area used to be an old dam which was filled with material from the site during construction of the lower storage area.
- There has been no instances of fuel spillages from the AST.



3.7 Areas of Environmental Concern/Chemicals of Primary Concern

Our assessment of site AECs is made on the basis of: available site history (anecdotal and DA records); aerial photograph interpretation; and site inspection. Based on past uses of AECs, chemicals of primary concern (COPC) have been identified as outlined in Table 5 and shown in Figure 1.

AEC	Location	Potential Contaminating Activity	COPC ¹	Likelihood for contamination
A	Refuelling area	Potential contamination from fuel spillage	TRH, PAH, HM, BTEX	High
В	Bunded area for fuel tank	Potential contamination from fuel spillage	TRH, PAH, HM, BTEX	High
С	Concrete pad used for storage of excavation equipment	Oil, fuel and hydraulic oil from machinery and drilling heads	TRH, PAH, HM, BTEX	High
D	Building waste storage area	Builders waste, wiring/metal and storage containers	TRH, PAH, HM, BTEX	Medium - High
E	Mechanical workshop	Leaking oil and fluid from excavation equipment and storage containers	TRH, PAH, HM, BTEX	High
F	Mechanical workshop forecourt	Leaking oil and fluid from servicing excavation equipment and plant	TRH, PAH, HM, BTEX	High
G	Truck wash down area	Oil, fluid and pesticides washed off trucks/excavation equipment	TRH, PAH, HM, BTEX, OPP/OCP	Medium – High
Н	Stockpile area	Stockpiles consisting of VENM from various building sites (no certification)	TRH, PAH, HM, BTEX, OPP/OCP, asbestos	Medium
I	Miscellaneous storage area of building materials	Storage of materials such as rusting metal, wood, plastics and containers	TRH, PAH, HM, BTEX, OPP/OCP	Low – Medium

Table 5: AECs and COPCs (extract from MA, 2014a).



AEC	Location	Potential Contaminating Activity	COPC1	Likelihood for contamination
L	Truck turning/parking/ offloading area	Fill from unknown sources. Leaking oil, fuel and fluid from vehicles and excavation equipment	TRH, HM, PAH, BTEX, asbestos	Low – Medium
Κ	General area of site used as office, car park and storage of mechanical equipment	Leaking oil, fuel and fluid from vehicles and excavation equipment	TRH, HM, PAH, BTEX	Low – Medium

3.8 Conclusion

A review of site history and walkover inspection indicates the site has the following potential contamination sources:

- Mechanical workshop and associated forecourt area.
- Truck wash down area.
- Above ground fuel tank and associated refuelling area.
- Concrete pad used for storage of machinery and drilling heads.
- Stockpile area consisting of spoil from various building sites (no certification of VENM status).
- Miscellaneous storage area of building materials such as metal, wood, plastics and old excavation equipment.
- Truck turning/parking/offloading area.
- General area of site used for office, car park and general storage of mechanical equipment.

In light of above, a Stage 2 ESA was undertaken to assess potential soil contamination associated with identified AEC and COPC.



4 Stage 2 Environmental Site Assessment

4.1 Field and Laboratory Investigations

4.1.1 Field Programme

Identified AEC and COPC were utilised to develop a field investigation programme to detail prevailing site contamination condition. Intrusive investigation (Table 6) was undertaken with sampling locations selected to provide adequate site coverage to assess extents and locations of AECs. Sampling was completed in general accordance with the sampling design guidelines outlined in NSW EPA (1995).

4.1.2 Sampling Investigations

Intrusive investigations were undertaken on February 20, 2014 and are summarised in Table 6.

Туре	Number of Locations	Equipment	Description
Hydraulic auger borehole	12	95 mm diameter solid flight hydraulic auger	Boreholes drilled to depths between 0.7 – 2.5 mBGL. A total of 57 primary soil samples were taken. Samples were taken off the lead auger tip.
Test pit	10	Spade	300 mm x 300 mm test pits excavated to depths between 0.3 – 0.6 mBGL. A total of 39 primary soil samples were taken.

 Table 6: Soil sampling methods.

Subsurface investigation locations are shown in Figure 14 – Attachment A with borehole/test pit logs provided in Attachment C.

4.1.3 Sampling Quality Assurance/Control

Soil sampling quality assurance/control processes (Table 7) were undertaken to meet data quality objectives.



Activity	Detail / Comments
Soil logging	Test pits/boreholes were logged by an environmental engineer in accordance with Martens and Associates SOP.
	Soil sampling was completed by an environmental engineer.
Soil sampling	Soil samples were placed into a laboratory- supplied, acid-rinsed 250mL glass jar, labelled with a unique identification number and where possible afforded no headspace to limit volatile loss.
Soil core ening	A portion of some test pit and borehole samples were placed into "zip-lock' plastic bags to assess presence of VOC compounds via photo-ionisation detector (PID), calibrated with 100 ppm isobutylene calibration gas.
2011 SCIEGUING	VOC concentrations obtained from PID, in combination with other field observations, were utilised to select samples to be analysed. PID concentrations are detailed on borehole logs in Attachment C.
	Two duplicate soil samples were taken and submitted to the laboratory for intra-laboratory analysis.
QA / QC sampling	One (1) trip blank (TB) and one (1) trip spike (TS) sample were placed with soil samples in cooler boxes and tested by the analytical laboratory to assess potential cross contamination between samples (TB) and the loss of volatile contamination from samples (TS) during transportation.
	The QA / QC Data Validation Report is presented in Attachment E and a Relative Percentage Difference (RPD) assessment in Attachment F.
	Sample collection, storage and transport were conducted according to Martens and Associates SOP.
Sample handling and transportation	Collected samples were placed into an ice chilled cooler-box.
	Samples were dispatched to a NATA- accredited laboratory under chain of custody documentation within holding times.
Decontamination of sampling equipment	Augers and spades were decontaminated between sampling locations by pressurised water spray with a solution of Decon-90 TM , a phosphate-free detergent, followed by rinsing with potable water.

 Table 7: Soil sampling quality assurance/control processes.



4.1.4 Laboratory Analytical Suite

Primary soil samples were selected for a suite of laboratory analyses (Table 8) to address site AECs and potential COPC identified in the Stage 1 ESA and/or visual and olfactory evidence of contamination. Discrete samples were analysed by Envirolab Pty Ltd a NATA accredited laboratory. A laboratory report is provided in Attachment D.

COPC	Number of Samples Analysed
BTEX	21
TRH	22
РАН	22
Heavy metals ¹	21
OCP	3
PCB	3
Benzo(a)pyrene TCLP	10
Asbestos (soil)	4

 Table 8: Summary of primary soil laboratory analyses.

Notes:

¹ Heavy metals – arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc.



5 Quality Control and Qualtiy Assurance Assessment

A review of QA/QC procedure has been completed and is present in the Data Validation Report presented in Attachment E. The report concludes that data is suitable for the purposes of the assessment. A relative percentage difference (RPD) summary is in Attachment F.



6 Assessment Criteria

6.1 Overview

Soil investigation and screening levels have been adopted to evaluate potential risk to human health and the ecosystem from site contamination. Investigation levels were selected based on:

- 1. The site being utilised for continued use for storage of building materials and construction plant.
- A sealed site (concrete or flexible pavement) or hybrid layer plus 300 mm of bitumen and road base or ripped sandstone. <u>We</u> note that the site is not currently fully sealed with minimal and degraded seal in areas of high traffic movement.

6.2 Soil Assessment Criteria

Investigation levels for soil were established based on the following references:

- NSW DEC (2006) Contaminated Sites: Guidelines for the NSW Site Auditor Scheme.
- CRC Care (2011) Health screening levels for petroleum hydrocarbons in soil and groundwater Part 1: Technical development document.
- NEPC (1999, amended 2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM).

6.2.1 Health Investigation Levels

Human health based soil investigation levels (HIL) for commercial/industrial land use provided in Column D of Table 1A(1) in the NEPM (1999, amended 2013) have been adopted as the soil investigation levels.

NEPC (1999, amended) has provided a health screening level for bonded ACM as 0.01% weight for weight (w/w). An additional health screening level is that no visible asbestos be present for surface soil. MA has adopted an asbestos investigation level of "non-detect" for this site.

Adopted HILS are summarised in Table 9.



Contaminant of Concern	Adopted HIL (mg/kg)	LOR (mg/kg)
Benzo(a)pyrene TEQ	40	0.5
Total PAH	4000	<2.55
Arsenic (total)	3000	4
Cadmium	900	0.5
Chromium (VI)	3600	1
Copper	240,000	1
Lead	1,500	1
Mercury	730	0.1
Nickel	6,000	1
Zinc	400,000	1
Aldrin + Dieldrin	45	0.2
Chlordane	530	0.1
DDT+DDD+DDE	3,600	0.3
Heptachlor	50	0.1
Asbestos	0.01% w/w = bonded asbestos 0.001% w/w = friable asbestos None visible at surface	0.01% w/w

 Table 9: Adopted health investigation levels for soil (HIL) and laboratory detection levels (LOR).

6.2.2 Health Screening Levels for Petroleum Hydrocarbon Compounds

Health screening levels (HSL) have been developed to address risk to human health, identified predominantly as inhalation of vapours from contaminant sources and direct contact with TPH affected soils.

HSLs for commercial/industrial land use in sand soils as outlined in Table 1A(3) in the NEPM (1999, amended 2013) have been adopted for assessment of vapour intrusion risk (Table 10). This selection is made to address the sand and clay fill materials identified. Direct contact HSL for commercial/industrial land use as outlined in Table A4 of CRC Care (2011) apply where material is at the surface or might be exposed by site works (Table 11).



	0m – <1m	1m – <2m	2m – <4m	4m+	Soil Saturation Concentration (Csat) ¹
Toluene	NL	NL	NL	NL	560
Ethylbenzene	NL	NL	NL	NL	64
Xylenes	230	NL	NL	NL	300
Naphthalene	NL	NL	NL	NL	9
Benzene	3	3	3	3	360
F1 (C ₆ – C ₁₀)	260	370	630	NL	950
F2 (C10 - C16)	NL	NL	NL	NL	560

Table 10: Commercial/industrial soil HSLs for vapour intrusion in sand (mg/kg).

Notes:

¹ The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum vapour risk for the given scenario. For these scenarios, no HSL is presented and the HSL is shown as 'not limiting' or NL (NEPM, 1999 amended 2013).

Table	11.	Direct	contact	трн нсі	and	laboratory	
lable		DIECI	Connact	II II IIJL	unu	laborator	Y LOK.

Contaminant of Concern	Soil Criteria (mg/kg)	LOR (mg/kg)
TPH (C6-C10)	26,000	25
TPH(C ₁₀ –C ₁₆)	20,000	50
TPH (C16-C34)	27,000	250
TPH (C ₃₄ – C ₄₀)	38,000	500
Benzene	430	0.2
Toluene	99,000	0.5
Ethyl benzene	27,000	1
Naphthalene	11,000	1
Xylene (total)	81,000	3



6.2.3 Ecological Screening Levels for Petrolemum Hydrocarbon Compounds

Ecological Screening Levels (ESL) have been developed to address potential environmental risk due to hydrocarbon compound contamination.

ESL apply principally to contamination contained in the top 2 m of soil with screening levels derived for fine and course grained soils. ESLs for coarse grained soils with commercial and industrial land use (Table 12) have been selected for this assessment as outlined in Table 1B(6) of the NEPM (1999, amended 2013).

Contamination at levels above ESL occurring at depths greater than 2 mbgl is not considered an environmental risk unless site works reduce cover to less than 2 m through excavation works.

Contaminant of Concern	Soil Criteria (mg/kg)	LOR (mg/kg)
F1 (C ₆ -C ₁₀)	215	25
F2 (C10-C16)	170	50
F3 (C16-C34)	1700	250
F4 (C ₃₄ – C ₄₀)	3300	500
Benzene	75	0.2
Toluene	135	0.5
Ethyl benzene	165	1
Xylene (total)	180	3
Benzo(a)pyrene	0.7	0.05

Table 12: ESL screening levels - TPH and BTEX ESL and LOR.



7 Results

7.1 Health Investigation Levels

The HIL criteria of 40 mg/kg for Benzo(a)pyrene TEQ was exceeded at BH122 at depths of 0.05 m (81 mg/kg) and 0.2 m (50 mg/kg).

7.2 Health Screening Levels for Petroleum Hydrocarbons

Health screening levels for petroleum hydrocarbons were not exceeded by any analysed samples.

7.3 Ecological Screening Levels for Petroleum Hydrocarbons

ESL criteria were exceeded for benzo(a)pyrene and TRH (C $_{16}\text{-}C_{34}$) at locations/depths as outlined in Table 13.

Contaminant	Criteria (mg/kg)	BH or TP /Depth (mBGL)	Result (mg/kg)
		105/0.2	2.80
		112/0.05	1.30
		116/0.05	1.30
		116/0.2	0.73
Benzo(a)pyrene	0.7	117/0.1	3.00
	0.7	117/0.5	3.70
		120/0.5	1.10
		122/0.05	59.00
		122/0.2	36.00
		123/0.05	6.20
F3 (C16-C34)		112/0.05	5,600
	1,700	122/0.05	3,100
		122/0.2	2,000

 Table 13: Samples which exceeded ESL criteria.

7.4 Benzo(a)pyrene TCLP

With the exception of sample TP122/0.2, benzo(a)pyrene TCLP was conducted on all samples which exceeded the benzo(a)pyrene ESL, and sample BH120/0.05. All analysed samples were below laboratory detection limits (<0.001 mg/kg) except sample BH122/0.05 which had pyrene and fluoranthene at or marginally above detection levels (0.001 mg/kg and 0.002 mg/kg respectively).



8 Conclusion and Recommendations

HILs for benzo(a)pyrene TEQ were exceeded by two samples with ESL criteria exceeded by 10 samples for benzo(a)pyrene and three samples for TRH (C_{16} - C_{34}).

In light of the above, and given the assessment criteria assumed a sealed site (the site is currently not fully sealed), a Remediation Action Plan (RAP) is to be prepared to detail site sealing and future management practices.

Assessment contained in this report is not applicable unless the site is sealed in nominated areas.

Site sealing is considered an appropriate remediation method given this will prevent human and ecological contact with contaminated soils, and given benzo(a)pyrene leachate from samples tested for TCLP occurred at low concentrations (maximum 0.001 mg/kg).

Following successful execution of the RAP and subsequent validation, the site would be fit for continued use.



9 Limitations

This Stage 1 and 2 contamination assessment was undertaken in accordance with current industry standards.

It is important to note that no land contamination study can be considered to be a complete and exhaustive characterisation of a site nor can it be guaranteed that any assessment shall identify and characterise all areas of potential contamination or all past potentially contaminating land-uses. Therefore, this report should not be read as a guarantee that only contamination identified shall be found on the site. Should material be exposed in future which appears to be contaminated, additional testing may be required to determine the implications for the site.

Martens & Associates Pty Ltd has undertaken this assessment for the purposes of assessing potential site contamination. No reliance on this report should be made for any other investigation or proposal. Martens & Associates Pty Ltd accepts no responsibility, and provides no guarantee regarding the characteristics of areas of the site not specifically studied in this investigation.



10 References

CRC Care (2011), Health screening levels for petroleum hydrocarbons in soil and groundwater Part 1: Technical development document.

Department of Mineral Resources (1983) Sydney 1:100,000 Geological Sheet 9130.

Martens and Associates (2014) Onsite Wastewater Assessment: 11 Addison Road, Ingleside, NSW, report reference P1404106JR03V01.

NEPC (1999, amended) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM).

NSW DEC (2006) Contaminated Sites: Guidelines for the NSW Site Auditor Scheme.

NSW OEH (2011) 2nd Ed Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites.



11 Attachment A – Site Survey and Figures







Martens & Associates Pty Ltd ABN 85 070 240 890	Environment Water Wastewater Geotechnical Civil Ma	nagement
Drawn: GMT		Drawing No:
Approved: GT	Site Plan & Areas of Environmental Concern	Figure 1
Date: 10/02/2014		
Scale: Not to Scale		Job No: P1404106





Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management		
Drawn:	GMT		Drawing No:	
Approved:	GT	Above ground fuel storage tank	Figure 3	
Date: 1	10/02/2014			
Scale: 1	Not to Scale		Job No: P1404106	

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Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management		
Drawn:	GMT		Drawing No:	
Approved:	GT	Drill heads and excavation equipment	Figure 4	
Date:	10/02/2014			
Scale:	Not to Scale		Job No: P1404106	





Martens & Associates Pty Ltd ABN 85 070 240 890		Environment Water Wastewater Geotechnical Civil Management		
Drawn:	GMT		Drawing No:	
Approved:	GT	Potable water storage tank	Figure 6	
Date:	10/02/2014			
Scale:	Not to Scale		Job No: P1404106	


Martens & Associates Pty Ltd ABN 850	70 240 890	Environment Water Wastewater Geotechnical Civil Man	agement
Drawn:	GMT		Drawing No:
Approved:	GT	Workshop forecourt area used for excavator maintenance	Figure 7
Date:	10/02/2014		
Scale:	Not to Scale		Job No: P1404106



Martens & Associates Pty Ltd ABN 85 0	70 240 890	Environment Water Wastewater Geotechnical Civil Man	gement
Drawn:	GMT		Drawing No:
Approved:	GT	Historical Aerial – 1930	Figure 8
Date:	10/02/2014	Source: NSW Department Lanas	
Scale:	Not to Scale		Job No: P1404106







Martens & Associates Pty Ltd ABN 85 02	70 240 890	Environment Water Wastewater Geotechnical Civil Man	agement
Drawn:	GMT		Drawing No:
Approved:	GT	Historical Aerial – 1982	Figure 11
Date:	10/02/2014	Source: NSW Department Lanas	
Scale:	Not to Scale		Job No: P1404106



Drawn:

Date:

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Approved:

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Job No: P1404106



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Martens & Associates Pty Ltd ABN 85 07	70 240 890	Environment Water Wastewater Geotechnical Civil Man	gement
Drawn:	GMT		Drawing No:
Approved:	GT	Historical Aerial – Present	Figure 13
Date:	10/02/2014	Source: Six maps	
Scale:	Not to Scale		Job No: P1404106



14.03.2014

Not to Scale

Date: Scale:

Job No: P1404106

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12 Attachment B - Historical Search Documents



Stage 1 and 2 Environmental Site Assessment: 11 Addison Road, Ingleside, NSW. P1404106JR02V01 - May 2014 Page 45

DEVELOPMENT APPLICATION FORM PROPERTINO:	
d Floor, Unit 11, No 5 Vuko Place, Warriewood OFFICER:	
D Box 882, MONA VALE NSW 1660 (9018, MONA VALE Icsimile: (02) 9970 7150 Islephone: (02) 9970 1111 BN No. 61340837871 mail: pittwater council@pittwater.nsw.gov.au rebsite: www.pittwaterlga.com.au PRE-LODGEMENT Pre-lodgement discussion with staff is recommended. Discuss your proposal with your neighbours prior to design or Incomplete applications or illegible information Incomplete applications or illegible information	
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MODIFICATION OF CONSENT Approval No 100100 Approval Bate 11-1	ΓE
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DEVELOPMENT APPLICATION

