



Analytical Results

Sub-Matrix: SOIL

(Matrix: SOIL)

Client sample ID

Compound	CAS Number	LOR	Client sampling date / time	Unit	TP3-W11a 0-0.1 28-Aug-2018 00:00 ES1825639-024 Result	TP3-W12a 0-0.1 28-Aug-2018 00:00 ES1825639-025 Result	TP3-W13a 0.8-0.9 28-Aug-2018 00:00 ES1825639-026 Result	TP3-W14a 0.8-0.9 28-Aug-2018 00:00 ES1825639-027 Result	TP3-W16a 0.8-0.9 28-Aug-2018 00:00 ES1825639-028 Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	-----	1.0	%		8.6	9.0	5.0	12.5	13.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	-----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	-----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	-----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	-----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	-----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	-----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	-----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	-----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	-----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	-----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	-----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	-----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		118	113	104	109	108
Toluene-D8	2037-26-5	0.2	%		116	109	102	106	104
4-Bromofluorobenzene	460-00-4	0.2	%		123	106	90.8	99.1	106



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Client sample ID						
Compound	CAS Number	Client sampling date / time		TP4-W2a 0.8-0.9	TP4-B1a 0-0.1	TP1-D2	TP2-D2	Trip Spike 3
		LOR	Unit					
		Result	Result					
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content		----	1.0	%	6.4	6.8	11.8	3.7
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction		-----	10	mg/kg	<10	<10	<10	19
C10 - C14 Fraction		-----	50	mg/kg	<50	<50	<50	-----
C15 - C28 Fraction		-----	100	mg/kg	<100	<100	<100	-----
C29 - C36 Fraction		-----	100	mg/kg	<100	<100	<100	-----
^ C10 - C36 Fraction (sum)		-----	50	mg/kg	<50	<50	<50	-----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10		10	mg/kg	<10	<10	<10	25
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX		10	mg/kg	<10	<10	<10	10
>C10 - C16 Fraction		-----	50	mg/kg	<50	<50	<50	-----
>C16 - C34 Fraction		-----	100	mg/kg	<100	<100	<100	-----
>C34 - C40 Fraction		-----	100	mg/kg	<100	<100	<100	-----
^ >C10 - C40 Fraction (sum)		-----	50	mg/kg	<50	<50	<50	-----
^ >C10 - C16 Fraction minus Naphthalene (F2)		-----	50	mg/kg	<50	<50	<50	-----
EP080: BTEXN								
Benzene	71-43-2		0.2	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3		0.5	mg/kg	<0.5	<0.5	<0.5	6.8
Ethylbenzene	100-41-4		0.5	mg/kg	<0.5	<0.5	<0.5	0.9
meta- & para-Xylene	108-38-3 106-42-3		0.5	mg/kg	<0.5	<0.5	<0.5	4.9
ortho-Xylene	95-47-6		0.5	mg/kg	<0.5	<0.5	<0.5	2.1
^ Sum of BTEX		-----	0.2	mg/kg	<0.2	<0.2	<0.2	14.7
^ Total Xylenes		-----	0.5	mg/kg	<0.5	<0.5	<0.5	7.0
Naphthalene	91-20-3		1	mg/kg	<1	<1	<1	<1
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0		0.2	%	114	105	116	104
Toluene-D8	2037-26-5		0.2	%	109	102	115	95.6
4-Bromofluorobenzene	460-00-4		0.2	%	112	108	113	100



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sub-Matrix: SOIL (Matrix: SOIL)		Client sample ID				Trip Blank 3		Trip Spike Control			
		Client sampling date / time				28-Aug-2018 00:00		28-Aug-2018 00:00			
Compound	CAS Number	LOD	Unit	ES1825639-040		ES1825639-041					
				Result		Result					
EP080/071: Total Petroleum Hydrocarbons											
C6 - C9 Fraction		10	mg/kg	<10		18					
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions											
C6 - C10 Fraction	C6_C10	10	mg/kg	<10		23					
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10		<10					
EP080: BTEXN											
Benzene	71-43-2	0.2	mg/kg	<0.2		<0.2					
Toluene	108-88-3	0.5	mg/kg	<0.5		6.0					
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5		0.9					
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5		4.6					
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5		2.0					
^ Sum of BTEX		0.2	mg/kg	<0.2		13.5					
^ Total Xylenes		0.5	mg/kg	<0.5		6.6					
Naphthalene	91-20-3	1	mg/kg	<1		<1					
EP080S: TPH(V)/BTEX Surrogates											
1,2-Dichloroethane-D4	17060-07-0	0.2	%	111		103					
Toluene-D8	2037-26-5	0.2	%	107		97.2					
4-Bromofluorobenzene	460-00-4	0.2	%	109		107					



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		R3	
		Client sampling date / time		28-Aug-2018 00:00	
Compound	CAS Number	LOR	Unit	ES1825639-038	
				Result	
EP080/071: Total Petroleum Hydrocarbons					
C6 - C9 Fraction		20	µg/L	<20	
C10 - C14 Fraction		50	µg/L	<50	
C15 - C28 Fraction		100	µg/L	<100	
C29 - C36 Fraction		50	µg/L	<50	
^ C10 - C36 Fraction (sum)		50	µg/L	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions					
C6 - C10 Fraction	C6_C10	20	µg/L	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	
>C10 - C16 Fraction		100	µg/L	<100	
>C16 - C34 Fraction		100	µg/L	<100	
>C34 - C40 Fraction		100	µg/L	<100	
^ >C10 - C40 Fraction (sum)		100	µg/L	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)		100	µg/L	<100	
EP080: BTEXN					
Benzene	71-43-2	1	µg/L	<1	
Toluene	108-88-3	2	µg/L	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	
meta- & para-Xylene	108-38-3	2	µg/L	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	
^ Total Xylenes		2	µg/L	<2	
^ Sum of BTEX		1	µg/L	<1	
Naphthalene	91-20-3	5	µg/L	<5	
EP080S: TPH(V)/BTEX Surrogates					
1,2-Dichloroethane-D4	17060-07-0	2	%	86.1	
Toluene-D8	2037-26-5	2	%	87.3	
4-Bromofluorobenzene	460-00-4	2	%	84.6	



Surrogate Control Limits

Sub-Matrix: SOIL			
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
Sub-Matrix: WATER			
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128



Environmental

QUALITY CONTROL REPORT

Work Order	: ES1825639	Page	: 1 of 9
Client	: AARGUS PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR MARK KELLY	Contact	: Customer Services ES
Address	: PO BOX 398 DRUMMOYNE NSW, AUSTRALIA 2047	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 1300137038	Telephone	: +61-2-8784 8555
Project	: ES7280/2 Remediation Validation	Date Samples Received	: 29-Aug-2018
Order number	:	Date Analysis Commenced	: 31-Aug-2018
C-O-C number	:	Issue Date	: 05-Sep-2018
Sampler	: NZ		
Site	: Belfield		
Quote number	: EN/222		
No. of samples received	: 38		
No. of samples analysed	: 38		



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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Accreditation Category
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

Key:

Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: SOIL

Sub-Matrix: SOIL									
Laboratory sample ID	Client sample ID	Method/Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1908212)									
ES1825639-004	TP1-W7a 1-1.1	EA055: Moisture Content	-----	0.1	%	6.1	6.8	11.0	No Limit
ES1825639-015	TP3-W2a 0.8-0.9	EA055: Moisture Content	-----	0.1	%	6.1	6.1	0.00	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1908213)									
ES1825639-026	TP3-W13a 0.8-0.9	EA055: Moisture Content	-----	0.1	%	5.0	6.4	23.5	No Limit
ES1825639-037	TP2-D2	EA055: Moisture Content	-----	0.1	%	3.7	3.9	6.32	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1907300)									
ES1825639-001	TP1-W1a 1-1.1	EP080: C6 - C9 Fraction	-----	10	mg/kg	<10	<10	0.00	No Limit
ES1825639-012	TP2-B1a 0-0.1	EP080: C6 - C9 Fraction	-----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1907301)									
ES1825639-024	TP3-W11a 0-0.1	EP080: C6 - C9 Fraction	-----	10	mg/kg	<10	<10	0.00	No Limit
ES1825639-034	TP4-W2a 0.8-0.9	EP080: C6 - C9 Fraction	-----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1908023)									
ES1825639-001	TP1-W1a 1-1.1	EP071: C15 - C28 Fraction	-----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	-----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	-----	50	mg/kg	<50	<50	0.00	No Limit
ES1825639-012	TP2-B1a 0-0.1	EP071: C15 - C28 Fraction	-----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	-----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	-----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1908024)									
ES1825639-024	TP3-W11a 0-0.1	EP071: C15 - C28 Fraction	-----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	-----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	-----	50	mg/kg	<50	<50	0.00	No Limit
ES1825639-034	TP4-W2a 0.8-0.9	EP071: C15 - C28 Fraction	-----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	-----	100	mg/kg	<100	<100	0.00	No Limit



Sub-Matrix: SOIL									
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1908024) - continued									
ES1825639-034	TP4-W2a 0.8-0.9	EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1907300)									
ES1825639-001	TP1-W1a 1-1.1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1825639-012	TP2-B1a 0-0.1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1907301)									
ES1825639-024	TP3-W11a 0-0.1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1825639-034	TP4-W2a 0.8-0.9	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1908023)									
ES1825639-001	TP1-W1a 1-1.1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1825639-012	TP2-B1a 0-0.1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1908024)									
ES1825639-024	TP3-W11a 0-0.1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1825639-034	TP4-W2a 0.8-0.9	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 1907300)									
ES1825639-001	TP1-W1a 1-1.1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
		EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC Lot: 1907301)									
ES1825639-024	TP3-W11a 0-0.1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL									
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 1907301) - continued									
ES1825639-024	TP3-W11a 0-0.1	EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1825639-034	TP4-W2a 0.8-0.9	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **WATER**

Sub-Matrix: WATER									
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1908148)									
ES1825663-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1908349)									
ES1825637-006	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1825658-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1908148)									
ES1825663-001	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1908349)									
ES1825637-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1825658-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1908349)									
ES1825637-006	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
ES1825658-004	Anonymous	EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit



Sub-Matrix: WATER									
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report			
EP080: BTEXN (QC Lot: 1908349) - continued						Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ES1825658-004	Anonymous	EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



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

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

Sub-Matrix: SOIL

Method: Compound				Method Blank (MB) Report		Laboratory Control Spike (LCS) Report			
	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1907300)									
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	93.0	68	128	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1907301)									
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	94.8	68	128	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1908023)									
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	108	75	129	
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	110	77	131	
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	103	71	129	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1908024)									
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	93.6	75	129	
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	90.2	77	131	
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	92.0	71	129	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1907300)									
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	98.7	68	128	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1907301)									
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	95.5	68	128	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1908023)									
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	110	77	125	
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	107	74	138	
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	90.5	63	131	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1908024)									
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	90.7	77	125	
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	90.3	74	138	
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	97.3	63	131	
EP080: BTEXN (QCLot: 1907300)									
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	97.4	62	116	
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	94.4	67	121	
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	93.7	65	117	
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	94.8	66	118	
	106-42-3								
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	97.7	68	120	
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	94.4	63	119	
EP080: BTEXN (QCLot: 1907301)									
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	99.8	62	116	

Sub-Matrix: SOIL

Method: Compound		Method Blank (MB) Report		Laboratory Control Spike (LCS) Report			
CAS Number	LOR	Unit	Result	Spike Concentration		Spike Recovery (%)	
						Low	High
EP080: BTEXN (QCLot: 1907301) - continued							
EP080: Toluene	0.5	mg/kg	<0.5		1 mg/kg	102	67
EP080: Ethylbenzene	0.5	mg/kg	<0.5		1 mg/kg	101	65
EP080: meta- & para-Xylene	0.5	mg/kg	<0.5		2 mg/kg	102	66
							118
EP080: ortho-Xylene	0.5	mg/kg	<0.5		1 mg/kg	105	68
EP080: Naphthalene	1	mg/kg	<1		1 mg/kg	94.7	63
							119

Sub-Matrix: WATER

Sub-Matrix: WATER										
Method: Compound		CAS Number	LOR	Unit	Method Blank (MB) Report		Laboratory Control Spike (LCS) Report			
					Result		Spike Concentration	Spike Recovery (%)		
								Low	High	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1908148)										
EP071: C10 - C14 Fraction				50	µg/L	<50	2000 µg/L	98.3	76	116
EP071: C15 - C28 Fraction				100	µg/L	<100	3000 µg/L	87.8	83	109
EP071: C29 - C36 Fraction				50	µg/L	<50	2000 µg/L	98.5	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1908349)										
EP080: C6 - C9 Fraction				20	µg/L	<20	260 µg/L	90.2	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1908148)										
EP071: >C10 - C16 Fraction				100	µg/L	<100	2500 µg/L	90.0	76	114
EP071: >C16 - C34 Fraction				100	µg/L	<100	3500 µg/L	103	81	111
EP071: >C34 - C40 Fraction				100	µg/L	<100	1500 µg/L	95.7	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1908349)										
EP080: C6 - C10 Fraction				20	µg/L	<20	310 µg/L	91.7	75	127
EP080: BTEXN (QCLot: 1908349)										
EP080: Benzene				71-43-2	1	<1	10 µg/L	90.4	70	122
EP080: Toluene				108-88-3	2	<2	10 µg/L	91.9	69	123
EP080: Ethylbenzene				100-41-4	2	<2	10 µg/L	92.3	70	120
EP080: meta- & para-Xylene				108-38-3	2	<2	10 µg/L	89.7	69	121
				106-42-3						
EP080: ortho-Xylene				95-47-6	2	<2	10 µg/L	94.8	72	122
EP080: Naphthalene				91-20-3	5	<5	10 µg/L	96.2	70	120

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL

Sub-Matrix: SOIL						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report		
				Spike Concentration	SpikeRecovery(%)	Recovery Limits (%)
					MS	Low High
EP080/071: Total Petroleum Hydrocarbons (QC/Lot: 1907300)						

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	SpikeRecovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1907300) - continued							
ES1825639-001	TP1-W1a 1-1.1	EP080: C6 - C9 Fraction	----	32.5 mg/kg	91.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1907301)							
ES1825639-024	TP3-W11a 0-0.1	EP080: C6 - C9 Fraction	----	32.5 mg/kg	99.0	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1908023)							
ES1825639-001	TP1-W1a 1-1.1	EP071: C10 - C14 Fraction	----	523 mg/kg	116	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	109	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	121	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1908024)							
ES1825639-024	TP3-W11a 0-0.1	EP071: C10 - C14 Fraction	----	523 mg/kg	112	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	114	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	118	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1907300)							
ES1825639-001	TP1-W1a 1-1.1	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	95.1	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1907301)							
ES1825639-024	TP3-W11a 0-0.1	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	103	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1908023)							
ES1825639-001	TP1-W1a 1-1.1	EP071: >C10 - C16 Fraction	----	860 mg/kg	118	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	113	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	102	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1908024)							
ES1825639-024	TP3-W11a 0-0.1	EP071: >C10 - C16 Fraction	----	860 mg/kg	105	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	111	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	116	52	132
EP080: BTEXN (QCLot: 1907300)							
ES1825639-001	TP1-W1a 1-1.1	EP080: Benzene	71-43-2	2.5 mg/kg	84.3	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	89.2	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	85.4	70	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	85.4	70	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	86.4	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	84.1	70	130
EP080: BTEXN (QCLot: 1907301)							
ES1825639-024	TP3-W11a 0-0.1	EP080: Benzene	71-43-2	2.5 mg/kg	91.7	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	92.4	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	94.3	70	130