Made under section 76A of the Environmental Planning and Assessment Act 1979

Office Use Only Village Park, 1 Park Street, MONA VALE PO Box 882, MONA VALE, NSW 1660 DX 9016, MONA VALE Telephone, (02) 9970, 1111 ABN No. 61340837871 Email, pitwater_council@pitwaler.nsw gov au Website, www.pitwater.nsw gov au DA NO 700/00/596/2 PITTWATER OUNCI PRE LODGEMENT LODGEMENT PUBLIC INSPECTION All documents lodged with finis development application including this form will be available for public access at Council s All information required by the check-list must be submitted with this application
 Incomplete applications or illegible information will not be accepted by Council Pre-lodge discussion with staff is recommended Discuss your proposal with your neighbours. phor to design or lodgement Carefulty read the checklist and guide in this form and ensure that all required information and gocumentation is provided offices and on Council's webste All fees are to be paid at the time of kodgerrent. . Please make an appointment to forge your application. You may be delayed for an unspecified time if no appointment is made with your application LOCATION OF THE PROPOSAL Address 11 ADDISON ROAD INGLESIDE (Lot 1831 DP 812302) PLEASE ENSURE DETAILS OF ALL LAND PARCELS ARE STATED ABOVE PROPOSAL \Box Section 95 Medification of Consent S96(1) Modifications involving minor only introdescription or miscalculation SS5(1A) Modifications involving minimal environmental impact (2986(2) Modelications intended to have some other effect as specified in the statement SS6AA Modifications by consent authorities of consents granted by the Court PLEASE PROVIDE DETAILED DESCRIPTION OF PROPOSAL · ADDITION OF A COVEROD NERANDAH · CONNERSION OF AN EXISTING STIRE POOM TO A WC · RELOCATION OF A BAK RE-CONFIGURATION OF EXTERNAL STAIRS Does the proposal involve development below mean high water? (If YES the written consent of the Crown is required) YES 💭 NO 💽 Ű 229 WHAT IS THE ESTIMATED COST OF THE PROPOSAL 5 Ð Calculation Sheet and attach to this application Please print out and complete the Estimated Cost of Construction Note: The estimated cost is the value of the works. It is the cost which would be incurred if a contractor carned out the works. This estimate must be supported by an actual quote contract price or independent estimate prepared by a surfably qualified person where a vanation from Councils estimate of costs is sought. STATE ENVIRONMENTAL PLANNING POLICY No 1 DEVELOPMENT STANDARDS C но 🗹 YES 🗍 🗌 is a SEPP 1 objection required to vary a development standard? Note, If YES, a detailed objection identifying the development standard to be varied and the grounds for your objection needs to accompany the development application For more assistance sea the NSW Government Planning and Infrastructure waste (www planning new gov av) under Development/Verving Development Standards 1.5 NOV 2011 - 10 (C) (C)

http://portal.pittwater.nsw.gov.au/interneti/masterplan/enquirer/templates/DAForm.as 14/11/2011

DEVELOPMENT APPLICATION

Made under section 78A of the Environmental Planning and Assessment Act 1979

Office Use Only Village Park, 1 Park Street, MONA VALE PO Box 682, MONA VALE NSW 1669 PITTWATER OX 9018 MONA VALE Telephone (02) 9970 1111 ABN No 61340837871 DA No Email pithwater_counci@pithwater new gov au Website www.pithwater.new.gov.au Date Received PUBLIC INSPECTION PRE LODGEMENT LODGEMENT All information reoursed by the block list must be submitted with this application
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DEVELOPMENT APPLICATION Made under section 78A of the Environmental Planning and Assessment Act 1979

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Village Park, 1 Park Street, MONA VALE PO Box 882, MONA VALE NSW 1660 DX 9018, MONA VALE Telephone: (02) 9970 1111 ABN No. 61340837871 Email: pittwater_council@pittwater.nsw.gov.au Website: www.pittwater.nsw.gov.au	PITTWATER COUNCIL	DA No.: <u>NO 263/B</u> Date Received: <u>13/q/13</u>	
PRE-LODGEMENT Pre-lodgement discussion with staff is recommended. Discuss your proposal with your neighbours prior to design or lodgement. Carefully read the checklist and guide in this form and ensure that all required information and documentation is provided with your application.	LODGEMENT All information required by the check-list must be submitted with this application. Incomplete applications or illegible information will not be accepted by Council. All fees are to be paid at the time of lodgement. Please make an appointment to lodge your application. You may be delayed for an unspecified time if no appointment is made.	PUBLIC INSPECTION • All documents lodged with this developn application, including this form, will be available for public access at Council's offices and on Council's website.	nent
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http://portal.pittwater.nsw.gov.au/interneti/masterplan/enquirer/templates/DAForm.asp... 3/09/2013

13 Attachment C – Borehole and Test Pit Logs



Stage 1 and 2 Environmental Site Assessment: 11 Addison Road, Ingleside, NSW. P1404106JR02V01 - May 2014 Page 50

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	EQU N BH HA HS CC (V TC 1 PT	IPMI Exis Back Hand Cond V-Bit Tungs Push	ENT ural e sting khoe d aug d Spa crete t sten n tube	/ ME ⁻ excav bucke ger ade Corei Carbi	THOD SL ure SH vation SC et RE Nil r de Bit	JPPORT Shorin Shotcr Rock E No sup	g N Non ete X Not Bolts 型 Wat poort → Wat	e obse measu er leve er out er infle	MOISTURE PENET rved D Dry L Lov red M Moist M Moist W Wet H Hig Wp Plastic limit R Re Now WI Liquid limit	TRATION CONS w VS oderate S gh F flusal St S VSt H F f	SISTENCY DENSITY Very Soft VL Ver Soft L Loo Firm MD Mee Stiff D Den Very Stiff VD Very Hard -riable	/ SAM y Loose A A se B E dium Dense U L se D D / Dense M N Ux T	PLING & Juger sample Sulk sample Indisturbed Disturbed s loisture co ube samp	TESTINC ple e d sample ample ontent le (x mm)	9 S V D D F E W	 Pocket per Standard Vane she CP Dynam penetro Field den S Water sa 	enetrometer penetration test ear ic cone meter sity mple	CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION N USCS Y Agricultural
L				<u> </u>			EXCAVATI	ON L	OG TO BE READ IN CONJU	INCTION WITH	ACCOMPANYING	REPORT NOTE	S AND	ABBRE	VIATIO	ONS		
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C	LIE	NT		K	evin Ma	atthews	Contrac	ting	J	COMMENCED	20.02.14	COMPLETE	20.02	2.14			REF	BH102
F	RO	JE	СТ	C	ontamir	nation A	Assessm	ent		LOGGED	BR	CHECKED	GT				Sheet 1 o	of 1
s	ITE			11	Addiso	on Roa	d Inglesi	de, I	NSW.	GEOLOGY	Sandstone	VEGETATIO	N Gras	s			PROJECT NO	. P1404106
E	QUIP	MEN			0000	Truck Mor	unted Hydraul	ic Aug	er	EASTING	NA	RL SURFAC	NA				01.005	4.00/
F	XCA\ F					95mmØ X T∆	1.7m depth		МА			ASPECT	West		SA		G & TEST	1-2% ING
		SUPPORT	WATER	MOISTURE	DEPTH (M)		GRAPHIC LOG	CLASSIFICATION	DESCRIF Soil type, texture, structure, n particle characteristics, orga fill, co	PTION OF STR nottling, colour, pla anics, secondary a ntamination, odou	ATA asticity, rocks, oxidation, and minor components, ir.	CONSISTENCY	DENSITY INDEX	ТҮРЕ	DEPTH (M)	A	RESUL	LTS AND OBSERVATIONS
,	/ 1	Nil	N	D	0.25			s	SAND - Dark brov	wn, fine to me	edium grained.			A B	0.2 0.2	Water tes - FILL 4106/10 4106/10	t resulted in very 2/ 0.2 2/ 0.2	y minor organic stain.
F	/ 1	Nil	N	D	0.3			-	SANDS	TONE FLOA	TER.					- FILL - FILL		
,	/ 1	Nil	N	D	 			CLS	CLAYE	Y SAND - Br	own.			A B	0.5 0.6	4106/10 4106/10	2/ 0.5 2/ 0.6	
,	/ 1	Nil	N	d V	 1.0 1.05		 	sc	SANDY CLAY - Dark	brown, with r	ed/orange mottles.			A	1.0	- POSS 4106/10	IBLY FILL 2/ 1.0	1
,	/ 1	Nil	Y	w	- - -			S	SAND - Grey, wet, r	medium grair	ned, minor clays.			A	1.5	- POSS 4106/10	IBLY FILL 2/ 1.5	
	V NII Y W								V bit refusal at 1.7m sand	on either sar stone bedroc	ndstone floater or k.	SAMPI	ING & T	ESTING		- V bit re GROUNE 0.5 HR A GROUNE	efusal at 1.7m. WATER LEVEL ITURE - BOREH FTER HOLE DR WATER DETE	LESTIMATED BASED HOLE MEASURED RILLED AND NO CTED.
	N BH HS CC V TC PT	Nat Ex Bac Har Con V-B Tun Pus	ural e isting ckhoe nd aug nd Spa icrete it gsten ih tube	excav excav bucke ger ade Corer Carbin	∎e S⊦ ation SC t RE Nil	 Shoring Shotcret Rock Bo No supp 	ne X Non Not Not Y Wat → Wat	e obse measu er leve er out	rved D Dry L Lov red M Moist M Mc I W Wet H Hig Wp Plastic limit R Re Now WI Liquid limit	w VS oderate S gh F fusal St VSt H F	very sont VL Very Loo Soft L Loose Firm MD Medium I Stiff D Dense Very Stiff VD Very Dens Hard Friable	se A Aug B Bul Dense U Un D Dis Se M Mo Ux Tub	er sample sample listurbed turbed sa sture con e sample	ie sample ample ntent e (x mm)	PF S D F W	 Pocket per Standard Vane she Vane she Dynam penetro Field den S Water sa 	enetrometer penetration test ar ic cone meter sity mple	SYMBOLS AND SOIL DESCRIPTION N USCS Y Agricultural
				<u>¥</u>			EXCAVATI	ON L	OG TO BE READ IN CONJU	NCTION WITH	ACCOMPANYING REP	ORT NOTES	AND A	BBRE	/IATIO	ONS		
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6	CLIENT Kevin Matthews									COMMENCED	20.02.14	COMPLETE	20.0	2.14		REF BH103
F	RC	JE	СТ	C	ontamir	nation	Assessm	ent		LOGGED	BR	CHECKED	GT			Sheet 1 of 1
5	ITE			11	Addise	on Roa	d Inglesi	de,	NSW.	GEOLOGY	Sandstone	VEGETATIO	NA NA			PROJECT NO. P1404106
E	QUIF	MEN	Т			Truck Mo	unted Hydraul	ic Aug	er	EASTING	NA	RL SURFAC	E NA			
F	XCA					95mmØ >	X 1.8m depth					ASPECT	Wes	t	~ ~ ~	
\vdash		EX	CAV		ON DA			z		TERIAL DA			~		SA	
	MEIHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)		GRAPHIC LOG	CLASSIFICATIO	DESCRI Soil type, texture, structure, n particle characteristics, orga fill, co	PTION OF STR nottling, colour, pla anics, secondary a ntamination, odou	ATA asticity, rocks, oxidation, and minor components, ir.	CONSISTENCY	DENSITY INDEX	ТҮРЕ	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
	/	Nil	N	м	0.25			SP	SAND - Dark brow	wn, fine to me	edium grained.			A	0.05	4106/103/ 0.05 - FILL -
	J.	Nil	Ν	м	 <u>1.0</u>			sc	CLAYEY SAND AN Light brown, tends to a after	D CRUSHEL dark brown sa approx. 0.7n) SANDSTONE - and with minor clay n.			A	0.5	- FILL
	/	Nil	N	м	<u>1.1</u> - - -				CRUSHED SAN	DSTONE - V	ariable colors.			A	1.5	- FILL - - 4106/103/ 1.5 - - V bit refusal at 1.8m
┢	+				1.8			1	V bit refusal at 1.8m	on either sar	ndstone floater or	+			\square	• Dit lei usai at 1.0111.
	✓ NII N M								MOISTURE PENET erved D Dry L Lo red M Moist M Ma el W Wet H Hig Wo Plastic limit R Re flow Wi Liquid limit	TRATION CON w VS gh F fusal St VSt H F	SISTENCY DENSITY Very Soft VL Very Loo Soft L Loose Firm MD Medium Sliff D Dense Very Stiff VD Very Der Hard Friable	SAMP See A Au Dense D Dio Nee M Mc Ux Tul	ING & 1 Jer samp disturbed sisturbed sisture co e sampli	rESTING sample sample ntent e (x nm)	; pp ps vs Do FE W	2.0 2.0
- 4			/	<u>¥</u>			EXCAVATI	ON L	UG TO BE READ IN CONJU	MARTENS &	ACCOMPANYING REF	ORT NOTES	AND A	ABBRE\	/IATIC	
Quality Sheet N	(ľ			rte Martens & Ass	NS sociates Pty.	. Ltd . 2014		Ph mail@ma	6/37 Hornsby, ione: (02) 9476 artens.com.au	Leighton Place NSW 2077 Australia 9999 Fax: (02) 9476 87 WEB: http://www.marten	67 Is.com.au		E	ng	gineering Log - Borehole

[CLIE	NT		к	evin Ma	atth	ews	;			COMMENCED	20.02.14		COMPLET	ED 20.0	2.14			REF	TP	104
		JEC	СТ	C	ontamir	nati	on /	Assessm d Inglosi	ent do l	NSW	LOGGED	AB		CHECKED	GT				Sheet 1	of 1	
		MEN	т		Auuiso	Har	nd Spa	ade	ue, i	N3W.	EASTING	NA		RL SURFA					PROJECT N	O. P14041	06
E	XCA	ΑΤΙΟ	DN D	IMEN	SIONS	300	mm x	300mm x 0.6r	n depti	h	NORTHING	NA		ASPECT	Wes	st			SLOPE	<5%	
L	-	EXC	AV	/AT	ION DA	TA				M	ATERIAL D	ATA				_	SA	MPLIN	G & TEST	TING	
	METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)			GRAPHIC LOG	CLASSIFICATION	DESCR Soil type, texture, structure, particle characteristics, or fill, c	IPTION OF STR mottling, colour, pl ganics, secondary contamination, odor	ATA asticity, rocks, o and minor compo ar.	xidation, onents,	CONSISTENCY	DENSITY INDEX	ТҮРЕ	DEPTH (M)	A	RESU DDITIONAL	ILTS AND OBSERVA	TIONS
1	IS	Nil	N	М	-				sc	CLAYEY SA	ND - Brown, <u>y</u>	vellow red.				E E E	0.05 0.2 0.3 0.4 0.5	4106/10 - FILL 4106/10 4106/10 4106/10 4106/10	4/ 0.05 4/ 0.2 4/ 0.3 4/ 0.4 4/ 0.5		- - -
					0.6 					Terminated	at 0.6m on cla	ayey sand.									- - 1.0 - - - - - - - - - - - - - - - - - - -
					- - - - - - - - - - - - - - - - - - -																- - - 3 <u>0</u> - - - - - - - - - - - - - - - - - - -
EQUIPMENT / METHOD SUPPORT WATER MOISTURE F Image: Support of the stating excavation SUPPORT None observed D Dry L Image: Support of the stating excavation SC Shotcrete X None observed D Dry L Image: Support of the stating excavation SC Shotcrete X Not measured M Moist M Image: Support of the stating excavation SC Shotcrete X Not measured M Moist M Image: Support of the stating excavation SC Shotcrete X Not measured M Moist M Image: Support of the stating excavation SC Shotcrete X Water outflow W Liquid limit CC Concrete Corer Image: Support of the stating excavation Image: Support of the st										MOISTURE PENE erved D Dry L L red M Moist M M el W Wet H H Wp Plastic limit R R Now WI Liquid limit Now WI Liquid limit	ETRATION CON ow VS ligh F lefusal St VSt H F UNCTION WITH MARTENS &	SISTENCY D Very Soft V Firm M Stiff D Very Stiff V Hard Friable I ACCOMPAN ASSOCIATES	ENSITY L Very Loo Loose D Medium D Dense D Very Dens NYING REP S PTY LTD	SAMI se A A B Bense U U D D D se M M Ux T	PLING & uger sampl ulk sampl ndisturbed s oisture cc ube samp	resting ble 3 3 3 4 sample ample ample intent le (x mm)	PPP S VS DO FE W	Pocket pe Standard S Vane she CP Dynam Penetro D Field den S Water sa	netrometer penetration tes ar cone meter sity mple	CLASS SYMBC SOIL D Y N A	- 4.0 - - - 4.5 IFICATION JLS AND ESCRIPTION JSCS vgricultural
2				2			-				MAR [ENS & 6/37	ASSOCIATES	» РТҮ LTD æ			E	no	iine	erina	a Loo	7 - 1
	(́ П - (с)Cop	a	rte Martens & Ass	n	S es Pty.	Ltd . 2014		P mail@n	Hornsby, Phone: (02) 9476 nartens.com.au	NSW 2077 Au 9999 Fax: (0 WEB: http://w	ustralia 2) 9476 876 ww.martens	37 s.com.au			- 3	Exc	avati	ion	2
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6	LIE	NT		ĸ	evin Ma	atth	ews	5			COMMENCED	20.02.14		COMPLET	E D 20.	02.14			REF	TP	2105
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5	ITE			11	Addise	on I	Roa	d Inglesi	de, I	NSW.	GEOLOGY	Sandstone		VEGETATI	ON NA				PROJECT N	IO . P1404	4106
	QUIP XCA\	MEN ATIO	í DN D	IMEN	ISIONS	Har 300	nd Spa mm x	ade 300mm x 0.6r	n depti	'n	EASTING NORTHING	NA		ASPECT	JE NA	A est			SLOPE	<5%	
	E	XC	AV	/AT	ION DA	TA				MA	ATERIAL D	ATA					SA	MPLIN	G & TES	TING	
	MEIHOU	SUPPORI	WATER	MOISTURE	DEPTH (M)			GRAPHIC LOG	CLASSIFICATION	DESCRI Soil type, texture, structure, r particle characteristics, org fill, co	PTION OF STR mottling, colour, pl anics, secondary ontamination, odor	ATA asticity, rocks, and minor com Jr.	oxidation, ponents,	CONSISTENCY	DENSITY INDEX	ТҮРЕ	DEPTH (M)	A	RESI DDITIONAL	JLTS AND OBSERV) /ATIONS
ŀ	is r	Jil	х	М	-				SP	SAND WITH medium	GRAVELS - L to course gra	ight browr ained.	n,			E E E E	0.05 0.2 0.3 0.4 0.5	4106/10 - FILL 4106/10 - ORGA 4106/10 4106/10 4106/10	5/ 0.05 15/ 0.2 NICS 5/ 0.3 15/ 0.4 15/ 0.5		- - -
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EQUIPMENT / METHOD SUPPORT WATER MOISTURE P N Natural exposure SH Shoring None observed D Dry L X Existing excavation SC Shotrete X None observed D Dry L BH Backhoe bucket RB Rock Boits Water level W Wet H Hand Spade CC Concrete Corer V V-Bit TC Tungsten Carbide Bit PT Push tube EXCAVATION LOG TO BE READ IN CC 									e obse measu er leve er outf er inflo	MOISTURE PENE rved D Dry L Lo red M Moist M M W Wet H Hi Wp Plastic limit R Re low WI Liquid limit w	TRATION CON w VS gh F flusal St VSt F UNCTION WITH	SISTENCY Very Soft Soft Firm Stiff Very Stiff Hard Friable	DENSITY VL Very Loo L Loose MD Medium I D Dense VD Very Dens NYING REP	SAMI Ise A A Dense U U D D Se M M Ux T	PLING & uger sam ulk samp ndisturbed oisturbed oisture c ube sam S AND	TESTINC nple le ed sample sontent ple (x mm) ABBRE ¹		 Pocket pr Standard Vane she Vane she Dynam penetro Field der S Water sa 	enetrometer penetration te ar ic cone meter sity mple	CLAS SYME SOIL Y N	- 4.5 SSIFICATION BOLS AND DESCRIPTION USCS Agricultural
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wuality of lea	(n (c)Cop	a	rte Martens & Ass	n	S es Pty.	Ltd . 2014		Pl mail@m -	Hornsby, Hone: (02) 9476 artens.com.au	20191101121 NSW 2077 / 9999 Fax: WEB: http://	Australia (02) 9476 876 www.martens	67 s.com.au		_	<u></u>	Exc	avat	ion	ש -