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL

Laboratory sample ID		Client sample ID	Method: Compound	CAS Number	Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%)		
EP080: BTEXN (QCLot: 1907301) - continued								Low	High
ES1825639-024		TP3-W11a 0-0.1	EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	93.6	70	130	
				106-42-3					
			EP080: ortho-Xylene	95-47-6	2.5 mg/kg	97.3	70	130	
			EP080: Naphthalene	91-20-3	2.5 mg/kg	88.7	70	130	
Sub-Matrix: WATER									
Laboratory sample ID		Client sample ID	Method: Compound	CAS Number	Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%)		
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1908148)								Low	High
ES1825663-002		Anonymous	EP071: C10 - C14 Fraction	----	200 µg/L	128	74	150	
			EP071: C15 - C28 Fraction	----	300 µg/L	107	77	153	
			EP071: C29 - C36 Fraction	----	200 µg/L	107	67	153	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1908349)									
ES1825637-006		Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	101	70	130	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1908148)									
ES1825663-002		Anonymous	EP071: >C10 - C16 Fraction	----	250 µg/L	128	74	150	
			EP071: >C16 - C34 Fraction	----	350 µg/L	108	77	153	
			EP071: >C34 - C40 Fraction	----	150 µg/L	98.3	67	153	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1908349)									
ES1825637-006		Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	101	70	130	
EP080: BTEXN (QCLot: 1908349)									
ES1825637-006		Anonymous	EP080: Benzene	71-43-2	25 µg/L	94.9	70	130	
			EP080: Toluene	108-88-3	25 µg/L	91.4	70	130	
			EP080: Ethylbenzene	100-41-4	25 µg/L	94.0	70	130	
			EP080: meta- & para-Xylene	108-38-3	25 µg/L	93.0	70	130	
				106-42-3					
			EP080: ortho-Xylene	95-47-6	25 µg/L	93.2	70	130	
		EP080: Naphthalene	91-20-3	25 µg/L	91.0	70	130		



Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order : ES1825639

Page

: 1 of 7

Client : AARGUS PTY LTD
Contact : MR MARK KELLY
Project : ES7280/2 Remediation Validation
Site : Belfield
Sampler : NZ
Order number :

Laboratory

: Environmental Division Sydney

Telephone

: +61-2-8784 8555

Date Samples Received

: 29-Aug-2018

Issue Date

: 05-Sep-2018

No. of samples received

: 38

No. of samples analysed

: 38

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- NO Method Blank value outliers occur.
- NO Duplicate outliers occur.
- NO Laboratory Control outliers occur.
- NO Matrix Spike outliers occur.
- For all regular sample matrices, NO surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- NO Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- NO Quality Control Sample Frequency Outliers exist.



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results. This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein. Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters. Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: SOIL

Method		Sample Date	Extraction / Preparation		Analysis		
Container / Client Sample ID(s)	Date extracted		Due for extraction	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
TP1-W1a - 1-1.1, TP1-W7a - 1-1.1, TP2-W1a - 0-0.1, TP2-W3a - 0-0.1, TP2-W5a - 0-0.1, TP2-B1a - 0-0.1, TP2-B3a - 0-0.1, TP4-W1a, TP3-W3a - 0.8-0.9, TP3-W5a - 0.8-0.9, TP3-W7a - 0.8-0.9, TP3-W11a - 0-0.1, TP3-W13a - 0.8-0.9, TP3-W16a - 0.8-0.9, TP3-B2a - 0-0.1, TP3-B4a - 0-0.1, TP2-D2	TP1-W5a - 1-1.1, TP1-W8a - 1-1.1, TP2-W2a - 0-0.1, TP2-W4a - 0-0.1, TP2-W12a - 0.9-1.0, TP2-B2a - 0-0.1, TP3-W2a - 0.8-0.9, TP3-W4a - 0.8-0.9, TP3-W6a - 0.8-0.9, TP3-W9a - 0-0.1, TP3-W12a - 0-0.1, TP3-W14a - 0.8-0.9, TP3-B1a - 0-0.1, TP1-D2, TP3-B3a - 0-0.1, TP4-W2a - 0.8-0.9, TP4-B1a - 0-0.1,	28-Aug-2018	-----	-----	31-Aug-2018	11-Sep-2018	✓



Matrix: SOIL

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

Method	Sample Date	Extraction / Preparation		Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Due for analysis
EP080/071: Total Petroleum Hydrocarbons					
Soil Glass Jar - Unpreserved (EP071)					
TP3-W11a - 0-0.1, TP3-W13a - 0.8-0.9, TP3-W16a - 0.8-0.9, TP3-B2a - 0-0.1, TP3-B4a - 0-0.1, TP4-W2a - 0.8-0.9, TP1-D2,	28-Aug-2018	03-Sep-2018	11-Sep-2018	✓	13-Oct-2018
TP3-W12a - 0-0.1, TP3-W14a - 0.8-0.9, TP3-B1a - 0-0.1, TP3-B3a - 0-0.1, TP4-W1a, TP4-B1a - 0-0.1, TP2-D2					✓
Soil Glass Jar - Unpreserved (EP071)					
TP1-W1a - 1-1.1, TP1-W7a - 1-1.1, TP2-W1a - 0-0.1, TP2-W3a - 0-0.1, TP2-W5a - 0-0.1, TP2-B1a - 0-0.1, TP2-B3a - 0-0.1, TP3-W3a - 0.8-0.9, TP3-W5a - 0.8-0.9, TP3-W7a - 0.8-0.9,	28-Aug-2018	31-Aug-2018	11-Sep-2018	✓	10-Oct-2018
TP1-W5a - 1-1.1, TP1-W8a - 1-1.1, TP2-W2a - 0-0.1, TP2-W4a - 0-0.1, TP2-W12a - 0.9-1.0, TP2-B2a - 0-0.1, TP3-W2a - 0.8-0.9, TP3-W4a - 0.8-0.9, TP3-W6a - 0.8-0.9, TP3-W9a - 0-0.1					✓
Soil Glass Jar - Unpreserved (EP080)					
TP1-W1a - 1-1.1, TP1-W7a - 1-1.1, TP2-W1a - 0-0.1, TP2-W3a - 0-0.1, TP2-W5a - 0-0.1, TP2-B1a - 0-0.1, TP2-B3a - 0-0.1, TP4-W1a, TP3-W3a - 0.8-0.9, TP3-W5a - 0.8-0.9, TP3-W7a - 0.8-0.9, TP3-W11a - 0-0.1, TP3-W13a - 0.8-0.9, TP3-W16a - 0.8-0.9, TP3-B2a - 0-0.1, TP3-B4a - 0-0.1, TP2-D2, Trip Spike 3, Trip Spike Control	28-Aug-2018	31-Aug-2018	11-Sep-2018	✓	11-Sep-2018
TP1-W5a - 1-1.1, TP1-W8a - 1-1.1, TP2-W2a - 0-0.1, TP2-W4a - 0-0.1, TP2-W12a - 0.9-1.0, TP2-B2a - 0-0.1, TP3-W2a - 0.8-0.9, TP3-W4a - 0.8-0.9, TP3-W6a - 0.8-0.9, TP3-W9a - 0-0.1, TP3-W14a - 0.8-0.9, TP3-B1a - 0-0.1, TP1-D2, TP3-B3a - 0-0.1, TP4-W2a - 0.8-0.9, TP4-B1a - 0-0.1, Trip Blank 3,					✓