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	NO.	JEC	1	11	Addiso	nati on	ion Roa	Assessn ad Ingles	ide,	NSW.			GEOLOG	GY	AB Sandstone			VEGETA	TION	NA				Sheet PROJECT	1 оf Г NO.	1 P1404106	
	QUIPN	NENT				Ha	nd Sp	ade	,	-			EASTIN	G	NA			RL SURF	ACE	NA							
F	XCAV				SIONS	300)mm :	x 300mm x 0.6	m dep	h			NORTHI		NA			ASPECT		West				SLOPE	1	-2%	
┢					ON DA		z	_	z			M	ATERIA	LDA	ATA					_		SA	MPLIN	G & TE	STIN	G	
			WATER	MOISTURE	DEPTH (M)			R GRAPHIC LOG	CLASSIFICATIO	Soi pa	il type, texture article charac	DESCRI e, structure, teristics, org fill, c	PTION O mottling, co ganics, seco ontaminatio	F STR. lour, pla ndary a n, odou	ATA Isticity, rock nd minor co r.	s, oxidati mponeni	ion, ts,	CONSISTENCY			түре	DEPTH (M)	Α	RE DDITION	SULTS	S AND SERVATIO	DNS
ŀ	IS N	101	N	м	- - -				S A A A A A A A A A A A A A A A A A A A		CLAYEY	SAND W medium	ITH GR	AVEL se gra	S - Light ined.	brown	١,				E E E E	0.05 0.2 0.3 0.4 0.5	4106/10 - FILL 4106/10 4106/10 4106/10 4106/10	6/ 0.05 6/ 0.2 6/ 0.3 6/ 0.4 6/ 0.5			-
					<u>0.6</u> 				×		Ter	minated	at 0.6m o	on cla	yey sand	1.											- - 1.0 - - - - - - - - - - - - - - - - - - -
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Image: Construct of the second sec									PENE L La M M H Hi imit R R mit	TRATION ow loderate igh efusal	CONS VS F St VSt F F F	BISTENCY Very Soft Soft Firm Stiff Very Stiff Hard Friable	DENS VL V MD V VD V	SITY Very Loos Loose Medium D Dense /ery Dens	SAI se A Dense U De M Ux ORT NOT	MPLIN Auger Bulk sa Undist Disturt Moistu Tube s	G & TES sample ample urbed sam re conte ample (x	STING ample ple ent x mm) BREV	pp S VS DC FE W3	Pocket p Standard Vane sho CP Dynam penetro Field der S Water sa	enetrometer penetration ar ic cone meter sity mple	n test	CLASSIFIC SYMBOLS SOIL DESC Y USC N Agric	- 4.5 ATION AND RIPTION S ultural			
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	PRO SITE	JEC	از	11	Addiso	nat on	ion Roa	Assessm ad Inglesi	de, l	NSW.			GEOLOG	у Зү	AB Sandstone			VEGETA	LION	GI NA				Sheet PROJECT	1 оf Г NO.	1 P1404106	
F	QUIP	MEN	Г			На	nd Sp	ade	,				EASTIN	G	NA			RL SURF	ACE	NA					_		
F	XCAV					300 T∧)mm :	< 300mm x 0.6i	n dept	h		мл			NA TA			ASPECT		West		54		SLOPE		5% C	
	METHOD		WATER	MOISTURE	DEPTH (M)		M PENETRATION	GRAPHIC LOG	CLASSIFICATION	Soil typ partick	D e, texture, s e characteri	DESCRII tructure, n istics, orga fill, co	PTION OI nottling, col anics, seco ontamination	F STR/ lour, pla ndary a n, odou	ATA sticity, rocks nd minor co	s, oxidati mponent	ion, ts,	CONSISTENCY			түре	DEPTH (M)	A		SULTS	S AND SERVATIO	ONS
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	QUIP	MENT	-		Audist	Han	d Spa	de	ue,	101		EASTING	NA		RL SURFA		NA			PROJECT	NU. P	1404106	
E	XCA	ATIO	N DI	IMEN	SIONS	300r	nm x	300mm x 0.3r	m dept	h		NORTHING	NA		ASPECT		West			SLOPE	1-2	%	
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	MEIHOU	SUPPORI	WATER	MOISTURE	DEPTH (M)			GRAPHIC LOG	CLASSIFICATION	s	DESCRII soil type, texture, structure, n particle characteristics, orga fiil, co	PTION OF STR nottling, colour, planics, secondary a intamination, odo	ATA asticity, rocks, o and minor comp ir.	oxidation, conents,	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	A	RESI DDITIONAI	ULTS /	AND ERVATION	S
ŀ	IS	Nil	N	м	- - 0.3				sc		GRAVELLY medium	' SAND - Ligl to course gra	nt brown, ained.				E	0.05	4106/10 - FILL 4106/10)8/ 0.05)8/ 0.2 + DUP	? 2A		-
					0.3 - - - - - - - - - - - - -						Refusal at 0.3	m on sandst	one floater.										
	EQI N X BH HS CV TC PT	JIPME Natu Exis Back Hanc Conc V-Bit Tungs Push	ENT / rral ex ting (hoe I 1 aug 1 Spa 1 Spa	/ ME xposi bucke ger ade Core Carbi	4.5 THOD SL Ire SH vation SC et RE Nil	JPPO I Sh S Sh B Ro No	RT oring otcret ck Bo supp	WATER N Non e X Not its 및 Wat → Wat → Wat EXCAVATI	ter inflo	erved ured el flow ow	MOISTURE PENET D Dry L Lo M Moist M Mo W Wet H Hig Wp Plastic limit R Re WI Liquid limit O BE READ IN CONJU	IRATION CON w VS oderate S ph F fusal St VSt H F NCTION WITH	SISTENCY I Very Soft I Firm I Stiff I Very Stiff Y Hard Friable	DENSITY VL Very Loos L Loose MD Medium L D Dense VD Very Dens NYING REP	SAM Ise A A Dense U I Se M M Ux 1	IPLING Auger : Bulk sa Undistu Disturb Moistur Tube s	3 & TESTI sample urple sample ved sample re content ample (x m	NG p S Ne V EVIATI	p Pocket p Standarc S Vane sh iCP Dynam penetr D Field der /S Water sa ONS	enetrometer penetration te sar ic cone ometer sisty imple	C S Sest S	CLASSIFICAT SYMBOLS AN SOIL DESCRI YUSCS NAgricultu	4.5 TON ID PTION
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MARTENS & ASSOCIATES PTY LTD 6/37 Leighton Place Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767												Ēnģ	gine Fyr	ering	g L tior	.og - n							
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EQU		NT		Auuis	Truck Mc	unted Hydraul	ic Aug	er	EASTING	NA	RL SURFAC		IA			PROJECT NO	P1404106
EXC	AVAT		DIMEN	SIONS	95mmØ	X 2.5m depth			NORTHING	NA	ASPECT	E	ast			SLOPE	1-2%
	EX	CA\	/AT	ION DA	TA			MA	TERIAL DA	ATA				SA	MPLIN	G & TEST	NG
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)		GRAPHIC LOG	CLASSIFICATION	DESCRI Soil type, texture, structure, n particle characteristics, org fill, co	PTION OF STR nottling, colour, pla anics, secondary a intamination, odou	ATA asticity, rocks, oxidation, and minor components, ir.	CONSISTENCY	DENSITY INDEX	ТҮРЕ	DEPTH (M)	А	RESUL DDITIONAL (TS AND DBSERVATIONS
v	Nil	N	м	_ _ 0.3			-	BITUMEN V R	VITH UNDEF OAD BASE.	RLAYING			A	0.2	- FILL 4106/10	9/ 0.2	-
v	Nil	N	м	-			sc	CLAYEY S	SAND - Dark	brown.			A	0.5	- FILL 4106/10	9/ 0.5	-
v	Nil	N	D	0.7			-	SANDS	TONE FLOA	TER.					- FILL		
v	Nil	N	м				CL	SILTY CLAY - L	ight grey and	I red mottled.			A	1.0	- FILL 4106/10	9/ 1.0	- 1.0 -
v	Nil	N	м	-			CL	SANDY CLAY A CRUSHED SANI	ND CLAYEY DSTONE - Va	' SAND AND ariable colours.			A	1.5	- FILL 4106/10	9/ 1.5	-
v	Nil	N	м	1.8 - 2.0 - 2.2			CL	SANDY CLAY E	YAND CLAYI Dark brown.	EY SAND -			A	2.0	- FILL 4106/10	9/ 2.0	- - -
v	Nil	N	м	- - 2.5			CL	SANDY C	CLAY - Dark I	prown.			A	2.5	- FILL 4106/10	9/ 2.5	-
								Borehole terminate	d at 2.5m on	sandy clay (fill).							- - -
				-													- - -
				-													-
				<u>4.0</u> 													4 <u>.0</u> - -
				4.5													- 4 F
E N B H C V T P	QUIPI A Ra A Ba A Ha IS Ha C Co V-E C Tur T Pu	MENT atural e xisting ackhoe and au and Sp ncrete Bit ngsten ish tub	/ ME exposi excar bucke ger bade core Core Carbine	THOD SI ure SI vation Si et R N r de Bit	UPPORT H Shoring C Shotcre B Rock B il No sup	WATER N Non te X Not oots ⊻ Wat	e obs measi er leve er out	MOISTURE PENET erved D Dry L Lo ured M Moist M Mot el W Wet H Hig Wp Plastic limit R Re flow WI Liquid limit ow	FRATION CON: w VS oderate S gh F fusal St VSt H F	SISTENCY DENSITY Very Soft VL Very Loc Soft L Loose Firm MD Medium I Stiff D Dense Very Stiff VD Very Den Hard Friable	SAMF Se A Au B Bi Dense U U D D Se M M Ux Tu	LING a liger sa ilk sam idisturt sturbeo bisture be san	I TESTING ple ped sample d sample content nple (x mm	G PF S V: D) FI W	 Pocket pr Standard S Vane she CP Dynam penetro D Field der S Water sa 	enetrometer penetration test ear ic cone meter sity mple	4:5 CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION Y USCS N Agricultural
+			<u>Ψ</u>			EXCAVATI	ON L	OG TO BE READ IN CONJU			ORT NOTE	S ANE) ABBRE	VIATI	ONS		
Juality Sheet No.			a	rte	ns sociates Ptv	. Ltd . 2014		Ph mail@ma	MAKTENS & 7 6/37 Hornsby, 10ne: (02) 9476 artens.com.au	ASSUCIATES PTY LTD Leighton Place NSW 2077 Australia 9999 Fax: (02) 9476 87 WEB: http://www.marten	67 s.com.au		E	ng	gine Bc	ering oreho	Log - le

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E	QUIP	MEN	IT	· ·		Truck	Mounted H	lydrauli	ic Aug	er	EASTING	NA	RL	LSURFACE	NA			1	1 1404100
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┢		= X (CAV		ION DA				z	M <i>A</i>	ATERIAL DA				×		SAMPLIN	G & TEST	NG
	MEIHOU	SUPPORT	WATER	MOISTURE	DEPTH (M)			GRAPHIC LOG	CLASSIFICATIO	DESCRII Soil type, texture, structure, n particle characteristics, org fill, co	PTION OF STR nottling, colour, pla anics, secondary a ontamination, odou	ATA asticity, rocks, oxidati and minor component r.	on, s,	CONSISTENCY		TYPE	A DEPTH(M)	RESUL DDITIONAL (TS AND DBSERVATIONS
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,	v	Nil	N	D	-				-	SANDS	TONE FLOA	TER.				A 0	- FILL 0.5 4106/11	10/ 0.5	-
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		JIPA Na Bab Cor	IENT disting ckhouc nd Span disting ckhouc it it	7 / MEst exposed b bucket ger vade		UPPOR H Shor C Shot B Rock	T Wing N Crete X Bolts V	/ATER Non 7_ Wat ∃ Wat	e obse measu er leve er outf	Borehole terminate crushe MOISTURE PENET erved D Dry L LO med M Moist M Ma al W Wet H Hig Wp Plastic limit R Re flow WI Liquid limit	TRATION CON w VS obterate S ph F fusal St VSt H F	SISTENCY DENS (fill). SISTENCY DENS Very Soft UL L Soft L L Firm MD M Very Soft VL V Hard Firable	J ITY /ery Loose oose /edium Dens Jense ery Dense	SAMPLIN A Auger B Bulks D Undsu M Moistu Ux Tube	IG & TES sample ample turbed sam bed sampure conten sample (x	TING mple itmm)	pp Pocket p S Standard VS Vane sh DCP Dynam penetrr FD Field det WS Water sa	enetrometer penetration test aar ic cone meter ssity mple	CLASSIFICATION SOIL DESCRIPTION SOIL DESCRIPTION V USCS N Agricultural
F		rus		<u> </u>			EXCA	VATIO		OG TO BE READ IN CONJU			G REPOR	T NOTES A	ND ABB	REVIA	TIONS		
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	SUPPORT	WATER	MOISTURE	DEPTH (M)	L M PENETRATIOI R RESISTANCE	GRAPHIC LOG	CLASSIFICATIO	DESCRII Soil type, texture, structure, r particle characteristics, org fill, cc	PTION OF STF nottling, colour, p anics, secondary intamination, odo	ATA asticity, rocks, oxidatio and minor components ur.	ın, ;	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	A	RESU DDITIONAL	LTS AND OBSERVATION	s
	/ Ni	I N	м	-			SP	SAND WITH GRA to c	AVELS - Darl oarse graine	c grey, medium d.				A	0.05	4106/1 - FILL 4106/1	2/ 0.05		-
	/ Ni	I N	М	0.4			SC	CLAYEY SAN	D - Grey/brov	vn, medium						- FILL			
	/ N	I N	м	- - - - - - - - - - - - - - - - - - -			SP	SAND WITH CL to co Borehole terminated	AY - Grey/br oarse grained at 1.0m on s	d. bwn, medium d. and with clay (fill).			A A	1.0	4106/1 ⁻ - FILL 4106/1 ⁻	2/ 0.5		
	EQUI	PMEN	T/ME	- - - - - - - - - - - - - - - - - - -	IPPORT	WATER		MOISTURE PENE	TRATION CON	SISTENCY DENSI	TY	SAMP	LING &	TESTING				CLASSIFICAT	- - - - - - - - - - - - - - - - - - -
	N BH E HA H CC C V V TC T PT F	Vatural Existin Backho Hand au Hand S Oncrete Goncrete Goncrete Co	expos g exca e buck uger pade e Core n Carb	ure St vation SC et RE Nil r	H Shoring C Shotcret 3 Rock Bc I No supp	Nonu te X Noti bits ⊻ Wat ort ← Wat	e obse measu er leve er outf er inflo	erved D Dry L Lo rred M Moist M Mi al W Wet H Hi Wp Plastic limit R Re flow WI Liquid limit	by VSV boderate S gh F fusal St VSt H F	Very Soft VL Vc Soft L Lc Firm MD Mi Stiff D De Very Stiff VD Ve Hard Friable	ery Loos oose edium D ense ery Dense	se A Au B Bu ense U Ur D Dia e M Mo Ux Tu	ger sam k samp disturbed isture c be samp	nple le ed sample sample ontent ple (x mm)	pr S V(D V D V V V	 Pocket p Standard Vane sh CP Dynam penetro Field der S Water sa 	enetrometer penetration tes ear ic cone meter isity imple	SYMBOLS AN SOIL DESCRIF Y USCS N Agricultu	D PTION ral
Ĺ			$\underline{\mathbb{V}}$			EXCAVATIO	ON LO	OG TO BE READ IN CONJU		H ACCOMPANYING	G REPO	ORT NOTES	AND	ABBRE	VIATIO	ONS			
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PROJECT Contamination Assessment LOGGED BR CHECKED G SITE 11 Addison Road Ingleside, NSW. GEOLOGY Sandstone VEGETATION N N EQUIPMENT Truck Mounted Hydraulic Auger EASTING NA RL SURFACE N EXCAVATION DIMENSIONS 95mmØ X 0.7m depth NORTHING NA ASPECT E EXCAVATION DATA MATERIAL DATA MATERIAL DATA ONESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, fill, contamination, odour. Xu and structure, structure, mottling, colour, plasticity, rocks, oxidation, fill, contamination, odour. Xu and structure, structure, mottling, colour, plasticity, rocks, oxidation, fill, contamination, odour. V Nil N D 0.1 XX BITUMEN WITH UNDERLAYING ROAD BASE GRAVEL. V V Nil N D - - CRUSHED SANDSTONE - Fine to medium grained, minimal clay, light grey. CRUSHED SANDSTONE - Fine to medium grained, minimal clay, light grey.	GT NA NA East S S S S S S S S S S S S S S S S S S S	ADDITIONAL OBSERVATIONS									
STIE Tracking in Roduing ingressible, NSV. Geology Sanssone Vede FArilon N EQUIPMENT Truck Mounted Hydraulic Auger EASTING NA RL SURFACE N EXCAVATION DIMENSIONS 95mm0 X 0.7m depth NORTHING NA ASPECT E EXCAVATION DATA MATERIAL DATA ASPECT E EXCAVATION DATA MATERIAL DATA Soil type, texture, structure, motting, colour, plasticity, rocks, oxidation, particle characteristics, fill, contamination, odour. Soil type, texture, structure, motting, colour, plasticity, rocks, oxidation, particle characteristics, fill, contamination, odour. Soil type, texture, structure, motting, colour, plasticity, rocks, oxidation, particle characteristics, fill, contamination, odour. Soil type, texture, structure, motting, colour, plasticity, rocks, oxidation, particle characteristics, fill, contamination, odour. Soil type, texture, structure, motting, colour, plasticity, rocks, oxidation, particle characteristics, fill, contamination, odour. Soil type, texture, structure, motting, colour, plasticity, rocks, oxidation, particle characteristics, fill, contamination, odour. Soil type, texture, structure, motting, colour, plasticity, rocks, oxidation, particle characteristics, fill, contamination, odour. Soil type, texture, structure, motting, colour, plasticity, rocks, oxidation, particle characteristics, fill, contamination, odour. Soil type, texture, structure, motting, colour, plasticity, rocks, oxidation, particle characteristics, fill, contamination, odour. Soil type, texture, structure, motting, colour, plasticity, rocks, oxidation, part	NA NA East S S S S LABE A O A O A O O A O O A	AMPLING & TESTING RESULTS AND ADDITIONAL OBSERVATIONS									
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O LX M M D 0.1 V Nil N D 0.1 XX BITUMEN WITH UNDERLAYING ROAD BASE GRAVEL. V Nil N D 0.1 XX CRUSHED SANDSTONE - Fine to medium grained, minimal clay, light grey.	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS									
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V NI N D - CRUSHED SANDSTONE - Fine to medium grained, minimal clay, light grey.		95 4106/113/ 0.05 - FILL									
0.7 0.7 10 - 10 - 10 - 10 - 10 - 10 - 110 - 110 - 110 - 110 - 110 - 111 -	A 0.3	5 4106/113/ 0.05 - FILL - 5 4106/113/ 0.5 7 4106/113/ 0.7 - V bit refusal at 0.7m. - 10 - 20 - 30 - - - <									
EQUIPMENT / METHOD SUPPORT WATER MOISTURE PENETRATION CONSISTENCY DENSITY SAMPLING N Attrait exposure SH Storing None observed D Dry L Low VS Very Soft VL Very Loose A Augerse SH Bx6/hoe bucket RB Rock Bolts Water level W Wet H High F Firm MD Medium Dense U Undisturi HS Hand spade Ni No support Water level W Wit H Refusal St Stiff D Dense D Disturbe HS Hand Spade Water outflow Wi Liquid limit VSt Very Stiff VD very Dense M Moisture H Hand Vater Viter outflow Wi Liquid limit VSt Very Stiff VD very Dense M Moisture	IG & TESTING sample ample turbed sample bed sample ure content sample (x mm)	PP Pocket penetrometer S Standard penetration test VS Vane shear DCP Dynamic cone penetrometer FD Field density N Agricultural									
v v-oit → Water inflow F Friable TC Tungsten Carbide Bit PT Push tube		vvs vvater sample									
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MARTENS & ASSOCIATES PTY LTD 6/37 Leighton Place Harreto, NSW 2077 Australia Engineering Log -											
Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767 mail@martens.com.au WEB: http://www.martens.com.au		MILLAN PALLAN -									

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нѕ	Nil	N	м	 0.4				sc	CI	Clay	y, medit AND - Li me	ight brov dium gra	arse g vn yel ained.	low/dark	brown,				E	0.2	4106/11 - FILL - Gravel: 4106/11	4/ 0.2 s (1-20mm, 5 4/ 0.3	5-10%).		
		MENT Atural xisting and Sig	/ / ME exposi g excase g excase g e core		JPPO 1 Sho 2 Sho 1 No	RT nring btcrete ck Bolt	WATER N Non s X Not rt √ Wat	e obse measus er levee	rved D red M d W low W	OISTURE Dry West P Plastic limit I Liquid limit	PENE L Lo M Mi H Hit R Re	TRATION w oderate gh	4m in VS S S S S S S S T S T S T S T	ISTENCY Kery System Soft Firm Stiff Very Stiff	DENSITY VL Very L MD Mediu D Dense VD Very D	.oose f n Dense f	SAMPLII A Aug J Bulki J Distu A Mois	NG & TE r sampleg surpled sample	SSTING asample ent (x mm)	pp F S S VS DCF	Pocket pr Standards Vandards Ponam penetro	netrometer penetration 1 ar c cone meter sity		CLASSIFICA SYMBOLS AN SOIL DESCR Y USCS N Agricult	
	V V.bit → Water inflow F Friable WS Water sample (x.imit) T Field density Y reground and the sample (x.imit																								
Ľ	EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS																								
			a	rte Martens & Ass	n	S s Pty. L1	td . 2014				Pr mail@m	MARTEI Horr none: (02) artens.co	NS & A 6/37 L nsby, N 9476 9 m.au V	SSOCIAT Leighton Pl ISW 2077 9999 Fax: VEB: http:/	ES PTY LTI ace Australia (02) 9476 8 /www.marte	D 3767 ens.com.a	u		E	ng E	ine Exc	erin avai	g L tio	_og - n	,

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s	ITE			11	Addiso	on Ro	ad Inglesi	de,	NSW.	GEOLOGY	Sandstone	VEGETAT		A			PROJECT NO.	P1404106
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E						95mmØ T ∧	X 2.5m depth		N A			ASPECT	E	East	6/			1-2%
\vdash			AV		UN DA	IA z		z	IN A	ATERIAL DA			~		5/		G&IESII	NG
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N	' N	il I	N	D	- - 0.7			××	FILL - Clayey sa dark brown, with thr	and, sandy cla n some sands rough profile.	ay and sand, tone floaters			A PIE A PIE	0.4 0.4 0.5 0.5	- FILL 4106/11 0.8 ppm 4106/11 0.5 ppm	5/ 0.4 5/ 0.5	-
\	′ N	il I	N	D	- - - - - - - - - - - - - -				SILTY	′ CLAY - Brov	vn.			A Pic A Pic	1.0 1.0 1.5 1.5	- FILL 4106/11 0.6 ppm 4106/11 0.4 ppm	5/ 1.0 + DUP B	- 1.0 - - - - - - - - - - - - - - - - - - -
\	' N	il	N	D	- - 2.0 - 2.25				SAND	Y CLAY - Bro	wn.			A PIC	2.0 2.0	- FILL 4106/11 0.4 ppm	5/ 2.0 	- 2.(-
\	' N	11	N	D	- - 2.5			SP	SANI	D - Light brow	/n.			А	2.5	4106/11	5/ 2.5	-
	EQUEN X BHA HS CC Y CT PT	PME Natu Backk Hand Conci Langs Push	ENT Firal e those t	/ MET xposu ercav de Corer Carbio		JPPORT + Shorin > Shotri No suj	g WATEF g N Nor ete X Not Solts 및 Wa port ⊣ Wa ▷ Wa	ter obset measus ter leve ter out	MOISTURE PENET erved D Dry L Lo red M Moist M Mu Wet H Hig Wp Plastic limit R Re NW WI Liquid limit	FRATION CON: w VS oderate S fusal St fusal St H H F I	n on sand. SISTENCY DENSITY Very Soft VL Very Lu Soft L Loose Firm MD Medium Stiff D Dense Very Stiff VD Very De Hard Friable	SAM pose A / h Dense U I prise M M Ux T	IPLING Auger s 3ulk sar Jndistur Joisturb Goistur Gube sa	3 & TESTIN ample mple ds ample e content imple (x mr	IG p S le D n) F	p. Pocket pi Standard S Vane sh CPD Dynam penetro D Field der VS Water sa	enetrometer penetration test ar ic cone immeter isity imple	CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION Y N USCS N Agricultural
⁺	Y EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS																	
Quality Sheet No.	(n		a	rte Martens & Ass	NS sociates Pt	y. Ltd . 2014		Ph mail@ma	MARTENS & A 6/37 Hornsby, I none: (02) 9476 artens.com.au	ASSOCIATES PTY LTE Leighton Place NSW 2077 Australia 9999 Fax: (02) 9476 8 WEB: http://www.marte) 767 ns.com.au		E	Eng	gine Bo	ering prehol	Log - le

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Р	RO	JEQ	ст	C	ontami	nation	Assessm	ent		LOGGED	BR	CHECKED	GT				Sheet 1 o	of 1
s	ITE			11	Addis	on Roa	ad Inglesi	de,	NSW.	GEOLOGY	Sandstone	VEGETATION	NA				PROJECT NO	P1404106
E	QUIPN	/EN	Т			Truck M	ounted Hydraul	ic Aug	er	EASTING	NA	RL SURFACE	NA					1
E					SIONS	95mmØ	X 2.5m depth				NA	ASPECT	East				SLOPE	1-2%
┢	E		;AV		ION DA			z	MA	TERIAL DA					SA	MPLIN	G&IESI	ING
METHOD	CIIDDODT		WATER	MOISTURE	DEPTH (M)	L M PENETRATION H RESISTANCE	R GRAPHIC LOG	CLASSIFICATIO	DESCRIF Soil type, texture, structure, n particle characteristics, orga fill, co	PTION OF STR nottling, colour, pla anics, secondary a ntamination, odou	ATA asticity, rocks, oxidation, and minor components, ir.	CONSISTENCY	DENSITY INDEX	ТҮРЕ	DEPTH (M)	A	RESUL DDITIONAL (TS AND DBSERVATIONS
`	'N	lil	И	м	- 0.2			xx	BITUMEN A SANI	ND BROWN D/ROAD BAS	CLAYEY E.			A PID A PID	0.05 0.05 0.2 0.2	4106/11 2.0 ppm - FILL 4106/11 2.0 ppm	6/ 0.05 6/ 0.2	-
~	/ N	111	Ν	м				xx	FILL - Clayey sa d	and, sandy cl lark brown.	ay and sand,			A PID	0.5 0.5	- FILL 4106/11 5.8 ppm	6/ 0.5	-
					1.0 - 1.25									A	1.0	4106/11	6/ 1.0	<u>1.0</u> - -
					-									A	1.5	4106/11	6/ 1.5	-
X	r N	88	Ν	м	 2.0 2.5			SP	SAND - Light b tree roots	rown tending s, then light b	to grey with rown.			A	2.0	4106/11 4106/11	6/2.0	- - - - - -
					_				Refusa	l at 2.5m in s	and.							-
					- - 3.0													- - 3.0
					-													-
					-													-
					- - 4.0													
					-													-
					-													-
	EQU N X BH HA HS CC (V V TC 1 PT	IPM Nate Exis Bac Han Han Cond V-Bit Fung Pust	ENT sural e isting khoe d au crete crete it gsten h tube	/ ME ⁻ exposi excav bucke ger ade Corei Carbi e	rHOD SI Ire SI vation Si et Ri Ni de Bit	JPPORT H Shoring C Shotcro B Rock E I No sup	WATER N Not toits ⊉ Wa port √ Wa	e obs meas ter lev ter out	J MOISTURE PENET erved D Dry L Lov ured M Moist M Md el W Wet H Hig Wp Plastic limit R Re flow WI Liquid limit ow	FRATION CON w VS oderate S th F fusal St VSt H F	SISTENCY DENSITY Very Soft VL Very Loos Firm MD Medium I Stiff D Dense Very Stiff VD Very Dens Hard Friable	SAMPLI SAMPLI Se A Aug B Bulk Dense U Und D Dist D Dist Ux Tube	NG & TE er sample sample isturbed urbed sa urbed sa ture con e sample	ESTING e sample mple itent : (x mm)	pp S V D F W	 Pocket pe Standard Vane sha CP Dynam penetro Field den Water sa 	enetrometer penetration test ar ic cone meter sity mple	4.5 CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION Y USCS N Agricultural
₽	Y EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS MARTENS & ASSOCIATES PTV LTD																	
ality Sheet No.	(n	n) a	rte	ns			Ph	MARTENS & . 6/37 Hornsby, ione: (02) 9476	ASSOCIATES PTY LTD Leighton Place NSW 2077 Australia 9999 Fax: (02) 9476 876	57		E	ng	jine Rr	ering	Log -
Qué		(C	Cop	yright I	Martens & As	sociates Pty	/. Ltd . 2014		mail@ma	artens.com.au	WEB: http://www.martens	s.com.au	1					10

С	IEN	Т	ĸ	evin Ma	atthews				COMMENCED	20.02.14	COMPLETE	D 20.0	2.14			REF	BH117
PI	roji	ЕСТ	С	ontami	nation A	Assessm	ent		LOGGED	BR	CHECKED	GT				Sheet 1 o	 f 1
SI	TE	NT	11	Addis	on Roa	d Inglesi	de,	NSW.	GEOLOGY	Sandstone	VEGETATI					PROJECT NO.	P1404106
EX	CAVA		DIMEN	ISIONS	95mmØ X	1.5m depth	ic Aug	ei	NORTHING	NA	ASPECT	Nort	th East			SLOPE	1-2%
	EX	CA\	/AT	ION DA	TA			МА	TERIAL DA	ATA				SA	MPLIN	G & TESTI	NG
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)		GRAPHIC LOG	CLASSIFICATION	DESCRIF Soil type, texture, structure, n particle characteristics, orge fiil, co	PTION OF STR nottling, colour, pla anics, secondary a intamination, odou	ATA asticity, rocks, oxidation, and minor components, ir.	CONSISTENCY	DENSITY INDEX	ТҮРЕ	DEPTH (M)	A	RESUL DDITIONAL C	TS AND BSERVATIONS
	Nil	N	D	0.05					BITUMEN				A	0.2	- FILL 4106/11	7/ 0.2	
v	Nil	N	м	_ _ _ _ 0.8			xx	FILL - Crushed sa tends to lig	ndstone, san ht brown sar	d, clayey sand, dy clay.			A PID	0.5 0.5	4106/11 0.2 ppm	7/ 0.5	-
v	Nil	N	м	- 1.0 - -			SP	SAND - Light bro somewhere br	own, tends to etween 1.0m	yellow brown and 1.5m.			A PID	1.0 1.0	4106/11 0.2 ppm 4106/11	7/ 1.0	1 <u>.</u>
\vdash	+			1.5		<u></u>	1	Dorohala terre	insted at 1 F	monocod			PID	1.5	0.1 ppm	I	
	EQUIP N N SH B HA	MENT atural (ixisting ackhoe	/ / ME exposi j excas	- 2.0 - 2.0 	UPPORT H Shoring C Shotcret B Rock Bo i No supp	WATER N Nor e x Not S ₩ Wa ort	e obst measurer leve	MOISTURE PENET srved D Dry L Lo red M Moist M Md W Wet H Hig Wp Plastic limit R Ref	IRATION CON w VS oderate S ph F fusal St	SISTENCY DENSITY VerySoft VL VeryI Soft L Loose Firm DD Mediu Stiff D Dense	SAMM coose A A m Dense U U D D D	PLING & " uger sampluk sample notisturbed s	TESTINC ple e d sample		o Pocket p Standard S Vane shardard CP Dynam	enetrometer penetration test ar ic cone	2.(2.(
	V V- TC Tu PT PI	ı⊐ıt ngsten Jsh tub	n Carbi ie	de Bit		→ War	er inflo	DW .	F	Fnable				W	vS Water sa	ample	
₽		-	<u>Ψ</u>			EXCAVATI	ON L	OG TO BE READ IN CONJU			EPORT NOTE	S AND A	ABBRE	VIATI	ONS		
Quality Sheet No			a	rte Martens & As	ns sociates Pty.	Ltd . 2014		Ph mail@ma	6/37 Hornsby, ione: (02) 9476 artens.com.au	Leighton Place NSW 2077 Australia 9999 Fax: (02) 9476 8 WEB: http://www.mart	8767 ens.com.au		E	ng	gine Bo	ering preho	Log - le