Matrix: SOIL

Method		Sample Date	Extraction / Preparation		Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Due for analysis
Evaluation: ✖ = Holding time breach ; ✔ = Within holding time						
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions						
Soil Glass Jar - Unpreserved (EP071)						
TP3-W11a - 0-0.1, TP3-W13a - 0.8-0.9, TP3-W16a - 0.8-0.9, TP3-B1a - 0-0.1, TP3-B3a - 0-0.1, TP3-B4a - 0-0.1, TP4-W2a - 0.8-0.9, TP1-D2,	TP3-W12a - 0-0.1, TP3-W14a - 0.8-0.9, TP3-B1a - 0-0.1, TP3-B3a - 0-0.1, TP4-W1a, TP4-B1a - 0-0.1, TP2-D2	28-Aug-2018	03-Sep-2018	11-Sep-2018	✔	04-Sep-2018 13-Oct-2018
Soil Glass Jar - Unpreserved (EP071)						
TP1-W1a - 1-1.1, TP1-W7a - 1-1.1, TP2-W1a - 0-0.1, TP2-W3a - 0-0.1, TP2-W5a - 0-0.1, TP2-B1a - 0-0.1, TP2-B3a - 0-0.1, TP3-W3a - 0.8-0.9, TP3-W5a - 0.8-0.9, TP3-W7a - 0.8-0.9,	TP1-W5a - 1-1.1, TP1-W8a - 1-1.1, TP2-W2a - 0-0.1, TP2-W4a - 0-0.1, TP2-W12a - 0.9-1.0, TP2-B2a - 0-0.1, TP3-W2a - 0.8-0.9, TP3-W4a - 0.8-0.9, TP3-W6a - 0.8-0.9, TP3-W9a - 0-0.1	28-Aug-2018	31-Aug-2018	11-Sep-2018	✔	04-Sep-2018 10-Oct-2018
Soil Glass Jar - Unpreserved (EP080)						
TP1-W1a - 1-1.1, TP1-W7a - 1-1.1, TP2-W1a - 0-0.1, TP2-W3a - 0-0.1, TP2-W5a - 0-0.1, TP2-B1a - 0-0.1, TP2-B3a - 0-0.1, TP4-W1a, TP3-W3a - 0.8-0.9, TP3-W5a - 0.8-0.9, TP3-W7a - 0.8-0.9, TP3-W11a - 0-0.1, TP3-W13a - 0.8-0.9, TP3-W16a - 0.8-0.9, TP3-B2a - 0-0.1, TP3-B4a - 0-0.1, TP2-D2, Trip Spike 3, Trip Spike Control	TP1-W5a - 1-1.1, TP1-W8a - 1-1.1, TP2-W2a - 0-0.1, TP2-W4a - 0-0.1, TP2-W12a - 0.9-1.0, TP2-B2a - 0-0.1, TP3-W2a - 0.8-0.9, TP3-W4a - 0.8-0.9, TP3-W6a - 0.8-0.9, TP3-W9a - 0-0.1, TP3-W12a - 0-0.1, TP3-W14a - 0.8-0.9, TP3-B1a - 0-0.1, TP1-D2, TP3-B3a - 0-0.1, TP4-W2a - 0.8-0.9, TP4-B1a - 0-0.1, Trip Blank 3,	28-Aug-2018	31-Aug-2018	11-Sep-2018	✔	31-Aug-2018 11-Sep-2018



Matrix: SOIL

Method		Container / Client Sample ID(s)	Sample Date	Extraction / Preparation		Analysis		
				Date extracted	Due for extraction	Date analysed	Due for analysis	
EP080: BTEXN								
Soil Glass Jar - Unpreserved (EP080)								
TP1-W1a - 1-1.1, TP1-W7a - 1-1.1, TP2-W1a - 0-0.1, TP2-W3a - 0-0.1, TP2-W5a - 0-0.1, TP2-B1a - 0-0.1, TP2-B3a - 0-0.1, TP4-W1a, TP3-W3a - 0-0.9, TP3-W5a - 0-0.9, TP3-W7a - 0-0.9, TP3-W11a - 0-0.1, TP3-W13a - 0-0.9, TP3-W16a - 0-0.9, TP3-B2a - 0-0.1, TP3-B4a - 0-0.1, TP2-D2, Trip Spike 3, Trip Spike Control			28-Aug-2018	31-Aug-2018	11-Sep-2018	31-Aug-2018	11-Sep-2018	✓
TP1-W5a - 1-1.1, TP1-W8a - 1-1.1, TP2-W2a - 0-0.1, TP2-W4a - 0-0.1, TP2-W12a - 0-0.1, TP2-B2a - 0-0.1, TP3-W2a - 0-0.9, TP3-W4a - 0-0.9, TP3-W6a - 0-0.9, TP3-W9a - 0-0.1, TP3-W12a - 0-0.1, TP3-W14a - 0-0.9, TP3-B1a - 0-0.1, TP1-D2, TP3-B3a - 0-0.1, TP4-W2a - 0-0.9, Trip Blank 3,								

Matrix: WATER

Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation		Analysis			
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
R3		28-Aug-2018	31-Aug-2018	04-Sep-2018	✓	03-Sep-2018	10-Oct-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
R3		28-Aug-2018	31-Aug-2018	11-Sep-2018	✓	31-Aug-2018	11-Sep-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
R3		28-Aug-2018	31-Aug-2018	04-Sep-2018	✓	03-Sep-2018	10-Oct-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
R3		28-Aug-2018	31-Aug-2018	11-Sep-2018	✓	31-Aug-2018	11-Sep-2018	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
R3		28-Aug-2018	31-Aug-2018	11-Sep-2018	✓	31-Aug-2018	11-Sep-2018	✓

Waste Analysis & Classification Report

6 – 14 Walker Street, Rhodes NSW

Prepared for: N. Moit & Sons (NSW) Pty Ltd

MOI-25-14555 / WAC1
v1. final
24th July 2018



ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION



WASTE ANALYSIS AND CLASSIFICATION REPORT
MOI-25-14555 / WAC1 / v1 final

1. INTRODUCTION

1.1. Background

ADE Consulting Group Pty Ltd (ADE) was commissioned by N. Moits & Sons (NSW) Pty Ltd (the Client) to undertake a Waste Analysis and Classification Assessment of the in-situ virgin soil materials within the subject area at 6 – 14 Walker Street, Rhodes New South Wales (NSW) (the Site) (*refer to Appendix I – Aerial Photograph*).

1.2. Site Information

Table 1. Summary of Site Information and Project Information.

Site Project Details	
Client:	N. Moits & Sons (NSW) Pty Ltd
ADE Project No:	MOI-25-14555 / WAC1 / v1 final
Site Address:	6 – 14 Walker Street, Rhodes NSW
Subject Area:	Moits Civil Site, virgin soil materials from proposed excavation areas, occurring from the current ground level (between 10-15 m below the original ground level) to a further 17 m below the current ground level (<i>refer to Appendix I – Aerial Photograph</i>).
Date of Field Work:	23.07.2018
Date of Report:	24.07.2018
Volume of Material:	Approximate area 9, 700m ² / volume 170,000 m ³
Sample Size:	Sixteen (16) samples for chemical characterisation.
Material Matrix:	Virgin soil materials generally consisted of: SHALE: dark grey, slightly moist. Foreign materials, paint chips, sulfidic ores, hydrocarbon odours / staining and Asbestos Containing Materials (ACM) were not observed in any of the materials inspected (<i>refer to Appendix II - Photographs</i>).

2. OBJECTIVES

The objective of the works issued to ADE by the Client was to classify the virgin soil materials from proposed excavation areas across the Site in accordance with the NSW Environment Protection Authority (EPA) *Waste Classification Guidelines, Part 1: Classifying Waste* (2014) for off-site disposal.

The Protection of the Environment Operations Act 1997 (POEO Act) defines Virgin Excavated Natural Material (VENM) as:

'Natural material (such as clay, gravel, sand, soil or soil fines):

- Excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities;
- Does not contain any sulfidic ores or soils or any other waste; and
- Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved for the time being pursuant to an EPA Gazettal notice.'

VENM is a waste that has been pre-classified as general solid waste (non-putrescible).