	LIE	NT		Ke	evin Ma	atth	ews					20.02.14		COMPLET	ED 2	0.02.14			REF	TP11	8
ŀ		JEC	;1	11		nati Sn I	on A	Assessir d Inglesi	dent	NSW		AB		VECETAT					Sheet 1	of 1	
		MENT	-		Auuisu	Har	nd Spa	d inglesi	ue,	N3W.	EASTING	NA		RL SURFA		NA			PROJECT N	U. P1404106	
E	XCAV	ATIO	N DI	MEN:	SIONS	300	mm X	300mm X 0.3	3m dep	th	NORTHING	NA		ASPECT	v	Vest			SLOPE	5-10%	
Γ	E	XC	AV	٩TI	ON DA	ΤA				M	ATERIAL D	ATA					SA	MPLIN	G & TEST	TING	
	MEIHOU	SUPPOR	WATER	MOISTURE	DEPTH (M)			GRAPHIC LOG	CLASSIFICATION	DESCR Soil type, texture, structure, particle characteristics, or fill, c	IPTION OF STR mottling, colour, pli ganics, secondary a ontamination, odou	ATA asticity, rocks, oxi and minor composi ir.	dation, nents,	CONSISTENCY	DENSITY INDEX	ТҮРЕ	DEPTH (M)	A	RESU DDITIONAL	ILTS AND OBSERVATION	vs
ŀ	IS N	Jil	N	м	 0.3				SP	GRAVELLY SAND coarse	- Black/dark b grained, with	prown, mediu clay.	m to			E	0.05	4106/11 - FILL 4106/11	8/ 0.05 + DOP 8/ 0.2	TA	_
	EQ X BHASC Y TT	IIPME Natus Back Hanc Concci V-Bit	ENT / Iral exx shoe t d Spage stere C stere C	MET posuucke de corer arbid		JPPC 1 St 3 Rc 1 Nc	DRT Noring Dotoret Dock Bo S supp	WATEF N Nor Its ¥ Wa ► Wa EXCAVATI	ter infic	MOISTURE PENE Prved D Dry L L red M Moist M M N W Wet H H W P Plastic limit R R W Wi Liquid limit NW	TRATION CON ow VS loderate S igh efusal St VSt H F	SISTENCY DE Very Soft VL Soft L Firm MI Stiff DU Friable	NSITY Very Loose Dense Medium D Dense Very Dense	SAM se A A bense U L se M N UX 1	PLING Juger sz Jukis san Judistur Joisturbe fube san ES ANI	& TESTING ample bed sample d sample mple (x mm D ABBRE	3 pr VIATIO	 Pocket pi Standard Stane she CP Dynam penetro Field der S Water sa 	enetrometer penetration tes ar ic cone meter sity mple	CLASSIFICA SYMBOLS A SOLI DESCR Y N Agricult	
┦				<u>÷</u>				ΕλυΑΥΑΠ	UN L	UG TU BE READ IN CONJ				UKINUT	:5 ANI	D ARRE	VIATI	JNS			
adily offer No.	(n	Contra			n	S	l td. 2014		P mail@n	MARTENS & 6/37 Hornsby, hone: (02) 9476 hartens.com.au	ASSOCIATES Leighton Place NSW 2077 Au 9999 Fax: (02 WEB: http://wv	PTY LTD e stralia !) 9476 876 /w.martens	37 s.com.au		E	ng	jine Exc	ering avat	y Log - ion	
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6	LIE	NT		K	evin Ma	tth	ews						COMMEN	NCED	20.02.14			COMPLET	ED	20.02.14			REF	-	TP11	9
F	RO	JEC	т	Co	ontamir	natio	on A	ssessn	nent				LOGGED	כ	AB			CHECKE	ו	GT			Sheet 1	of	1	-
ls Is				11	Addiso	on F	Road	I Ingles	ide,	NSW.			GEOLOG	GY C	Sandstone					A			PROJECT	NO.	P1404106	
E	XCAV		N DI	MEN	SIONS	300r	nm X :	300mm X 0.	4m dep	oth			NORTHI	NG	NA			ASPECT	40E	NA			SLOPE	5%	6	
L	E	хс	AV	ΑΤΙ	ON DA	ΤA						MA		L DA	ТА						S	SAMPLIN	G & TES	STINC	3	
			WATER	MOISTURE	DEPTH (M)			GRAPHIC LOG	CLASSIFICATION	Soil pa	type, texture, rticle characte	DESCRI structure, r eristics, org fill, co	PTION OF mottling, col janics, seco ontamination	F STR/ lour, pla indary a n, odour	ATA sticity, rock nd minor co ⁻ .	s, oxidatio mponents	n, ,	CONSISTENCY	DENSITY INDEX		DEDTH (M)		RES DDITIONA	SULTS	AND SERVATIOI	NS
F	IS N	il	N	М	0.1				× SP	GI	RAVELLY	SAND coarse	- Black/d arained.	lark bi with o	rown, me clav.	edium to	2 A				E 0.0	05 4106/1 - FILL	19/ 0.05			_
-	IS N	iil,	N	м	-			 	CL		CLAY V	VITH TF hi	RACE SA	ANDS	- Mediu	m to					E 0. E 0.	2 4106/1 3 4106/1	19/ 0.2 19/ 0.3			-
F					<u>0.4</u>	<u></u>					Re	efusal at	t 0.4m or	n sano	dstone.											
					_																					-
					_ 																					- 1.0
					_																					-
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		- - 2.0																								2.0
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	4.0																									4.0
																									-	
EQUIPMENT / METHOD SUPPORT WATER MOISTURE N Natural exposure SH Shoring N None observed D Dry											DEVE	TDATION		NOTENO	0510										- 4.5	
N Natural exposure SH Shoring N None observed D Dry I X Existing excavation SC Shotcrete X Not measured M Moist I BH Backhoe bucket RB Rock Bolts											PENE L Lo M M H Hi nit R Re it	i KA HON ow oderate gh efusal	CONS VS F St St VSt H F F F	Very Soft Soft Firm Stiff Very Stiff Hard Friable	DENSIT VL VI L Lo MD Mi D De VD Ve	i Y ery Loos oose edium D ense ry Densi	se A B ense U D e M Ux	nPLING Auger s Bulk sa Undistu Disturb Moistur Tube sa	A TEST ample mple rbed sam ed sample e content ample (x r	nnG ple mm)	pp Pocket p S Standarr VS Vane sh DCP Dynar penetr FD Field de WS Water s	enetrometer I penetration ear nic cone ometer nsity ample	test	VLASSIFICA SYMBOLS A SOIL DESCR Y USCS N Agricul	I ION ND RIPTION tural	
F	r' I	- usn	lube	Ā			E	XCAVAT	ION L	OG TO I	BE READ I			WITH	ACCOM		REPO		ES AN	D ABB	REVIA	TIONS				
4.04	MARTENS & ASSOCIATES PTY LTD 6/37 Leighton Place Engineering Log -																									
(G) Convicted Martens & Associates Ptv Ltd. 2014												SW 2077 9999 Fax VEB: http:	Australi : (02) 94	ia 76 876 nartens	7 .com.au			_//	Exc	ava	y L tiol	-09 - n	-			
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СГ	CLIENT Kevin Matthews									20.02.14	PLETED	20.02.14 REF BH120						
PF	ROJECT Contamination Assessment								LOGGED	BR	CHE	CHECKED				Sheet 1 of 1		
SI	TE 11 Addison Road Ingleside, NSW.						GEOLOGY	Sandstone	VEG		NA			PROJECT NO. P1404106				
EX			IMEN	SIONS	95mmØ X	2.5m depth	- Auger		NORTHING	NA	ASPE	ECT	North			SLOPE	1-2%	
	EX	CA	ΆΤ	ON DA	ТА			MA	TERIAL DA	TA				S		ING		
МЕТНОD	SUPPORT	WATER	MOISTURE	DEPTH (M)		GRAPHIC LOG	CLASSIFICATION	DESCRII Soil type, texture, structure, n particle characteristics, org fill, co	PTION OF STR/ nottling, colour, pla anics, secondary a ntamination, odour	ATA sticity, rocks, oxidatio nd minor components	CONSISTENCY			DEPTH (M)	A	RESUL DDITIONAL (TS AND DBSERVATIONS	
v	Nil	N	D	- - - 0.6			sw	SAND - Light gre	y, gravels (5-	15mm, 10%).			,	A 0.0	- FILL	20/ 0.05 20/ 0.5 + DUP B2	2	
v	Nil	Ν	D	- - - - - - - - - - - - - -			SP	SAND - Light gre	ey, fine to meo uniform.	lium grained,			, P ,	A 1. ID 1.0 A 1.1 ID 1.1	- LIKEL 0 4106/12 0 0.6 ppn 5 4106/12 5 0.3 ppn	Y FILL 20/ 1.0 	<u>1.</u>	
v	Nil	N	м	- - 2.0 - - - 2.5			SP	SAND - Light bro clayey	own, minor cla sand with dep	ay, tending to oth.			P	A 2.1	0 4106/12 0 0.5 ppn 5 4106/12	20/ 2.0	2.	
				-				Borehole term	ninated at 2.5r	n in sand.								
				 													3_	
				-														
				-														
				<u>4.0</u> 													4 <u>-</u>	
E H H G V	QUIPI Na H Ba A Ha S Ha C Co V-f C Tur T Pu	MENT atural e xisting ackhoe and au and Sp ncrete Bit ngsten sh tub	/ ME exposi excav bucke ger ade Corei Carbi e	4.5 THOD SL ire SH ration SC et RE Nil	JPPORT Shoring Shotcrete Rock Boll No suppo	WATER N Non e X Not ts 및 Wat ort → Wat → Wat	e observ measure er level er outflov er inflow	MOISTURE PENET ed D Dry L Lo d M Moist M Mt W Wet H Hig Wp Plastic limit R Re w WI Liquid limit	TRATION CONS w VS y pderate S th F I fusal St S VSt H H F F F	SISTENCY DENSI Very Soft VL V Soft L Lt Tirm MD M Stiff D D Very Stiff VD Ve Hard riable	TY ery Loose pose edium Dense ense ery Dense	SAMPLIN A Auger B Bulks U Undis D Distur M Moistr Ux Tube	G & TEST sample ample turbed sample bed sample ire content sample (x r	ING ple mm)	pp Pocket p S Standarc VS Vane sh DCP Dynam penetrc FD Field der WS Water sa	enetrometer penetration test aar ic cone meter sity imple	4. CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION Y USCS N Agricultural	
4		/	<u>*</u>		E	-XCAVATIO	JN LOO	I O BE READ IN CONJU و		ACCOMPANYIN		NUTES A	NU ABBE			-	_	
lality Sheet No		'n	a	rte	ns			Ph	6/37 I Hornsby, N ione: (02) 9476	Leighton Place ISW 2077 Austral 9999 Fax: (02) 94	ia 76 8767	au		En	gine Rr	ering oreho	Log - le	
ď 🗖	\sim	(C) Cop	yright I	vartens & Ass	sociates Pty. L	.td . 2014		man@ma	antens.com.au V	יבט. ווווף.//www.n	າສາ ເອເເຣ.com.	au					. •	

С	CLIENT Kevin Matthews								COMMENCED	20.02.	.14			REF	BH121		
PI	PROJECT Contamination Assessment SITE 11 Addison Road Ingleside, NSW.						LOGGED	BR	CHECKED	GT				Sheet 1 o	 f 1		
s							NSW.	GEOLOGY	Sandstone	VEGETATION	NA				PROJECT NO.	P1404106	
EC	EQUIPMENT Truck Mounted Hydraulic Auger					er	EASTING	NA	RL SURFACE	NA							
EX	CAVA				95mmØ> T∧	K 2.5m depth		F.# A			ASPECT	SAMPI ING & TESTING				5%	
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)		GRAPHIC LOG	CLASSIFICATION	DESCRIF Soil type, texture, structure, n particle characteristics, orgg fill, co	PTION OF STR nottling, colour, pla anics, secondary a intamination, odou	ATA asticity, rocks, oxidation, and minor components, ir.	CONSISTENCY	DENSITY INDEX	түре	DEPTH (M)	A	RESUL	TS AND DBSERVATIONS
v	Nil	N	D	- - - - 0.7			<	BITUMEN WITH U SANDSTO	UNDERLAYII NE - Variable	NG CRUSHED colours.			PID A A	0.0 0.05	0.1 ppm 4106/12 - FILL 4106/12	1/ 0.05	-
v	Nil	N	м	- - 1.0 - - -			SC SC	CLAYEY S	SAND - Light	brown.			A PID A PID	1.0 1.0 1.5 1.5	- FILL 4106/12 7.5 ppm 4106/12 0.9 ppm	1/ 1.0	- - - - - - -
v	Nil	N	м	- - 2.0 - - - 2.5			CL	SANDY CLA' med	Y - Light brow dium grained	<i>u</i> n, sand is			A	2.0	4106/12	1/2.0	
	EQUIP N N E BH BH HS HA H HS HA H HS T T T T T T T T T	MENT Atural - and au and Sponcrete Bit ngsten sh tub	T/ME exposis 9 buckate 9 carabi 9 carabi 9 carabi 9 carabi 9 carabi 9 carabi	2.3 	JPPORT I Shoring 3 Rock B No supp	WATER N Non te X Not Sort ¥ Wat Wat Wat	ter obs ter leve ter out ter infic	MOISTURE PENET arved D Dry L Loo red M Moist M Ma al W Wet H Hig Wp Plastic limit R Rei flow Wi Liquid limit sow	TRATION CON w VS ph F fusal St H F NCTION WITH	SISTENCY DENSITY Very Soft VL Very Loose Firm MD Medium I Stiff D Dense Very Stiff VD Very Den Hard Friable	SAMPLI SE A Aug B Buik Dense U Und Se M Mois Ux Tube	NG & TE r sample sturbed ture control sample	ESTING e sample tent (x mm)	5 pp ps vs vs Do FE W	 Pocket pr Standard Stane she CP Dynam penetrc Field der S Water sa 	enetrometer penetralion test aar is cone meter sity mple	- - - - - - - - - - - - - - - - - - -
0.4 4		/	÷			EXCAVAT	UN L	UG TU BE READ IN CONJU	MARTENS &	ACCOMPANYING REP ASSOCIATES PTY LTD	ORT NUTES.		BRKE/				
Quality Sheet N		(C) Col	a	rte Martens & Ass	NS sociates Pty.	Ltd . 2014		Ph mail@ma	6/37 Hornsby, Ione: (02) 9476 artens.com.au	Leighton Place NSW 2077 Australia 9999 Fax: (02) 9476 87 WEB: http://www.marten	67 s.com.au		Ē	ng	nne Bo	ering preho	Log - le

[LIENT Kevin Matthews								COMMENCED 20.02.14 COMPLETED						FED	20.02.1	14			REF		BH12	22			
ŀ		JEC :	СТ	T Contamination Assessment 11 Addison Road Ingleside, NSW.					GEOLO	D GV	AB			VEGETAT		GT				Sheet '	1 of	1					
F		MEN	IENT Hand Auger						EASTIN	G	NA			RL SURF	ACE	NA				PROJECT	I NO.	P1404106					
E	XCA	/ΑΤΙΟ	ם אכ	DIMEN	ISIONS	70m	ء ۱mØ ک	K 0.5m depth					NORTH	ING	NA			ASPECT		West				SLOPE	5	5%	
L		EXCAVATION DATA				M	ATERIA	LDA	TA							SA	MPLIN	G & TE	STIN	G							
	METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)			GRAPHIC LOG	CLASSIFICATION	So p	il type, textur article charad	DESCRI e, structure, cteristics, org fill, c	PTION O mottling, co janics, secc ontaminatio	F STR. Iour, pla ondary a on, odou	ATA Isticity, rock nd minor co r.	s, oxidatio mponents	on, s,	CONSISTENCY			TYPE	DEPTH (M)	A	RE DDITION	SULT: AL OB	S AND SERVATIO	INS
,	HA	Nil	N	м	_ _ _ 0.5				SP	C	GRAVELL	Y SAND coarse	- Black/o grained,	dark b , with	rown, me clay.	edium t	0				E E E	0.05 0.2 0.3 0.4	4106/12 - FILL 4106/12 4106/12 4106/12	2/ 0.05 2/ 0.2 2/ 0.3 2/ 0.4			-
					- - - - - - - - - - -						Refi	usal at 0.4	5m on sa	andsto	one floate	er.											- - 1.0 - - - - - - - - - -
					- 3.0 - - - - - - - - - - - - - - - - - - -																						
	EQ N X HA HS CC V TC PT	JIPMI Natu Exis Bacl Han Conc V-Bit Tung Pust	ENT ural e sting khoe d aug d Sp crete t sten n tub	Carb	4.5 THOD SL ure SH vation SC et RE Nil r ide Bit	JPPC I Sh 3 Ro No	DRT noring notcrel ock Bo o supp	WATER N Non bits 및 Wai ort ↓ Wai → Wai ► Wai	e obse measu ter leve ter out ter infle	erved i ured i el y flow y ow	MOISTURE D Dry M Moist W Wet WP Plastic WI Liquid li	PENE L Lo M M H Hi limit R Re mit	TRATION ow oderate gh efusal JNCTION	CONS VS F St VSt H F F WITH	SISTENCY Very Soft Soft Firm Stiff Very Stiff Hard -riable ACCOMF	DENSI VL V MD M VD V VD V	TY 'ery Looss ledium De ense ery Dense G REPC	SAN B ense U e M Ux Ux D DRT NOTI	Auger Bulk si Undist Disturl Moistu Tube s	G & TE: sample ample urbed sam ire conte sample (ND AB	STING ample pple ent (x mm)	pp S VS DC FE W	Pocket p Standard Vane shu P Dynam penetrc D Field der S Water sa	enetrometer penetration ear ic cone meter sity mple	n test	CLASSIFIC SYMBOLS A SOIL DESC Y USCS N Agrice	- <u>4.5</u> ATION AND RIPTION
2		/		2	4 -	~	_						MARTE	6/37	Leighton F	les PT Place	TLID				E	na	ine	erin	na i	Loa	-
	(р - (с	Р ;) Сор		Martens & Ass	n	S es Pty.	Ltd . 2014				P mail@rr	Hor hone: (02) hartens.co	nsby, I) 9476)m.au \	NSW 2077 9999 Fax VEB: http:	/ Austra : (02) 94 ://www.r	lia 176 8767 nartens.	7 .com.au				- 3	Bo	oreh		<u>e</u>	

CLIENT Kevin Matthews							COMMENCED 20.02.14 CO			COMPLET	TED	20.02.14			REF	TP123						
F		JEC	СТ	C(ontamii Addise	nati on I	on A Road	Assessm d Inglesi	ent de l	NSW			AB		CHECKE		GT NA			Sheet 1	of 1	
E	QUIPI	MENT	г	· · ·	/ taulo	Har	nd Spa	ide				EASTING	NA		RL SURF	ACE	NA			T NOOLOT N		
E	XCAV					300	mm X	300mm X 0.5	m dep	th		NORTHING	NA		ASPECT	T North West SLOPE 5%					5%	
┢					ION DA		z		z		MA	ATERIAL	DATA			2	S		AMPLING & TESTING			
		SUPPOR	WATER	MOISTURE	DEPTH (M)			GRAPHIC LOG	CLASSIFICATIO	Soil type, textur particle charad	DESCRI e, structure, f teristics, org fill, co	PTION OF S mottling, colour anics, seconda ontamination, o	TRATA , plasticity, rock rry and minor co dour.	s, oxidation, omponents,	CONSISTENCY	DENSITY INDE)		DEPTH(M)	A	RESU DDITIONAL	ILTS AND OBSERVATIONS	
F	IS N	Nil	N	м	_				SP	GRAVELL	Y SAND	- Black/dar	k brown, m	edium to				= 0.0 = 0.1 = 0.3	- FILL 2 4106/12 3 4106/12	:3/ 0.05 :3/ 0.2 :3/ 0.3	-	
					_ 0.5						coarse	grained, wi	un clay.					E 0.4	4 4106/12	3/0.4	-	
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	EQU		ENT	/ ME	4.5 THOD SI	JPPC	DRT	WATER			PENE	TRATION C	ONSISTENCY	DENSITY	SAN		G & TEST	ING	nn Boolist -	anatromotor	4.5 CLASSIFICATION	
N None observed D Dry L Lo X Existing excavation SC Shotcrete X None observed D Dry L L BH Backhoe bucket RB Rock Bolts X None observed W Woit M Moist HA Hand Spade Ni No support V Water level W Plastic limit R HS Hand Spade H Horset normosten V Vater outflow VI Liquid limit CC Concrete Corer V V-Bit H Water inflow Vater inflow									oderate S gh F efusal St V F	Soft Firm t Stiff St Very Stiff Hard Friable	L Very Lo L Loose MD Medium D Dense VD Very Der	B Dense U D nse M Ux	Auger 9 Bulk sa Undistu Disturb Moistur Tube si	ample ample urbed sam ed sample re content ample (x r	ple e nm)	S Standard VS Vane sh DCP Dynam penetro FD Field der WS Water sa	penetration tes ar ic cone meter sity mple	STIVIDULS AND SOLID DESCRIPTION Y USCS N Agricultural				
F	PT	Push	n tube	<u> </u>				EXCAVATI	ON LO	OG TO BE READ	IN CONJU	JNCTION W	ITH ACCOM	PANYING REF	PORT NOT	ES AN		REVIAT	TIONS			
Sileer NO. 4		p	n') a	rte	n	S					MARTENS 6/ Hornsb	& ASSOCIA 37 Leighton by, NSW 207	TES PTY LTD Place 7 Australia	2.			En	gine	ering	g Log -	
Audity		(C)) Cop	yright I	Martens & As	sociat	es Pty. I	Ltd . 2014			Pl mail@m	iartens.com.a	au WEB: http	k. (U2) 9476 87 ://www.marter	o/ ns.com.au				Exc	avat	ion	
14 Attachment D – COCs and Laboratory Reports