3. SCOPE OF WORK

The scope of work required to achieve the objectives of the investigation involved the following:

- Completion of a Safety, Health & Environment Work Method Statement prior to undertaking works;
- Inspection of the subject area;
- Collection of discrete soil samples for chemical characterisation of the soil materials;
- Cold storage of all samples collected;
- Submission of collected samples under Chain of Custody (CoC) conditions to a National Association of Testing Authorities (NATA) accredited laboratory for analysis;
- Laboratory analysis of samples for Heavy Metals – Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc (Heavy Metals), Total Recoverable Hydrocarbons (TRHs), Benzene, Toluene, Ethylbenzene, and Xylene (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs), Organophosphorus Pesticides (OPPs), Organochlorine Pesticides (OCPs), Polychlorinated Biphenyls (PCBs), and Potential Hydrogen (pH).
- Evaluation of results in accordance with assessment criteria outlined in the New South Wales Environment Protection Authority (NSW EPA) *Waste Classification Guidelines. Part 1: Classifying Waste* (2014); and
- Preparation of a report outlining the investigation methodology, interpretation of the site data (results), classification and conclusions.

4. PRELIMINARY DESKTOP STUDY

4.1. Proposed Excavation Works, Former Waste Classification Reports and Anecdotal Information

ADE was advised by the Client that the total volume of material to be excavated was approximately 170,000 m³. The subject area covers an area of approximately 9,700 m², occurring from the current ground level (between 10-15 m below the original ground level) to a further 17 m below the current ground level.

This report should be read in conjunction with the previous waste classification report undertaken on overlying VENM clays and shale:

- Waste Analysis and Classification Report – 6 – 14 Walker Street, Rhodes NSW. Ref: MOI-25-13135 / WAC1 / v1 final, dated 17th November 2017. Prepared for N. Moits & Sons (NSW) Pty Ltd (ADE 2017).

This report was undertaken at the request of the Client to fulfil the required sampling density for the remaining

volume of VENM shale to be removed from Site to allow importation into the site known as Penrith Lakes (Penrith Lakes Development Corporation, 89-151 Old Castlereagh Road, Castlereagh, NSW 2749). Based on the remaining volume provided to ADE by the Client of 170,000 m³, a further sixteen (16) soil samples were taken from the Site.

4.2. Acid Sulfate Soils

A review of the Department of Land and Water Conservation NSW Acid Sulfate Soil Risk Maps – Edition Two (DLWC, 1997) was undertaken to determine the potential for Acid Sulfate Soil (ASS) at the site. The Site was identified as 'No Known Occurrence' with regards to ASS risk (*refer to Appendix III – Supporting Documents*). No visual (staining) or olfactory (odours) indicators for ASS were observed in any of the soil materials inspected.

Previous sampling for ASS done by ADE in the former VENM report for the site did not identify any ASS/PASS at the Site (ADE 2017).

4.3. NSW EPA Contaminated Land Register

A review of the 'List of Contaminated Sites notified to the EPA' listed by the NSW EPA under the Contaminated Land Management Act 1997 identifies five (5) notices within the Site's suburb of Rhodes.

A review of the NSW Office of Environment and Heritage (OEH) 'Contaminated Land – Record of Notices' listed by the NSW EPA under the Contaminated Land Management Act 1997 identifies sixty-nine (69) former and eight (8) current notices relating to the suburb of Rhodes. Notices pertaining to a former Allied Fields factory and Union Carbide factory were identified within 500 m of the Site. These notices identify the dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) as a contaminant having previously affected these Sites.

No olfactory or visual signs of contamination were noted, nor any PCBs detected in the soil samples collected on the 9th of November 2017. As such, ADE does not consider it necessary to include dioxin compounds in the scope of analysis.

5. SAMPLING PLAN, METHODOLOGY, FIELD INVESTIGATIONS AND INVESTIGATION PATTERN

5.1. Scope of Analysis

Based on anecdotal evidence and review of The Department of Land and Water Conservation – Acid Sulfate Soil Risk Map, Edition 2 and the NSW Contaminated Land Register, the following suite of analytes has been included within the scope of analysis:

- Heavy Metals;
- TRHs;
- PAHs;
- BTEX;
- PCBs;
- OCPs;
- OPPs; and
- pH.

5.2. Sampling Plan

ADE was advised by the Client that the subject virgin material would be exported to Penrith Development Corporation. Therefore, ADE reviewed the VENM minimum sampling density, as prescribed in the Penrith Lakes Importation Protocol to determine appropriate sampling density for the receiving facility (DLA 2016).

A total of sixteen (16) discrete samples from sixteen (16) sampling locations were collected for Waste Analysis and Classification on Monday 23rd July 2018.

Table 2. Minimum sampling density for assessment of the subject area in accordance with DLA (2016).

Approximate Material Volume Criteria (m ³)	Number of Sampling Points Recommended	Approximate Material Volume of the Subject Area (m ³)	Number of Sampling Points Undertaken
1,000	4	170,000	16
2,000	5		
4,000	6		
8,000	7		
15,000	8		
30,000	9		
50,000	10		
70,000	11		
90,000	12		
110,000	13		
130,000	14		
150,000	15		
170,000	16		

5.3. Equipment Decontamination

All sampling equipment comprised of dedicated disposable materials (e.g. nitrile gloves) which were changed between each sample. As such, additional decontamination procedures were not deemed necessary. All disposable sampling equipment and rubbish was collected and removed prior to leaving Site.

New South Wales Office:

ADE Consulting Group Pty Ltd
Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

Victoria Office:

ADE Consulting Group Pty Ltd
Unit 4 / 95 Salmon Street
Port Melbourne, VIC 3207

Telephone:

NSW: (02) 8541 7214
VIC: 1300 796 922

Internet:

site: ade.group
e-mail: info@ADenvirotech.com.au

ABN:

14 617 358 808

5.4. Documentation

A field observation log was kept by sampling personnel. Details recorded in the log included:

- Location and sample number;
- Soil profile notes;
- Sampling method;
- Sample identification;
- Sample description; and
- Sample point measurements.

A comprehensive master sample register was maintained. As samples were received, they were given a unique sequential number from the sample register into which details from the labels were entered. Before packing and dispatch of samples for analysis, a CoC form was completed (*refer to Appendix V – Chain of Custody*). This form recorded details of the individual samples being dispatched and the type of analysis required for each sample.

5.5. Sampling and Laboratory Submission

Test pits were completed throughout the subject area with an excavator provided by the Client, with samples collected at a depth between 0.3 m to 0.5 m BGL. **Table 3** on the following page provides a summary of the soil materials observed within each test pit of the subject area.

Field activities were conducted by an experienced Environmental Consultant. The samples were placed in sterile glass jars with Teflon lined lids. The samples were transferred to a cooler box which contained ice packs (or equivalent) present in order to maintain the samples at a temperature below approximately 4 °C.

The following outlines the NATA accredited laboratories used for analytical testing:

- Samples collected by ADE on the 23rd July 2018 for analysis of Heavy Metals, PAHs, TRHs, OCPs, OPPs, PCBs, BTEX, and pH were submitted to Sydney Laboratory Services (SLS).

Copies of the completed CoC forms were retained on the Central Filing System and the original was sent to the analytical laboratory together with the samples.

Table 3. Summary of Virgin Soil Samples Collected.