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SOIL ANALYSIS CHAIN OF CUSTODY FORM

					Project						
Name	Contarr	ination Asse	ssment: 11 Addison	Rd, Ingl	eside						
Martens Contact Officer	Ben Ros	e				Contac	ct Email	brose@martons			
*	Sample	Date	20.02.2014		Dispatch Date	21.02.2	014	Turnground Time		7.2700	
Sampling and Shipping	Our Refe	erence	P1404106JCOC0	10/1		Shippir	ng Method (X)	Hand	Post	Courier	>
	On Ice ((x)	X No Ice (X	0	Othei	(x)					<
					aboratory						
Name	Envirola	th Services F	٦/د								
Sample Delivery Address	12 Ashle	ey St, Chats	poov								
Delivery Contact	Name	Aileen Hie	Phon	e 02	9910 6200	Fuv					
Please Send Report By (X)	Post		ax Email	×	Reportir	id Email Address	hrocommand		envirolabs	ervices.com.a	ы
				Combo	Combo	Aver Land					
			Sample ID	5	3 8HM	BIEX BIEX di TRH	ploH br				
		-	4106/105/0.2		×						
		2	4106/107/0.2		×						
		Μ	4106/109/0.5	×							
		t	4106/109/1.0		×						
		S.	4106/109/1.5		×						
		9	4106/110/1.0		×			(Envirolat (
		C+	4106/112/0.05		×			ENVIROUAB	12 A.	shley St	
		clo	4106/112/0.5		×				-netswood No Ph: (02) 99	310 4200	
		6	4106/115/0.4		×			Job No:	10148	e	
		2	4106/115/1.0		×			Date Receiver	d: 01 0	1	
		11	4106/115/2.0		×			Time Receive	d: 16:01		
		12	4106/116/0.05	×				Received by:	21+		
		13	4106/116/0.2		×			Cooling Ceol	molent		
		て	4106/117/0.1		×			Security: mtad	ctBroken/Na	ne	
		5	4106/117/0.5		×						
]				
						Head Offit Unit 6 / 37 Hornsby N	Leighton Place SW 2077, Australia	~ ~ ~ ~ ~ ~	ail@martens ww.martens. TENS & ASSOC	.com.au .com.au ∩i∆⊺ec P.i	
						144 70 11	7777 Fax UZ 44/	5 8767 ABN 8.	5 070 240 890	ACN 070 240 890	

> www.martens.com.au MARTENS & ASSOCIATES P/L ABN 85 070 240 890 ACN 070 240 890

SOIL ANALYSIS CHAIN OF CUSTODY

Page of

	Sample ID	Combo 5	Combo 3	8HM	BTEX	BTEX and TRH	Hold
91	4106/119/0.05	×					
It	4106/120/0.5		×				
Ś	4106/120/1.0		×				
5	4106/121/1.0		×				
02	4106/122/0.05		×				
5	4106/123/0.05		×				
2	4106/DUPB1			×			
3	4106/DUPB2			×			
た	Spike				×		
52	Blank					×	
26	4106/109/2.0						×
E	4106/109/2.5						×
28	4106/110/0.2						×
29	4106/110/0.5						×
30	4106/112/1.0						×
2	4106/115/1.5						×
33	4106/115/2.5						×
m	4106/116/0.5						×
24	4106/116/1.0						×
37	4106/116/1.5						×
36	4106/116/2.0						×
37	4106/120/1.5						×
36	4106/120/2.0						×
39	4106/121/0.5						×
2	4106/121/1.5						×
Ŧ	4106/121/2.0						×
5	4106/121/2.5						×



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

CERTIFICATE OF ANALYSIS

105486

Client: Martens & Associates Pty Ltd 6/37 Leighton Place Hornsby NSW 2077

Attention: Ben Rose

Sample log in details:

Your Reference:	P1404106JCO	C01\	/01, Ingleside
No. of samples:	42 soils		
Date samples received / completed instructions received	21/02/14	/	21/02/14

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data. Samples were analysed as received from the client. Results relate specifically to the samples as received. Results are reported on a dry weight basis for solids and on an as received basis for other matrices. *Please refer to the last page of this report for any comments relating to the results.*

Report Details:

 Date results requested by: / Issue Date:
 28/02/14
 / 28/02/14

 Date of Preliminary Report:
 None Issued

 NATA accreditation number 2901. This document shall not be reproduced except in full.

 Accredited for compliance with ISO/IEC 17025.

Tests not covered by NATA are denoted with *.

Results Approved By:

Jacinta/Hurst

Laboratory Manager



vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	105486-1	105486-2	105486-3	105486-4	105486-5
Your Reference		4106/105	4106/107	4106/109	4106/109	4106/109
Depth		0.2	0.2	0.5	1.0	1.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014
TRHC6 - C9	mg/kg	<25	<25	<25	<25	<25
TRHC6 - C10	mg/kg	<25	<25	<25	<25	<25
vTPHC6 - C10 less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	100	86	90	99	87

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	105486-6	105486-7	105486-8	105486-9	105486-10
Your Reference		4106/110	4106/112	4106/112	4106/115	4106/115
Depth		1.0	0.05	0.5	0.4	1.0
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014
TRHC6 - C9	mg/kg	<25	<25	<25	<25	<25
TRHC6 - C10	mg/kg	<25	<25	<25	<25	<25
vTPHC6 - C10 less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	81	98	92	99	105

vTRH(C6-C10)/BTEXN in Soil Our Reference: Your Reference Depth Date Sampled	UNITS	105486-11 4106/115 2.0 20/02/2014	105486-12 4106/116 0.05 20/02/2014	105486-13 4106/116 0.2 20/02/2014	105486-14 4106/117 0.1 20/02/2014	105486-15 4106/117 0.5 20/02/2014
l ype of sample		SOII	SOII	SOII	SOII	SOII
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014
TRHC6 - C9	mg/kg	<25	<25	<25	<25	<25
TRHC6 - C10	mg/kg	<25	<25	<25	<25	<25
$vTPHC_6$ - C 10 less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	87	89	88	90	88
vTRH(C6-C10)/BTEXN in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS 	105486-16 4106/119 0.05 20/02/2014 soil	105486-17 4106/120 0.5 20/02/2014 soil	105486-18 4106/120 1.0 20/02/2014 soil	105486-19 4106/121 1.0 20/02/2014 soil	105486-20 4106/122 0.05 20/02/2014 soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014
TRHC6 - C9	mg/kg	<25	<25	<25	<25	<25
TRHC6 - C10	mg/kg	<25	<25	<25	<25	<25
vTPHC6 - C10 less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	89	92	60	82	89

vTRH(C6-C10)/BTEXN in Soil				
Our Reference:	UNITS	105486-21	105486-24	105486-25
Your Reference		4106/123	4106/Spike	4106/Blank
Depth		0.05	-	-
Date Sampled		20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	26/02/2014	26/02/2014	26/02/2014
TRHC6 - C9	mg/kg	<25	[NA]	<25
TRHC6 - C10	mg/kg	<25	[NA]	<25
vTPHC6 - C 10 less BTEX (F1)	mg/kg	<25	[NA]	<25
Benzene	mg/kg	<0.2	100%	<0.2
Toluene	mg/kg	<0.5	106%	<0.5
Ethylbenzene	mg/kg	<1	96%	<1
m+p-xylene	mg/kg	<2	95%	<2
o-Xylene	mg/kg	<1	94%	<1
naphthalene	mg/kg	<1	[NA]	<1
Surrogate aaa-Trifluorotoluene	%	88	108	87

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	105486-1	105486-2	105486-3	105486-4	105486-5
Your Reference		4106/105	4106/107	4106/109	4106/109	4106/109
Depth		0.2	0.2	0.5	1.0	1.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
TRHC 10 - C14	mg/kg	<50	<50	<50	<50	<50
TRHC 15 - C28	mg/kg	<100	<100	<100	<100	<100
TRHC29 - C36	mg/kg	<100	<100	<100	<100	<100
TRH>C10-C16	mg/kg	<50	<50	<50	<50	<50
TRH>C10 - C16 less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C16-C34	mg/kg	<100	<100	<100	<100	<100
TRH>C34-C40	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	93	92	92	92	92
		1		1		

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	105486-6	105486-7	105486-8	105486-9	105486-10
Your Reference		4106/110	4106/112	4106/112	4106/115	4106/115
Depth		1.0	0.05	0.5	0.4	1.0
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
TRHC 10 - C14	mg/kg	<50	<50	<50	<50	<50
TRHC 15 - C28	mg/kg	<100	2,800	<100	<100	<100
TRHC29 - C36	mg/kg	<100	3,300	<100	100	<100
TRH>C10-C16	mg/kg	<50	<50	<50	<50	<50
TRH>C10 - C16 less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C16-C34	mg/kg	<100	5,600	<100	100	<100
TRH>C34-C40	mg/kg	<100	1,300	<100	<100	<100
Surrogate o-Terphenyl	%	93	119	91	89	91

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	105486-11	105486-12	105486-13	105486-14	105486-15
Your Reference		4106/115	4106/116	4106/116	4106/117	4106/117
Depth		2.0	0.05	0.2	0.1	0.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
TRHC 10 - C14	mg/kg	<50	<50	<50	<50	<50
TRHC 15 - C28	mg/kg	<100	120	<100	<100	130
TRHC29 - C36	mg/kg	<100	500	240	180	290
TRH>C10-C16	mg/kg	<50	<50	<50	<50	<50
TRH>C10 - C16 less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C16-C34	mg/kg	<100	440	210	200	350
TRH>C34-C40	mg/kg	<100	630	170	<100	180
Surrogate o-Terphenyl	%	90	92	89	88	90
svTRH (C10-C40) in Soil						
Our Reference:	UNITS	105486-16	105486-17	105486-18	105486-19	105486-20

Our Reference:	UNITS	105486-16	105486-17	105486-18	105486-19	105486-20
Your Reference		4106/119	4106/120	4106/120	4106/121	4106/122
Depth		0.05	0.5	1.0	1.0	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
TRHC 10 - C14	mg/kg	<50	<50	<50	<50	<50
TRHC 15 - C28	mg/kg	<100	<100	<100	<100	1,700
TRHC29 - C36	mg/kg	<100	140	<100	<100	2,000
TRH>C10-C16	mg/kg	<50	<50	<50	<50	53
TRH>C10 - C16 less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	53
TRH>C16-C34	mg/kg	<100	120	<100	<100	3,100
TRH>C34-C40	mg/kg	<100	150	<100	<100	1,500
Surrogate o-Terphenyl	%	91	87	90	88	112

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	105486-21
Your Reference		4106/123
Depth		0.05
Date Sampled		20/02/2014
Type of sample		soil
Date extracted	-	24/02/2014
Date analysed	-	24/02/2014
TRHC 10 - C 14	mg/kg	<50
TRHC 15 - C28	mg/kg	340
TRHC∞ - C∞	mg/kg	850
TRH>C10-C16	mg/kg	<50
TRH>C10 - C16 less Naphthalene (F2)	mg/kg	<50
TRH>C16-C34	mg/kg	920
TRH>C34-C40	mg/kg	980
Surrogate o-Terphenyl	%	93

PAHs in Soil						
Our Reference:	UNITS	105486-1	105486-2	105486-3	105486-4	105486-5
Your Reference		4106/105	4106/107	4106/109	4106/109	4106/109
Depth		0.2	0.2	0.5	1.0	1.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	5.2	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	1.0	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	6.9	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	6.3	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	2.7	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	2.5	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	4.4	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	2.8	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	1.7	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	1.7	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQNEPMB1	mg/kg	4.0	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	36	NIL(+)VE	NIL(+)VE	NIL(+)VE	NIL(+)VE
Surrogate p-Terphenyl-d14	%	106	98	97	97	95

PAHs in Soil						
Our Reference:	UNITS	105486-6	105486-7	105486-8	105486-9	105486-10
Your Reference		4106/110	4106/112	4106/112	4106/115	4106/115
Depth		1.0	0.05	0.5	0.4	1.0
DateSampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
l ype of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	0.9	<0.1	0.2	0.1
Anthracene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.3	2.2	0.3	0.8	0.5
Pyrene	mg/kg	0.2	2.0	0.3	0.8	0.6
Benzo(a)anthracene	mg/kg	<0.1	1	0.1	0.4	0.3
Chrysene	mg/kg	0.1	0.9	0.1	0.4	0.3
Benzo(b+k)fluoranthene	mg/kg	0.2	1.9	0.3	0.9	0.6
Benzo(a)pyrene	mg/kg	0.14	1.3	0.18	0.60	0.39
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	0.8	0.1	0.4	0.2
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.1	0.9	0.1	0.4	0.2
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	2	<0.5	1	1
Total +ve PAH's	mg/kg	1.3	12	1.5	4.9	3.3
Surrogate p-Terphenyl-d14	%	97	98	100	100	104

PAHs in Soil						
Our Reference:	UNITS	105486-11	105486-12	105486-13	105486-14	105486-15
Your Reference		4106/115	4106/116	4106/116	4106/117	4106/117
Depth		2.0	0.05	0.2	0.1	0.5
DateSampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
l ype of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.7	0.3	0.3	0.5
Anthracene	mg/kg	<0.1	0.2	<0.1	<0.1	0.2
Fluoranthene	mg/kg	0.1	2.4	1.1	3.5	4.2
Pyrene	mg/kg	0.1	2.2	1.1	3.4	4.8
Benzo(a)anthracene	mg/kg	<0.1	1.0	0.6	1.8	2.3
Chrysene	mg/kg	<0.1	0.9	0.5	1.8	2.2
Benzo(b+k)fluoranthene	mg/kg	<0.2	2.2	1.1	5.4	5.8
Benzo(a)pyrene	mg/kg	0.07	1.3	0.73	3.0	3.7
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	1.0	0.4	2.5	2.9
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.1	<0.1	0.3	0.4
Benzo(g,h,i)perylene	mg/kg	<0.1	1.1	0.5	2.5	2.9
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	2	1	4.0	5.0
Total +ve PAH's	mg/kg	0.28	13	6.4	24	30
Surrogate p-Terphenyl-d14	%	100	107	103	102	102

PAHs in Soil						
Our Reference:	UNITS	105486-16	105486-17	105486-18	105486-19	105486-20
Your Reference		4106/119	4106/120	4106/120	4106/121	4106/122
Depth		0.05	0.5	1.0	1.0	0.05
DateSampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.9
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	2.8
Acenaphthene	mg/kg	<0.1	0.2	<0.1	<0.1	4.5
Fluorene	mg/kg	<0.1	0.1	<0.1	<0.1	5.9
Phenanthrene	mg/kg	<0.1	2.4	0.8	0.4	64
Anthracene	mg/kg	<0.1	0.5	0.1	<0.1	15
Fluoranthene	mg/kg	0.1	3.7	1.4	0.9	110
Pyrene	mg/kg	0.1	3.0	1.1	0.9	96
Benzo(a)anthracene	mg/kg	<0.1	1.3	0.5	0.4	49
Chrysene	mg/kg	<0.1	1.1	0.4	0.4	40
Benzo(b+k)fluoranthene	mg/kg	<0.2	2.0	0.8	0.8	86
Benzo(a)pyrene	mg/kg	0.11	1.1	0.44	0.49	59
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	0.7	0.3	0.3	32
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	4.5
Benzo(g,h,i)perylene	mg/kg	0.1	0.6	0.3	0.3	30
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	2	1	1	81
Total +ve PAH's	mg/kg	0.58	17	6.1	4.8	600
Surrogate p-Terphenyl-d14	%	103	103	97	106	102

PAHs in Soil		
Our Reference:	UNITS	105486-21
Your Reference		4106/123
Depth		0.05
Date Sampled		20/02/2014
I ype of sample		SOII
Date extracted	-	24/02/2014
Date analysed	-	25/02/2014
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	0.3
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	3.1
Anthracene	mg/kg	0.7
Fluoranthene	mg/kg	10
Pyrene	mg/kg	9.8
Benzo(a)anthracene	mg/kg	5.3
Chrysene	mg/kg	4.4
Benzo(b+k)fluoranthene	mg/kg	9.8
Benzo(a)pyrene	mg/kg	6.2
Indeno(1,2,3-c,d)pyrene	mg/kg	3.4
Dibenzo(a,h)anthracene	mg/kg	0.5
Benzo(g,h,i)perylene	mg/kg	3.4
Benzo(a)pyrene TEQ NEPM B1	mg/kg	9.0
Total +ve PAH's	mg/kg	57
Surrogate p-Terphenyl-d14	%	103

Organochlorine Pesticides in soil				
Our Reference:	UNITS	105486-3	105486-12	105486-16
Your Reference		4106/109	4106/116	4106/119
Depth		0.5	0.05	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014
НСВ	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	93	96

PCBs in Soil				
Our Reference:	UNITS	105486-3	105486-12	105486-16
Your Reference		4106/109	4106/116	4106/119
Depth		0.5	0.05	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil
Date extracted	-	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	98	93	96

Acid Extractable metals in soil						
Our Reference:	UNITS	105486-1	105486-2	105486-3	105486-4	105486-5
Your Reference		4106/105	4106/107	4106/109	4106/109	4106/109
Depth		0.2	0.2	0.5	1.0	1.5
DateSampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date digested	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Arsenic	mg/kg	6	<4	4	7	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	0.4	<0.4
Chromium	mg/kg	6	10	13	14	14
Copper	mg/kg	7	3	22	23	4
Lead	mg/kg	35	11	23	20	14
Mercury	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	<1	5	2	1
Zinc	mg/kg	92	20	130	19	24
Acid Extractable metals in soil						
Our Reference:	UNITS	105486-6	105486-7	105486-8	105486-9	105486-10
Your Reference		4106/110	4106/112	4106/112	4106/115	4106/115
Depth		1.0	0.05	0.5	0.4	1.0
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
		3011	3011	3011	3011	3011
Datedigested	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Arsenic	mg/kg	<4	<4	<4	<4	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	15	16	31	14
Copper	mg/kg	6	17	17	18	22
Lead	mg/kg	12	23	12	28	35
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	12	2	11	4
Zinc	mg/kg	21	72	21	40	51
Acid Extractable metals in soil						
Our Reference:	UNITS	105486-11	105486-12	105486-13	105486-14	105486-15
Your Reference		4106/115	4106/116	4106/116	4106/117	4106/117
Deptn Date Sampled		2.0	0.05	0.2	0.1	0.5
Type of sample		soil	soil	soil	soil	soil
Data digastad		24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Arsonic	ma/ka	24/02/2014	24/02/2014	6	24/02/2014	24/02/2014
	ma/ka	~0 /	~0.4	~0.4	~0 /	~0 /
Chromium	ma/ka	15	10	20.7	26	18
Copper	ma/ka	6	30	10	20 1	5
Copper	mg/kg	0	30		4	15
Lead	mg/kg	22	17	54	9	15
	mg/кg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	22	3	3	4
Zinc	mg/kg	27	32	53	12	18