Sample No. (refer to Appendix I – Aerial Photograph)	Sample I.D.	Sample Type	Sample Description	Depth of Sample (m) (BGL)
Test Pit 1	WAC1-TP1	Soil (chemical analysis)	SHALE: dark grey, slightly moist	0.3
Test Pit 2	WAC1-TP2			0.4
Test Pit 3	WAC1-TP3			0.3
Test Pit 4	WAC1-TP4			0.4
Test Pit 5	WAC1-TP5			0.3
Test Pit 6	WAC1-TP6			0.3
Test Pit 7	WAC1-TP7			0.4
Test Pit 8	WAC1-TP8			0.3
Test Pit 9	WAC1-TP9			0.3
Test Pit 10	WAC1-TP10			0.4
Test Pit 11	WAC1-TP11			0.3
Test Pit 12	WAC1-TP12			0.3
Test Pit 13	WAC1-TP13			0.3
Test Pit 14	WAC1-TP14			0.4
Test Pit 15	WAC1-TP15			0.3
Test Pit 16	WAC1-TP16			0.3

5.6. Limitations of Field Investigation

The information in this report relates to the virgin soil materials from the subject area only. Any materials outside of the subject area or any overlying fill materials are not included within the scope of this report. If there are any unexpected finds that are not consistent with this classification, please contact ADE immediately on (02) 8541 7214.

6. SUMMARY OF RESULTS

6.1. Summary of Field Observations

Virgin soil materials generally consisted of: SHALE: dark grey, slightly moist. Foreign materials, paint chips, sulfidic ores, hydrocarbon odours / staining and ACM were not observed in any of the materials inspected (*refer to Appendix II - Photographs*).

Following visual inspection of the soil materials and surrounding site, the scope of analysis for soil samples listed in Section 5.1 of this report was considered adequate at the time of inspection.

6.2. Virgin Excavated Natural Material (VENM) Assessment

The details of the analytical results are summarised in **Table 4** below. Refer to *Appendix IV – Analytical Reports* for individual sample results.

Table 4. Summary of Analytical Results – VENM.

Site Assessment Criteria (SAC)				Results		Conclusion
Analytes	Maximum Values of Total Concentration Assigned for General Solid Waste CT1/CT2, mg/kg	Maximum Values of Total Concentration Assigned for General Solid Waste TCLP1 (mg/L)/ SCC1 (mg/kg)	Background Ranges ¹	Maximum Total Concentration Detected, (mg/kg)	Average Total Concentration detected, (mg/kg)	Virgin Excavated Natural Material (VENM)
Metals						
Arsenic	100/400	5/500	1-50	9	7	Acceptable
Cadmium	20/80	1/100	1	ND	ND	Acceptable
Chromium	100/400	5/1900	5-1000	9	7	Acceptable
Copper	NA	NA	2-100	59	29	Acceptable
Lead	100/400	5/1500	2-200	29	18	Acceptable
Mercury	4/16	0.2/50	0.03	ND	ND	Acceptable
Nickel	40/160	2/1050	5-500	32	17	Acceptable*
Zinc	NA	NA	10-300	110	61	Acceptable
TRHs						
TRH Fraction C ₆ – C ₁₀	NA	NA/650	-	ND	ND	Acceptable
TRH Fraction C ₁₀ – C ₄₀	NA	NA/10000	-	71	66	Acceptable*
TRH Fraction C ₁₀ -C ₁₆	NA	NA	-	71	66	Acceptable*
TRH Fraction C ₁₆ -C ₃₄	NA	NA	-	ND	ND	Acceptable
TRH Fraction C ₃₄ -C ₄₀	NA	NA	-	ND	ND	Acceptable
OCPs						
DDT + DDD + DDE	NA	NA	-	ND	ND	Acceptable
Aldrin + Dieldrin	NA	NA	-	ND	ND	Acceptable
Chlordane	NA	NA	-	ND	ND	Acceptable
Endosulfan ²	60/240	3/108	-	ND	ND	Acceptable
BTEX						
Benzene	10/40	0.5/18	-	ND	ND	Acceptable
Toluene	288/1152	14.4/518	-	ND	ND	Acceptable
Ethyl-benzene	600/2400	30/1080	-	ND	ND	Acceptable
Xylenes (total)	1000/4000	50/1800	-	ND	ND	Acceptable
PCBs						
Total PCBs	50/50	NA/50	-	ND	ND	Acceptable
PAHs						
PAH total	NA	NA/200	-	ND	ND	Acceptable
Benzo(a)pyrene	0.8/3.2	0.04/10	-	ND	ND	Acceptable
Other						
pH	-	-	-	9.5	8.8	Acceptable*

Notes to Table

ND – Not detected/below Practical Quantitation Limit (PQL)

NA – Not Applicable

1 – Background ranges, are taken from *The Field Geologist's Manual* (3rd ed.) (Berkman, 1989).

2 – Endosulfan (CAS Registry Number 115-29-7) means the total of Endosulfan I (CAS Registry Number 959-98-8), Endosulfan II (CAS Registry Number 891-86-1) and Endosulfansulfate (CAS Registry Number 10.31-07-8).

*Refer to results discussion on the following page.

New South Wales Office:

ADE Consulting Group Pty Ltd
Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

Victoria Office:

ADE Consulting Group Pty Ltd
Unit 4 / 95 Salmon Street
Port Melbourne, VIC 3207

Telephone:

NSW: (02) 8541 7214
VIC: 1300 796 922

Internet:

site: ade.group
e-mail info@ADenvirotech.com.au

ABN:

14 617 358 808

6.3. TRH Results Discussion

Samples collected were generally observed to be below the limit of reporting (LOR) (refer to *Appendix IV – Analytical Reports*), with the exception of the following:

- WAC1.TP4 collected from Shale returned a concentration of TRH Fraction C10-C16 at 71 mg/kg;
- WAC1.TP14 collected from Shale returned a concentration of TRH Fraction C10-C16 at 63 mg/kg; and
- WAC1.TP16 collected from Shale returned a concentration of TRH Fraction C10-C16 at 63 mg/kg.

ADE had previously undertaken an investigation of the overlying VENM material within the subject area (ADE 2017). The soil materials within ADE (2017) were reported to consist of shale, fine grained, poorly graded, dark grey, brittle with ironstone bands, dry. The material extended from the surface to a maximum depth of 10 m BGL. No visual staining or hydrocarbon odours indicative of contamination were observed in any samples collected.

Given that no contamination was identified within the overlying virgin shale material previously classified, ADE concluded that the minor exceedance detected within the natural shale bedrock can be attributed to naturally occurring hydrocarbons.

The concentrations detected are consistent with concentrations of naturally occurring hydrocarbons highlighted in the publication "*Natural Hydrocarbon Concentrations in Ashfield Shale*" (Halim and Wu, 2009). The results are consistent with the findings presented in the publication. The findings in the publication by (Halim and Wu, 2009) returned value of 60 mg/kg for TPH C10-C14 and 150 mg/kg for TPH C10-C36. The maximum value of TPH C10-C16 in the recovered shale sample WAC1.TP11 was 71 mg/kg.

Following an overview of the results collected over the course of the investigations undertaken and based on the evidence presented, ADE believes that the material is consistent with the definition of VENM and therefore is suitable to be classified as such.

6.4. Nickel Results Discussion

The chemical results for the maximum concentration for Nickel were below the adopted criteria for VENM illustrated in DLA (2016). However, the analytical results for the average concentration for Nickel had a slight exceedance of 2 mg / kg above the adopted criteria of 15 mg/kg illustrated in DLA (2016) (refer to *Table 4*).

ADE believes that these slight exceedances are associated with natural higher concentrations of Nickel within shale rock formations, thus this material is consistent with the definition of VENM and is suitable to be classified as such.

6.5. pH Results Discussion

Based on ADE's experience, the slightly alkaline average pH of the subject materials (pH 8.8) is considered consistent with the Ashfield Shale profile.

6.6. Asbestos Assessment

ACM was not observed throughout the subject area during soil sampling (refer to *Appendix II – Photographs*).

6.7. Local Geology and Soil Landscape

The Site is located on the Blacktown Soil Landscape (9130bt) as indicated on the NSW Office of Environment and Heritage (*refer to Appendix III – Supportive Documents*).