Acid Extractable metals in soil						
Our Reference:	UNITS	105486-16	105486-17	105486-18	105486-19	105486-20
Your Reference		4106/119	4106/120	4106/120	4106/121	4106/122
Depth		0.05	0.5	1.0	1.0	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date digested	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Arsenic	mg/kg	<4	<4	<4	10	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	3	2	27	9
Copper	mg/kg	8	2	<1	8	19
Lead	mg/kg	6	2	2	17	17
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	9	1	<1	3	11
Zinc	mg/kg	17	4	2	20	60

Acid Extractable metals in soil				
Our Reference:	UNITS	105486-21	105486-22	105486-23
Your Reference		4106/123	4106/DUPB1	4106/DUPB2
Depth		0.05	-	-
Date Sampled		20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil
Date digested	-	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	24/02/2014	24/02/2014	24/02/2014
Arsenic	mg/kg	<4	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	11	21	4
Copper	mg/kg	29	18	3
Lead	mg/kg	26	63	3
Mercury	mg/kg	<0.1	0.2	<0.1
Nickel	mg/kg	24	6	2
Zinc	mg/kg	40	94	5

		1	1			1
Moisture						
Our Reference:	UNITS	105486-1	105486-2	105486-3	105486-4	105486-5
Your Reference		4106/105	4106/107	4106/109	4106/109	4106/109
Depth		0.2	0.2	0.5	1.0	1.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Moisture	%	79	14	19	19	15
Wolstare	70	1.5	17	13	15	13
Moisture						
Our Reference:	UNITS	105486-6	105486-7	105486-8	105486-9	105486-10
Your Reference		4106/110	4106/112	4106/112	4106/115	4106/115
Depth		1.0	0.05	0.5	0.4	1.0
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
 Date prepared	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analyzed	_	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Date analyseu	-	23/02/2014	25/02/2014	25/02/2014	25/02/2014	23/02/2014
Moisture	%	18	15	16	13	22
Moisture						
Our Reference:		105486-11	105486-12	105/86-13	105486-14	105/96-15
Vour Reference.	UNITS	100400-11	100400-12	103400-13	103400-14	105400-15
Ponth		4100/115	4100/110	4100/110	4100/117	4100/117
Depth Deta Consultad		2.0	0.05	0.2	0.1	0.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
		5011	SOII	5011	5011	SOII
Date prepared	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Moisture	%	19	6.8	14	5.7	10
Moisture						
Our Reference:	UNITS	105486-16	105486-17	105486-18	105486-19	105486-20
Your Reference		4106/119	4106/120	4106/120	4106/121	4106/122
Depth		0.05	0.5	1.0	1.0	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date analysed	-	25/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014
Moisture	%	20	11	3.9	15	8.6
Moisture]	
Our Reference:	UNITS	105486-21	105486-22	105486-23		
Your Reference		4106/123	4106/DUPB1	4106/DUPB2		
Depth		0.05	-	-		
Date Sampled		20/02/2014	20/02/2014	20/02/2014		
Type of sample		soil	soil	soil		
Date prepared	-	24/02/2014	24/02/2014	24/02/2014		
Date analysed	-	25/02/2014	25/02/2014	25/02/2014		
Moisturo	0/_	7 1	24	60		
ivioisture	70	7.1	24	0.9	1	

MethodID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
	F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note Naphthalene is determined from the VOC analysis.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020ICP- AES	Determination of various metals by ICP-AES.
Metals-021 CV- AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

		Clie	nt Referenc	e: P	1404106JCO	C01V01, Ingleside		
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXNin Soil						Base II Duplicate II % RPD		
Date extracted	-			24/02/2 014	105486-1	24/02/2014 24/02/2014	LCS-11	24/02/2014
Date analysed	-			26/02/2 014	105486-1	26/02/2014 26/02/2014	LCS-11	26/02/2014
TRHC6 - C9	mg/kg	25	Org-016	<25	105486-1	<25 <25	LCS-11	103%
TRHC6 - C10	mg/kg	25	Org-016	<25	105486-1	<25 <25	LCS-11	103%
Benzene	mg/kg	0.2	Org-016	<0.2	105486-1	<0.2 <0.2	LCS-11	100%
Toluene	mg/kg	0.5	Org-016	<0.5	105486-1	<0.5 <0.5	LCS-11	98%
Ethylbenzene	mg/kg	1	Org-016	<1	105486-1	<1 <1	LCS-11	104%
m+p-xylene	mg/kg	2	Org-016	2	105486-1	<2 <2	LCS-11	105%
o-Xylene	mg/kg	1	Org-016	<1	105486-1	<1 <1	LCS-11	103%
naphthalene	mg/kg	1	Org-014	<1	105486-1	<1 <1	[NR]	[NR]
<i>Surrogate</i> aaa- Trifluorotoluene	%		Org-016	105	105486-1	100 97 RPD:3	LCS-11	87%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate	Duplicate results	Spike Sm#	Spike %
svTRH (C10-C40) in Soil					Sm#	Base II Duplicate II % RPD		Recovery
Date extracted	-			24/02/2	105486-1	24/02/2014 24/02/2014	LCS-11	24/02/2014
				014				
Date analysed	-			24/02/2 014	105486-1	24/02/2014 24/02/2014	LCS-11	24/02/2014
TRHC 10 - C14	mg/kg	50	Org-003	<50	105486-1	<50 <50	LCS-11	108%
TRHC 15 - C28	mg/kg	100	Org-003	<100	105486-1	<100 110	LCS-11	112%
TRHC 29 - C36	mg/kg	100	Org-003	<100	105486-1	<100 100	LCS-11	95%
TRH>C10-C16	mg/kg	50	Org-003	<50	105486-1	<50 <50	LCS-11	108%
TRH>C16-C34	mg/kg	100	Org-003	<100	105486-1	<100 190	LCS-11	112%
TRH>C34-C40	mg/kg	100	Org-003	<100	105486-1	<100 <100	LCS-11	95%
Surrogate o-Terphenyl	%		Org-003	90	105486-1	93 95 RPD:2	LCS-11	115%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II % RPD		
Date extracted	-			24/02/2 014	105486-1	24/02/2014 24/02/2014	LCS-11	24/02/2014
Date analysed	-			25/02/2 014	105486-1	25/02/2014 25/02/2014	LCS-11	25/02/2014
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	<0.1 <0.1	LCS-11	109%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	0.5 0.2 RPD:86	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	<0.1 0.2	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	0.3 0.3 RPD:0	LCS-11	115%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	5.2 5.0 RPD:4	LCS-11	108%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	1.0 0.8 RPD:22	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	6.9 9.0 RPD:26	LCS-11	108%

Client Reference: P1404106JCOC01V01, Ingleside								
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		Receivery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	6.3 7.7 RPD:20	LCS-11	113%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	2.7 3.3 RPD:20	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	2.5 3.3 RPD:28	LCS-11	102%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	105486-1	4.4 5.7 RPD:26	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	105486-1	2.8 3.5 RPD:22	LCS-11	108%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	1.7 2.0 RPD:16	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	0.3 0.4 RPD:29	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	105486-1	1.7 1.7 RPD:0	[NR]	[NR]
<i>Surrogate p</i> -Terphenyl- d14	%		Org-012 subset	101	105486-1	106 106 RPD:0	LCS-11	131%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate	Duplicate results	Spike Sm#	Spike %
Organochlorine Pesticides in soil					Sit#	Base II Duplicate II % RPD		Recovery
Date extracted	-			24/02/2	[NT]	[NT]	LCS-5	24/02/2014
				014				
Date analysed	-			25/02/2 014	[NT]	[NT]	LCS-5	25/02/2014
НСВ	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	123%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	87%
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	95%
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	96%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	115%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	88%
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	85%
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	87%
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	103%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-5	101%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-005	87	[NT]	[NT]	LCS-5	88%

		Clie	nt Referenc	e: P	1404106JCO	C01V01, Ingleside		
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/02/2 014	[NT]	[NT]	LCS-5	24/02/2014
Date analysed	-			25/02/2 014	[NT]	[NT]	LCS-5	25/02/2014
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	LCS-5	100%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	87	[NT]	[NT]	LCS-5	84%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil						Base II Duplicate II % RPD		
Date digested	-			24/02/2 014	105486-1	24/02/2014 24/02/2014	LCS-1	24/02/2014
Date analysed	-			24/02/2 014	105486-1	24/02/2014 24/02/2014	LCS-1	24/02/2014
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	105486-1	6 8 RPD:29	LCS-1	92%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	105486-1	<0.4 <0.4	LCS-1	99%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	105486-1	6 8 RPD:29	LCS-1	96%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	105486-1	7 7 RPD:0	LCS-1	95%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	105486-1	35 23 RPD:41	LCS-1	95%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	105486-1	0.2 0.1 RPD:67	LCS-1	101%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	105486-1	2 2 RPD:0	LCS-1	97%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	105486-1	92 110 RPD:18	LCS-1	96%

QUALITYCONTROL	UNITS	PQL	_	METHOD	Blank			
Moisture								
Date prepared	-				[NT]			
Date analysed	-				[NT]			
Moisture	%		0.1	Inorg-008	[NT]			
QUALITYCONTROL	UNITS	S	I	Dup.Sm#		Duplicate	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXNin Soil					Base+D	Ouplicate + %RPD		
Date extracted	-		1	05486-11	24/02/2	014 24/02/2014	105486-2	24/02/2014
Date analysed	-		1	05486-11	26/02/2	014 26/02/2014	105486-2	26/02/2014
TRHC6 - C9	mg/k	g	1	05486-11		<25 <25	105486-2	106%
TRHC6 - C10	mg/kg	g	1	05486-11		<25 <25	105486-2	106%
Benzene	mg/k	g	1	05486-11	<	0.2 <0.2	105486-2	100%
Toluene	mg/kạ	g	1	05486-11	<	:0.5 <0.5	105486-2	114%
Ethylbenzene	mg/k	g	1	05486-11		<1 <1	105486-2	107%
m+p-xylene	mg/kg	g	1	05486-11		<2 <2	105486-2	106%
o-Xylene	mg/k	g	1	05486-11		<1 <1	105486-2	105%
naphthalene	mg/k	g	1	05486-11		<1 <1	[NR]	[NR]
<i>Surrogate</i> aaa- Trifluorotoluene	%		1	05486-11	87	95 RPD: 9	105486-2	92%
QUALITYCONTROL	UNITS	S		Dup.Sm#		Duplicate	Spike Sm#	Spike % Recovery
svTRH (C10-C40) in Soil					Base+D	Duplicate + %RPD		
Date extracted	-		1	05486-11	24/02/2	014 24/02/2014	105486-2	24/02/2014
Date analysed	-		1	05486-11	24/02/2	014 24/02/2014	105486-2	24/02/2014
TRHC 10 - C14	mg/k	g	1	05486-11		<50 <50	105486-2	99%
TRHC 15 - C28	mg/kg	g	1	05486-11	<	100 <100	105486-2	114%
TRHC29 - C36	mg/k	g	1	05486-11	<	100 <100	105486-2	98%
TRH>C10-C16	mg/kg	g	1	05486-11		<50 <50	105486-2	99%
TRH>C16-C34	mg/kg	g	1	05486-11	<	100 <100	105486-2	114%
TRH>C34-C40	mg/kg	g	1	05486-11	<	100 <100	105486-2	98%
Surrogate o-Terphenyl	%		1	05486-11	90	88 RPD:2	105486-2	105%
QUALITYCONTROL	UNITS	S		Dup.Sm#		Duplicate	Spike Sm#	Spike % Recovery
PAHs in Soil				·	Base+D	ouplicate+%RPD		
Date extracted	-		1	05486-11	24/02/2	014 24/02/2014	105486-2	24/02/2014
Date analysed	-		1	05486-11	25/02/2	014 25/02/2014	105486-2	25/02/2014
Naphthalene	mg/kg	g	1	05486-11	<	:0.1 <0.1	105486-2	99%
Acenaphthylene	mg/kg	g	1	05486-11	<	:0.1 <0.1	[NR]	[NR]
Acenaphthene	mg/ke	g	1	05486-11	<	:0.1 <0.1	[NR]	[NR]
Fluorene	mg/ke	g	1	05486-11	<	:0.1 <0.1	105486-2	105%
Phenanthrene	mg/ke	g	1	05486-11	<	0.1 <0.1	105486-2	99%
Anthracene	ma/ko	g	1	05486-11	<	0.1 <0.1	[NR]	[NR]
Fluoranthene	ma/ka	q	1	05486-11			105486-2	99%
Pvrene	ma/ka	a	1	05486-11	0.1	0.1 RPD: 0	105486-2	102%
Benzo(a)anthracene	ma/ka	a	1	05486-11	2	0.1 <0.1	INR1	INR1
Chrysene	ma/k	9	1	05486-11		0.1 < 0.1	105486-2	92%
Chrysene	Πy/K	a		00-00-11			100400-2	32 /0

		Client Reference	e: P1404106JCOC01	V01, Ingleside	
QUALITYCONTROL	UNITS	Dup.Sm#	Duplicate	Spike Sm#	Spike % Recovery
PAHs in Soil			Base + Duplicate + %RPD		
Benzo(b+k)fluoranthene	mg/kg	105486-11	<0.2 <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	105486-11	0.07 0.07 RPD:0	105486-2	95%
Indeno(1,2,3-c,d)pyrene	mg/kg	105486-11	<0.1 <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	105486-11	<0.1 <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	105486-11	<0.1 <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	105486-11	100 92 RPD:8	105486-2	102%
QUALITYCONTROL	UNITS	Dup.Sm#	Duplicate	Spike Sm#	Spike % Recovery
Acid Extractable metals in			Base + Duplicate + % RPD		
SOII					
Date digested	-	105486-11	24/02/2014 24/02/2014	105486-2	24/02/2014
Date analysed	-	105486-11	24/02/2014 24/02/2014	105486-2	24/02/2014
Arsenic	mg/kg	105486-11	<4 <4	105486-2	92%
Cadmium	mg/kg	105486-11	<0.4 <0.4	105486-2	94%
Chromium	mg/kg	105486-11	15 16 RPD:6	105486-2	97%
Copper	mg/kg	105486-11	6 7 RPD:15	105486-2	108%
Lead	mg/kg	105486-11	22 26 RPD:17	105486-2	102%
Mercury	mg/kg	105486-11	<0.1 <0.1	105486-2	105%
Nickel	mg/kg	105486-11	3 3 RPD:0	105486-2	92%
Zinc	mg/kg	105486-11	27 30 RPD:11	105486-2	91%
QUALITYCONTROL	UNITS	Dup.Sm#	Duplicate		
vTRH(C6-C10)/BTEXNin			Base + Duplicate + % RPD		
501					
Date extracted	-	105486-21	24/02/2014 24/02/2014		
Date analysed	-	105486-21	26/02/2014 26/02/2014		
TRHC6 - C9	mg/kg	105486-21	<25 <25		
TRHC6 - C10	mg/kg	105486-21	<25 <25		
Benzene	mg/kg	105486-21	<0.2 <0.2		
Toluene	mg/kg	105486-21	<0.5 <0.5		
Ethylbenzene	mg/kg	105486-21	<1 <1		
m+p-xylene	mg/kg	105486-21	<2 <2		
o-Xylene	mg/kg	105486-21	<1 <1		
naphthalene	mg/kg	105486-21	<1 <1		
<i>Surrogate</i> aaa- Trifluorotoluene	%	105486-21	88 104 RPD: 17		

Cliont	Poforonco:
Client	Reference:

QUALITYCONTROL	UNITS	Dup.Sm#	Duplicate
svTRH (C10-C40) in Soil			Base + Duplicate + %RPD
Date extracted	-	105486-21	24/02/2014 24/02/2014
Date analysed	-	105486-21	24/02/2014 24/02/2014
TRHC 10 - C 14	mg/kg	105486-21	<50 <50
TRHC 15 - C28	mg/kg	105486-21	340 260 RPD:27
TRHC29 - C36	mg/kg	105486-21	850 850 RPD:0
TRH>C10-C16	mg/kg	105486-21	<50 <50
TRH>C16-C34	mg/kg	105486-21	920 820 RPD:11
TRH>C34-C40	mg/kg	105486-21	980 1100 RPD:12
Surrogate o-Terphenyl	%	105486-21	93 93 RPD:0
QUALITYCONTROL	UNITS	Dup.Sm#	Duplicate
PAHs in Soil			Base + Duplicate + %RPD
Date extracted	-	105486-21	24/02/2014 24/02/2014
Date analysed	-	105486-21	25/02/2014 25/02/2014
Naphthalene	mg/kg	105486-21	<0.1 <0.1
Acenaphthylene	mg/kg	105486-21	0.3 0.3 RPD:0
Acenaphthene	mg/kg	105486-21	<0.1 <0.1
Fluorene	mg/kg	105486-21	<0.1 0.2
Phenanthrene	mg/kg	105486-21	3.1 3.8 RPD:20
Anthracene	mg/kg	105486-21	0.7 0.6 RPD:15
Fluoranthene	mg/kg	105486-21	10 9.4 RPD:6
Pyrene	mg/kg	105486-21	9.8 9.0 RPD:9
Benzo(a)anthracene	mg/kg	105486-21	5.3 3.9 RPD:30
Chrysene	mg/kg	105486-21	4.4 3.3 RPD:29
Benzo(b+k)fluoranthene	mg/kg	105486-21	9.8 7.2 RPD:31
Benzo(a)pyrene	mg/kg	105486-21	6.2 4.6 RPD:30
Indeno(1,2,3-c,d)pyrene	mg/kg	105486-21	3.4 2.4 RPD:34
Dibenzo(a,h)anthracene	mg/kg	105486-21	0.5 0.4 RPD:22
Benzo(g,h,i)perylene	mg/kg	105486-21	3.4 2.4 RPD:34
Surrogate p-Terphenyl-d14	%	105486-21	103 106 RPD:3

		Client Referenc	e: P1404106JCOC01
QUALITYCONTROL	UNITS	Dup.Sm#	Duplicate
Acid Extractable metals in soil			Base + Duplicate + %RPD
Datedigested	-	105486-21	24/02/2014 24/02/2014
Date analysed	-	105486-21	24/02/2014 24/02/2014
Arsenic	mg/kg	105486-21	<4 <4
Cadmium	mg/kg	105486-21	<0.4 <0.4
Chromium	mg/kg	105486-21	11 11 RPD:0
Copper	mg/kg	105486-21	29 30 RPD:3
Lead	mg/kg	105486-21	26 19 RPD:31
Mercury	mg/kg	105486-21	<0.1 <0.1
Nickel	mg/kg	105486-21	24 20 RPD:18
Zinc	mg/kg	105486-21	40 35 RPD:13

Report Comments:

Asbestos ID was analysed by Approved Identifier: Asbestos ID was authorised by Approved Signatory: Not applicable for this job Not applicable for this job

INS: Insufficient sample for this testPQL: Practical Quantitation LimitNT: INA: Test not requiredRPD: Relative Percent DifferenceNA: Test han<: Less than</td>>: Greater thanLCS

NT: Not tested NA: Test not required LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. **Duplicate**: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

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

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is

generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

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

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

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

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

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SOIL ANALYSIS CHAIN OF CUSTODY FORM

Name	Contami												
		nation Asse.	ssment: 1	1 Addiso	n Rd, Ing	leside							
Martens Contact Officer	Ben Rose							Contact Email	hroce@morto				
	Sample [Date	20.02	2014		Dispatch	Date	04.03.2014					
Sampling and Shipping	Our Refe	ence	P1404	106JCOC	02V01			Shinning Method ()		-	standa	g	
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	)	2/ 41	06/123/0.05	×			Envirolab - c	certificate of analysis 10548	9				
		4	106/122/0.2		×	×	Sent to	envirolab with this COC	-				

> mail@martens.com.au
 > www.martens.com.au
 MARTENS & ASSOCIATES P/L
 ABN 85 070 240 R90

Head Office Unit 6 / 37 Leighton Place Hornsby NSW 2077, Australia Ph 02 9476 9999 Fax 02 9476 8767



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

#### CERTIFICATE OF ANALYSIS

105486-A

Client: Martens & Associates Pty Ltd 6/37 Leighton Place Hornsby NSW 2077

Attention: Ben Rose

#### Sample log in details:

Your Reference: No. of samples: Date samples received / completed instructions received

## P1404106JCOC01V01, Ingleside

Additional testing on soils 21/02/14 / 04/03/14

#### Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data. Samples were analysed as received from the client. Results relate specifically to the samples as received. Results are reported on a dry weight basis for solids and on an as received basis for other matrices. *Please refer to the last page of this report for any comments relating to the results.* 

#### **Report Details:**

 Date results requested by: / Issue Date:
 11/03/14
 / 7/03/14

 Date of Preliminary Report:
 None Issued

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Tests not covered by NATA are denoted with *.