Typical soils found in this landscape include:

- bt1 - Friable brownish-black loam. This is a friable brownish-black loam to clay loam with moderately pedal sub-angular blocky structure and rough-faced porous ped fabric. This material occurs as topsoil (A1 horizon). Peds are well defined sub-angular blocky and range in size from 2mm to 20 mm. Surface condition is friable. Colour is commonly brownish-black but can range from dark reddish-brown to dark yellowish-brown. The pH ranges from slightly acid (pH 5.5) to neutral (pH 7.0). Rounded iron indurated fine gravel-sized shale fragments and charcoal fragments are sometimes present. Roots are common.
- bt2 - Hardsetting brown clay loam. This is a hardsetting brown clay loam to silty clay loam with apedal massive to weakly pedal structure and slowly porous earthy fabric. It commonly occurs as an A2 horizon. Peds when present are weakly developed, sub-angular blocky and are rough faced and porous. They range in size between 20 mm and 50 mm. Colour is commonly dark brown but can range from dark reddish-brown to dark brown. The pH ranges from moderately acid (pH 5.0) to slightly acid (pH 6.5). Platy ironstone gravel-sized shale fragments are common. Charcoal fragments and roots are rarely present.
- bt3 - Strongly pedal, mottled brown light clay. This is a brown light to medium clay with strongly pedal polyhedral or sub angular-blocky structure and smooth-faced dense ped fabric. This material usually occurs as subsoil (B horizon). Texture often increases with depth. Peds range in size from 5 mm to 20 mm. Colour is usually brown but may range from reddish-brown to brown. Red, yellow or grey mottles are commonly present and often become more numerous with depth. The pH ranges from strongly acid (pH 4.5) to slightly acid (pH 6.5). Fine to coarse gravel-sized shale fragments are common and widespread and often occur in stratified bands. Both roots and charcoal fragments are rare.
- bt4 - Light grey plastic mottled clay. This is plastic light grey silty clay to heavy clay with moderately pedal polyhedral to sub-angular blocky structure and smooth-faced dense ped fabric. This material usually occurs as deep subsoil above shale bedrock (B3 or C horizon). Peds range in size from 2 mm to 20 mm. Colour is usually light grey or, less commonly, greyish yellow. Red, yellow or grey mottles are common. The pH ranges from strongly acid (pH 4.0) to moderately acid (pH 5.5). Strongly weathered ironstone concretions and rock fragments are common. Gravel-sized shale fragments and roots are occasionally present. Charcoal fragments are rare.

7. CONCLUSIONS

Based on the data and evidence collected in the course of the investigation, it is the opinion of ADE that:

- The concentrations of Heavy Metals, TRHs, BTEX, PAHs, OCPs, OPPs and PCBs in the soil samples collected from the subject area meet the criteria for classification as 'VENM';
- The material is consistent with the local geology and soil landscape for the area;
- ACM was not observed throughout the subject area during soil sampling;
- Foreign materials, paint chips, sulfidic ores and hydrocarbon odours / staining were not observed in any of the materials inspected;
- The three (3) slight detections of TRH within the natural shale bedrock can be attributed to naturally occurring hydrocarbons within the virgin shale material;
- Based on the slight detections of TRH in the natural shale at the Site, and previously documented evidence of similar concentrations of TRH in Ashfield Shale, ADE believes the material is suitable for classification as VENM. It is at the discretion of the receiving facility to determine the suitability of the material for importation based on site specific requirements;
- The material being excavated and transported off-site for disposal must be from within the subject area shown on the attached figure and must be consistent with the waste description provided. If there are any unexpected finds that are not consistent with this classification, please contact ADE immediately on (02) 8541 7214.

8. WASTE CLASSIFICATION

Material Description:	Virgin soil materials generally consisted of: SHALE: fine grained, poorly graded, dark grey, slightly moist. Foreign materials, paint chips, sulfidic ores, hydrocarbon odours / staining and ACM were not observed in any of the materials inspected (<i>refer to Appendix II - Photographs</i>).
Approximate Volume of Material:	170,000 m ³
Material Classification:	Virgin Excavated Natural Material (VENM)

9. REFERENCES

- ADE Consulting Group (2017). Waste Analysis and Classification, MOI-25-13135 / WAC1 / v.2 final.
- *Assessment of Site Contamination, National Environment Protection (Assessment of Site Contamination) Measure, 1999 (2013 Amendment).*
- Australian Standard AS 4482.1 *Guide to the investigation and sampling of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds*, 2005.
- Australian Standard AS 4482.2 *Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile compounds*, 1999.
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- DLA Environmental (2016). *Penrith Lakes Development Corporation Importation Protocol*. North Sydney, New South Wales.
- *Guidelines for the NSW Site Auditor Scheme*, NSW DEC (NSW DECC), Second Edition, April 2006.
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- *The Field Geologist's Manual*, compiled by D A Berkman, Third Edition 1989. Publisher – The Australian Institute of Mining and Metallurgy.
- *Victorian EPA Industrial Waste Resource Guidelines for Soil Sampling*, 2010.
- *Waste Classification Guidelines - Part 1: Classifying Waste*, NSW EPA, November 2014.

10. LIMITATIONS

This report has been prepared for the exclusive use of the client. ADE has used a degree of care and skill ordinarily exercised in similar investigations by reputable members of the environmental industry in Australia. No other warranty, expressed or implied, is made or intended. No one section or part of a section, of this report should be taken as giving an overall idea of this report. Each section must be read in conjunction with the whole of this report, including its appendices and attachments.

Any other party should satisfy themselves that the scope of work conducted, and report herein meets their specific needs. ADE cannot be held liable for third party reliance on this document, as ADE is not aware of the specific needs of the third party.

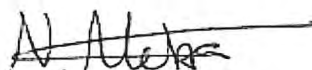
The subsurface environment can present substantial uncertainty due to its complex heterogeneity. The conclusions presented in this report are based on limited investigation of conditions at specific sampling locations chosen to be as representative as possible under the given circumstances. However, it is possible that this investigation may not have encountered all areas of contamination at the site due to the limited sampling and testing program undertaken.

The material subject to classification pertains only to the Site and subject area outlined within the report and must be consistent with the waste description reported. If there are any unexpected finds that are not consistent with this classification, ADE must be notified immediately.

ADE's professional opinions are based upon its professional judgement, experience, training and results from analytical data. In some cases, further testing and analysis may be required, thus producing different results and/or opinions. ADE has limited its investigation to the scope agreed upon with its client.



Reviewed by:
Mathew Toole
Project Manager
M.Sc. (Mar. Sci. & Mgt.)



Written by:
Nikolce Aleksieski
Environmental Consultant
M. Sc. (Environmental & Sustainability)