#### **Results Approved By:**

Jacinta/Hurst

Jacinta/Hurst Laboratory Manager



PAHs in TCLP (USEPA 1311)						
Our Reference:	UNITS	105486-A-12	105486-A-13	105486-A-14	105486-A-15	105486-A-17
Your Reference		4106/116	4106/116	4106/117	4106/117	4106/120
Depth		0.05	0.2	0.1	0.5	0.5
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil	soil
pH of soil for fluid# determ.	pH units	9.3	9.5	7.9	7.8	7.9
pH of soil for fluid # determ. (acid)	pH units	1.7	1.8	1.7	1.7	1.7
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.0	5.0	5.0	5.0	5.0
Date extracted	-	06/03/2014	06/03/2014	06/03/2014	06/03/2014	06/03/2014
Date analysed	-	06/03/2014	06/03/2014	06/03/2014	06/03/2014	06/03/2014
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
AcenaphtheneinTCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(g,h,i) perylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL(+)VE	NIL(+)VE	NIL(+)VE	NIL(+)VE	NIL(+)VE
Surrogate p-Terphenyl-d14	%	107	100	126	85	92

PAHs in TCLP (USEPA 1311)			
Our Reference:	UNITS	105486-A-20	105486-A-21
Your Reference		4106/122	4106/123
Depth		0.05	0.05
Date Sampled		20/02/2014	20/02/2014
I ype of sample		SOIL	soil
pH of soil for fluid# determ.	pH units	7.8	9.0
pH of soil for fluid # determ. (acid)	pH units	1.7	1.7
Extraction fluid used	-	1	1
pH of final Leachate	pH units	5.0	5.0
Date extracted	-	06/03/2014	06/03/2014
Date analysed	-	06/03/2014	06/03/2014
Naphthalene in TCLP	mg/L	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001
AcenaphtheneinTCLP	mg/L	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001
Fluoranthene in TCLP	mg/L	0.002	<0.001
Pyrene in TCLP	mg/L	0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001
Benzo(g,h,i) perylene in TCLP	mg/L	<0.001	<0.001
Total +ve PAH's	mg/L	0.0030	NIL(+)VE
Surrogate p-Terphenyl-d14	%	101	101

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311 and in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+.
Org-012 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

Client Reference: P1404106JCOC01V01, Ingleside									
QUALITY CONTROL PAHs in TCLP (USEPA	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery	
1311)									
Date extracted	-			06/03/2 014	[NT]	[NT]	LCS-W3	06/03/2014	
Date analysed	-			06/03/2 014	[NT]	[NT]	LCS-W3	06/03/2014	
Naphthalene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	82%	
Acenaphthylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]	
Acenaphthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]	
Fluorene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	88%	
Phenanthrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	89%	
Anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]	
Fluoranthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	84%	
Pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	88%	
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]	
Chrysene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	83%	
Benzo(b+k)fluoranthene in TCLP	mg/L	0.002	Org-012 subset	<0.002	[NT]	[NT]	[NR]	[NR]	
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W3	93%	
Indeno(1,2,3-c,d)pyrene -TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]	
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]	
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]	
Surrogate p-Terphenyl- d14	%		Org-012	98	[NT]	[NT]	LCS-W3	97%	

#### **Report Comments:**

sample 1 and 7: TCLP not conducted as per phone conversation.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

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

#### **Quality Control Definitions**

**Blank**: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. **Duplicate**: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

**Matrix Spike** : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. **LCS (Laboratory Control Sample)** : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

**Surrogate Spike:** Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

#### Laboratory Acceptance Criteria

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

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is

generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

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

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

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

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


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

#### CERTIFICATE OF ANALYSIS

105486-B

Client: Martens & Associates Pty Ltd 6/37 Leighton Place Hornsby NSW 2077

Attention: Ben Rose

#### Sample log in details:

Your Reference: No. of samples: Date samples received / completed instructions received

#### P1404106JCOC01V01, Ingleside

Additional	testing	on	soils
21/02/14		/	04/03/14

#### Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data. Samples were analysed as received from the client. Results relate specifically to the samples as received. Results are reported on a dry weight basis for solids and on an as received basis for other matrices. *Please refer to the last page of this report for any comments relating to the results.* 

#### **Report Details:**

 Date results requested by: / Issue Date:
 13/03/14
 /
 13/03/14

 Date of Preliminary Report:
 None Issued

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 Tests not covered by NATA are denoted with *.

#### **Results Approved By:**

Jacinta/Hurst

Laboratory Manager

В



PAHs in TCL P(LISEPA 1311)			
Our Reference:	LINITS	105486-B-1	105486-B-7
Your Reference		4106/105	4106/112
Depth		0.2	0.05
Date Sampled		20/02/2014	20/02/2014
Type of sample		soil	soil
pH of soil for fluid# determ.	pH units	9.3	9.6
pH of soil for fluid # determ. (acid)	pH units	1.8	1.7
Extraction fluid used	-	1	1
pH of final Leachate	pH units	6.3	5.2
Date extracted	-	13/03/2014	13/03/2014
Date analysed	-	13/03/2014	13/03/2014
Naphthalene in TCLP	mg/L	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001
AcenaphtheneinTCLP	mg/L	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene-TCLP	mg/L	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001
Total +ve PAH's	mg/L	NIL(+)VE	NIL(+)VE
Surrogate p-Terphenyl-d14	%	120	102

## Client Reference: P1404106JCOC01V01, Ingleside

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311 and in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Org-012 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

Client Reference: P1404106JCOC01V01, Ingleside								
QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Dete extremented				12/02/2				12/02/2014
Date extracted	-			014	נואון	נואון	LC3-W1	13/03/2014
Date analysed	-			13/03/2 014	[NT]	[NT]	LCS-W1	13/03/2014
Naphthalene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	105%
Acenaphthylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	118%
Phenanthrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	114%
Anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	111%
Pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	116%
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	98%
Benzo(b+k)fluoranthene in TCLP	mg/L	0.002	Org-012 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	118%
Indeno(1,2,3-c,d)pyrene -TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl- d14	%		Org-012	85	[NT]	[NT]	LCS-W1	119%

#### **Report Comments:**

Asbestos ID was analysed by Approved Identifier: Asbestos ID was authorised by Approved Signatory: Not applicable for this job Not applicable for this job

INS: Insufficient sample for this testPQL: Practical Quantitation LimitNT: INA: Test not requiredRPD: Relative Percent DifferenceNA: Test han<: Less than</td>>: Greater thanLCS:

NT: Not tested NA: Test not required LCS: Laboratory Control Sample

#### **Quality Control Definitions**

**Blank**: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. **Duplicate**: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

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**Surrogate Spike:** Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

#### Laboratory Acceptance Criteria

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Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is

generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

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

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

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

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

### Simon Song

From: Sent: To: Cc: Subject: Nancy Zhang Monday, 17 March 2014 12:47 PM Simon Song Aileen Hie FW: Results for registration '105486 - P1404106JCOC01V01, Ingleside'

Regards,

Nancy Zhang | Organics Section Supervisor | Envirolab Services Pty Ltd

Great Chemistry.Great Service

12 Ashley Street Chatswood NSW 2067 T 612 9910 6200 F 612 9910 6201 mailto:nzhang@envirolab.com.au | http://www.envirolab.com.au

-----Original Message-----From: Gray Taylor [<u>mailto:GTaylor@martens.com.au</u>] Sent: Friday, 14 March 2014 10:02 PM To: Nancy Zhang; Ben Rose Cc: Jacinta Hurst Subject: RE: Results for registration '105486 - P1404106JCOC01V01, Ingleside'

Nancy

Please sample the following samples for asbestos in soil

1. 119/0.05 -16 2. 109/0.5 - 3 3.116/0.05 -12 4. 107/0.2 - 7

Please do 2 day turn around

Any questions please call me.

Martens & Associates Pty Ltd

Gray Taylor Senior Engineer/Project Manager BE Engineering

Martens & Associates Pty Ltd Unit 6/37 Leighton Place Hornsby, NSW 2077 P + 61 2 9476 9999

105486BC Me19/3. 2days T/A.

F + 61 2 9476 8767 M 0422 685 594 www.martens.com.au

This message is intended for the addressee named and may contain confidential / privileged information. If you are not the intended recipient, please delete it and notify the sender. Views expressed in this message are those of the individual sender, and are not necessarily the views of Martens & Associates Pty Ltd. You should scan any attached files for viruses.

-----Original Message-----From: Nancy Zhang [mailto:NZhang@envirolab.com.au] Sent: Friday, 28 February 2014 4:46 PM To: Ben Rose; secretary Subject: Results for registration '105486 - P1404106JCOC01V01, Ingleside'

Please refer to attached for: a copy of the Certificate of Analysis a copy of the Invoice a copy of the COC an excel file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to: Jacinta Hurst on <u>ihurst@envirolabservices.com.au</u> or David Springer on <u>dspringer@envirolabservices.com.au</u> or Tania Notaras on <u>tnotaras@envirolabservices.com.au</u>

Regards

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

Regards,

Nancy Zhang | Organics Section Supervisor | Envirolab Services Pty Ltd

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#### CERTIFICATE OF ANALYSIS

105486-C

Client: Martens & Associates Pty Ltd 6/37 Leighton Place Hornsby NSW 2077

Attention: Ben Rose

#### Sample log in details:

Your Reference: No. of samples: Date samples received / completed instructions received

#### P1404106JCOC01V01, Ingleside

Additional	testing	on	soils
21/02/14	1	/	17/03/14

#### Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data. Samples were analysed as received from the client. Results relate specifically to the samples as received. Results are reported on a dry weight basis for solids and on an as received basis for other matrices. *Please refer to the last page of this report for any comments relating to the results.* 

#### **Report Details:**

 Date results requested by: / Issue Date:
 19/03/14
 /
 19/03/14

 Date of Preliminary Report:
 None Issued

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 Accredited for compliance with ISO/IEC 17025.

 Tests not covered by NATA are denoted with *.

#### **Results Approved By:**

Jacinta/Hurst

Laboratory Manager



## Client Reference: P1404106JCOC01V01, Ingleside

Asbestos ID - soils					
Our Reference:	UNITS	105486-C-2	105486-C-3	105486-C-12	105486-C-16
Your Reference		4106/107	4106/109	4106/116	4106/119
Depth		0.2	0.5	0.05	0.05
Date Sampled		20/02/2014	20/02/2014	20/02/2014	20/02/2014
Type of sample		soil	soil	soil	soil
Date analysed	-	19/03/2014	19/03/2014	19/03/2014	19/03/2014
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Orange sandy soil	Light brown sandy soil	Dark brown sandy soil	Beige sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg			
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

#### **Report Comments:**

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

Asbestos ID was analysed by Approved Identifier:	Matt Mansfield
Asbestos ID was authorised by Approved Signatory:	Paul Ching

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

#### **Quality Control Definitions**

**Blank**: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. **Duplicate**: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

**Matrix Spike** : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

**Surrogate Spike:** Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

#### Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

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

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

## 15 Attachment E – Data Validation Report





### 1. Sample Handling

- a. Were sample holding times met?
- b. Were samples in proper custody between the field and reaching the laboratory?
- c. Were the samples properly and adequately preserved?
- d. Were the samples received by the laboratory in good condition?

## COMMENTS

Hold time was not met for 2 samples due to samples being misplaced by the

laboratory. Results for the analytes were non detect and therefore results are

considered appropriate for use.

Sample handling is:

✓ Satisfactory

Partially Satisfactory Unsatisfactory







## 2. Precision / Accuracy Statement

Yes	No
	(Comments below)
✓	
✓	
✓	
✓	
✓	
✓	
✓	

- a. Was a NATA registered laboratory used?
- b. Did the laboratory perform the requested tests?
- c. Were laboratory methods adopted NATA endorsed?
- d. Were appropriate test procedures followed?
- e. Were reporting limits satisfactory?
- f. Was the NATA Seal on the reports?
- g. Were reports signed by an authorised person?

## COMMENTS

Precision / Accuracy of the Laboratory Report:

Satisfactory

 $\checkmark$ 

Partially Satisfactory Unsatisfactory





## 3. Field Quality Assurance / Quality Control (QA/QC)

- a. Number of Primary Samples analysed (does not include duplicates)
- b. Number of days of sampling
- c. Number and Type of QA/QC Samples analysed
  - Intra-Laboratory Field Duplicates
  - Inter-Laboratory Field triplicates
  - Trip Blanks
  - Wash Blanks
  - Other (Field Blanks, Trip Spikes etc.)
- Field Duplicates

Adequate Numbers of intra-laboratory field duplicates analysed?

Adequate Numbers of inter-laboratory field duplicates analysed?

Were RPDs within Control Limits?

- i. Organics (± 50%)
- ii. Metals / Inorganics (± 50%)
- iii. Nutrients (± 50%)

## COMMENTS

50% threshold exceeded for lead, zinc and nickel. However, all results at

concentrations well below soil assessment criteria and therefore data is

considered directly useable.

Media	Number
Soil:	23
Water:	-
	1
Soil	Water
2	
0	
1	
0	
1	







## 4. Field Quality Assurance / Quality Control (QA/QC) - Continued

### <u>Trip Blank / Wash Blanks</u>

Were Adequate Numbers of trip blanks analysed?

Were Adequate Numbers of wash blanks analysed?

Were the Trip Blanks free of contaminants?

Were the Wash Blanks free of contaminants?

(If no, comment whether the contaminants present are also detected in the samples and whether they are common laboratory chemicals.)

## COMMENTS

## <u>Trip Spikes</u>

Were adequate numbers of Trip Spikes analysed?

Were the Trip Spike results within control limits?

## COMMENTS

Field QA/QC:

Satisfactory

√

Partially Satisfactory

Unsatisfactory









## 5. Laboratory Internal Quality Assurance / Quality Control (QA/QC) Procedures

a. Type and Number of QA/QC Samples

QA/QC Type	Yes	No
Laboratory Blanks/Reagent Blanks (at least 1 per batch)	✓	
Matrix Spikes/Matrix Spike Duplicates (1 for each soil type)	✓	
Laboratory Control Samples	✓	
Laboratory Duplicates (at least one per batch or 1 per 10 samples, whichever is smaller)	~	
Surrogates (where appropriate) ¹	$\checkmark$	

¹ Number of surrogate spikes carried out on each sample

- b. Were the laboratory blanks/reagents blanks free of contamination?
- c. Were the spike recoveries within control limits?
- d. Were the RPDs of the laboratory duplicates within control limits?
  - i. Organics (+-50 %)
  - ii. Metals / Inorganics (+-50 %)
- e. Were the surrogate recoveries within control limits?

## COMMENTS

Inter-laboratory RPD for Acenaphthylene (86%) and Mercury (67%) exceeded control limits. Levels for both were low and well below site assessment criteria therefore this variability is considered acceptable and does not affect the suitability of data for use.

 $\checkmark$ 

Laboratory internal QA / QC is:

- Satisfactory
  - Partially Satisfactory

Unsatisfactory



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		Our Ref:

P1404106JC02V01 datavalidation.





## 6. Summary of Quality Assurance / Quality Control (QA/QC)

QA/QC Type	Satisfactory	Partially Satisfactory	Unsatisfactory
Sample handling	✓		
Precision / Accuracy of the Laboratory Report	✓		
Field QA / QC	✓		
Laboratory Internal QA / QC	✓		

### iv. Data Usability

- 1. Data directly usable
- 2. Data usable with the following corrections/modifications (see comment below)
- 3. Data not usable.

## COMMENTS



√

# 16 Attachment F – Relative Percentage Differences (RPDs)



# Supplementary Stage 1 and 2 ESA: Relative Percentage Difference (RPD)

	LOR	Primary	Intra-laboratory	RPD (%)	Primary	Intra-laboratory	RPD (%)		
RTEY		4106/115/1.0	4106/DUPB1		4106/120/0.5	4106/DUPB2			
Benzene	<0.2	3011	3011		301	501			
Toluene	<0.5								
Fthylbenzene	<0.5								
Total Xylene	<1								
Total Recoverable Hyd	rocarbons								
TPH C ₆ - C ₉	<10								
TPH C ₁₀ - C ₁₄	<50								
TPH C ₁₅ - C ₂₈	<100								
TPH C ₂₉ - C ₃₆	<100								
Total TPH C ₁₀ - C ₃₆	<250								
Polyaromatic Hydroca	rbons								
Benzo(a)pyrene	<0.05								
Total PAH	<0.5								
Heavy Metals					<u>.</u>				
Arsenic	<4	7	5	33	<4	<4	NA		
Cadmium	<0.5	<0.4	<0.4	NA	<0.4	<0.4	NA		
Chromium (III)	<1	14	21	-40	3	4	-29		
Copper	<1	22	18	20	2	3	-40		
Lead	<1	35	63	-57	2	3	-40		
Mercury	<0.1	<0.1	0.2	NA	<0.1	<0.1	NA		
Nickel	<1	4	6	-40	1	2	-67		
Zinc	<1	51	94	-59	4	5	-22	 	

Note:

¹ Limit of Reporting

All results in mg/kg unless otherwise noted