APPENDIX I – AERIAL PHOTOGRAPH

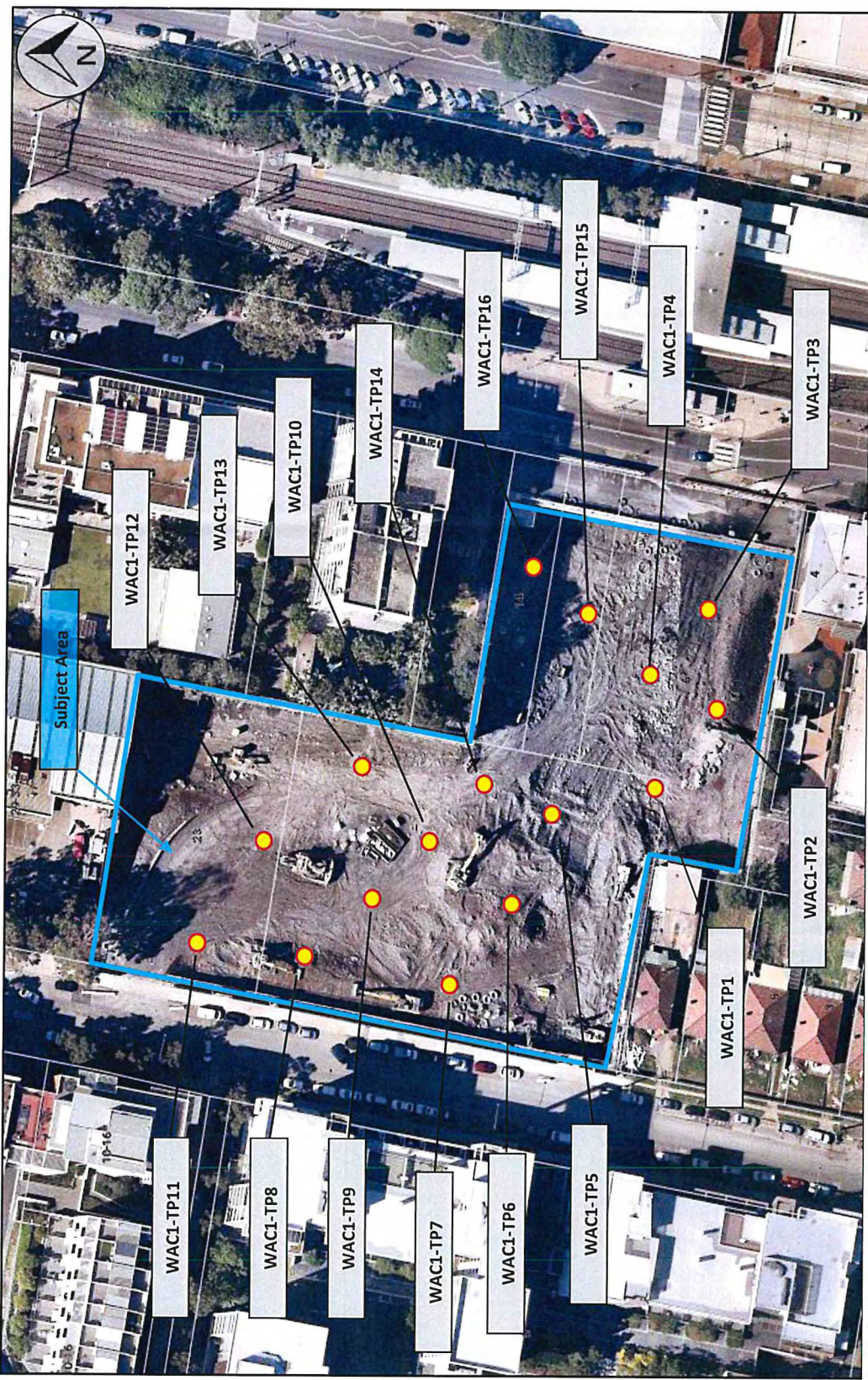
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ADE Consulting Group Pty Ltd
Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

Victoria Office:
ADE Consulting Group Pty Ltd
Unit 4 / 95 Salmon Street
Port Melbourne, VIC 3207

Telephone:
NSW: (02) 8541 7214
VIC: 1300 796 922

Internet:
site: ade.group
e-mail info@ADenvirotech.com.au

ABN:
14 617 358 808



Aerial Photograph 1 - Location of subject area and test pit locations at 6 – 14 Walker Street, Rhodes NSW (adapted from www.nearmap.com.au/, accessed 23.07.2018).

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APPENDIX II – PHOTOGRAPHS

New South Wales Office:
ADE Consulting Group Pty Ltd
Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

Victoria Office:
ADE Consulting Group Pty Ltd
Unit 4 / 95 Salmon Street
Port Melbourne, VIC 3207

Telephone:
NSW: (02) 8541 7214
VIC: 1300 796 922

Internet:
site: ade.group
e-mail info@ADenvirotech.com.au

ABN:
14 617 358 808



Photograph 1. Representative photograph of subject area (facing south). Date: 23.07.2018.



Photograph 2. Representative photograph of shale material observed within the subject area. Date: 23.07.2018.

New South Wales Office:
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Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

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ABN:
14 617 358 808

APPENDIX III – SUPPORTING DOCUMENTS

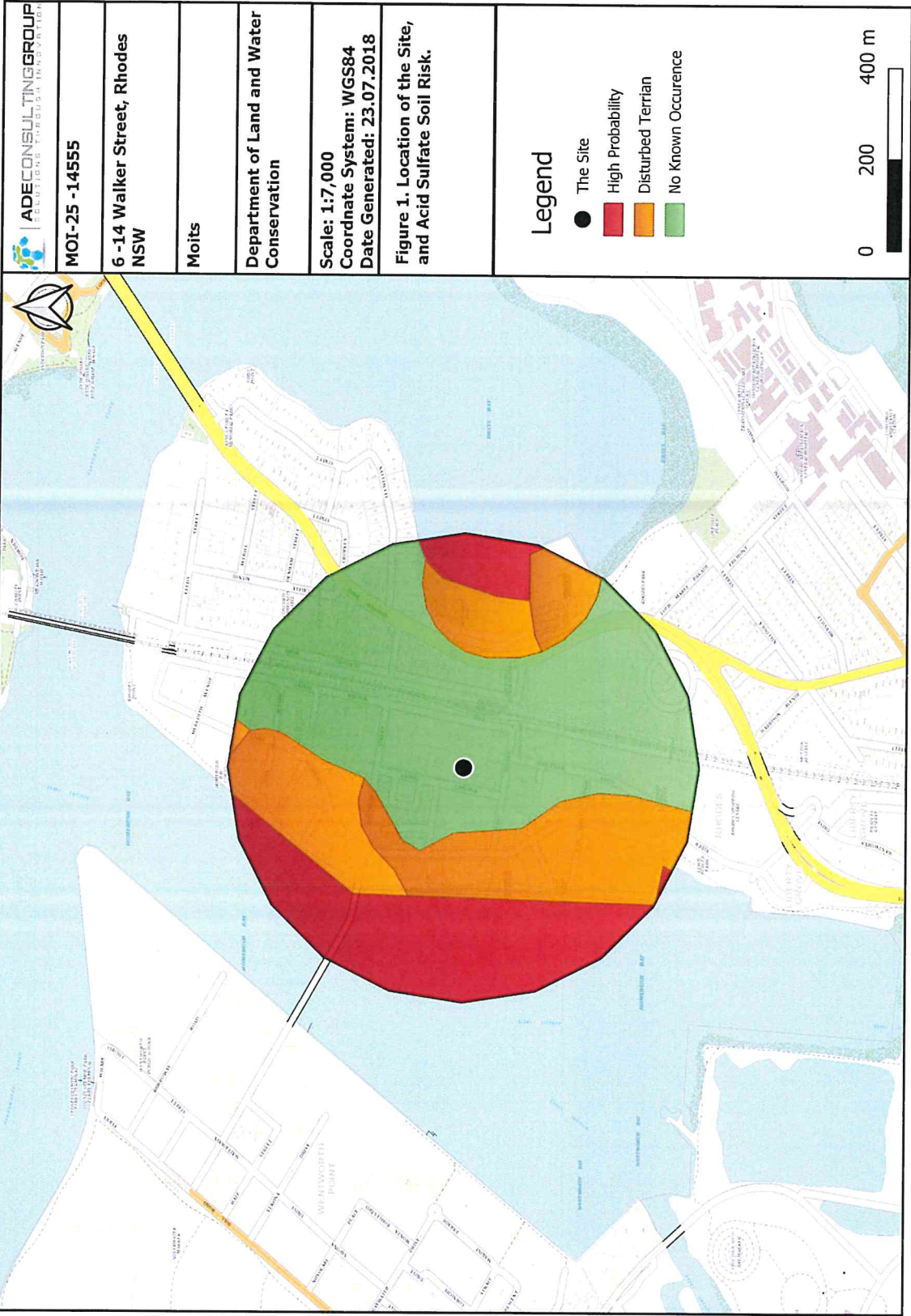
New South Wales Office:
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Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

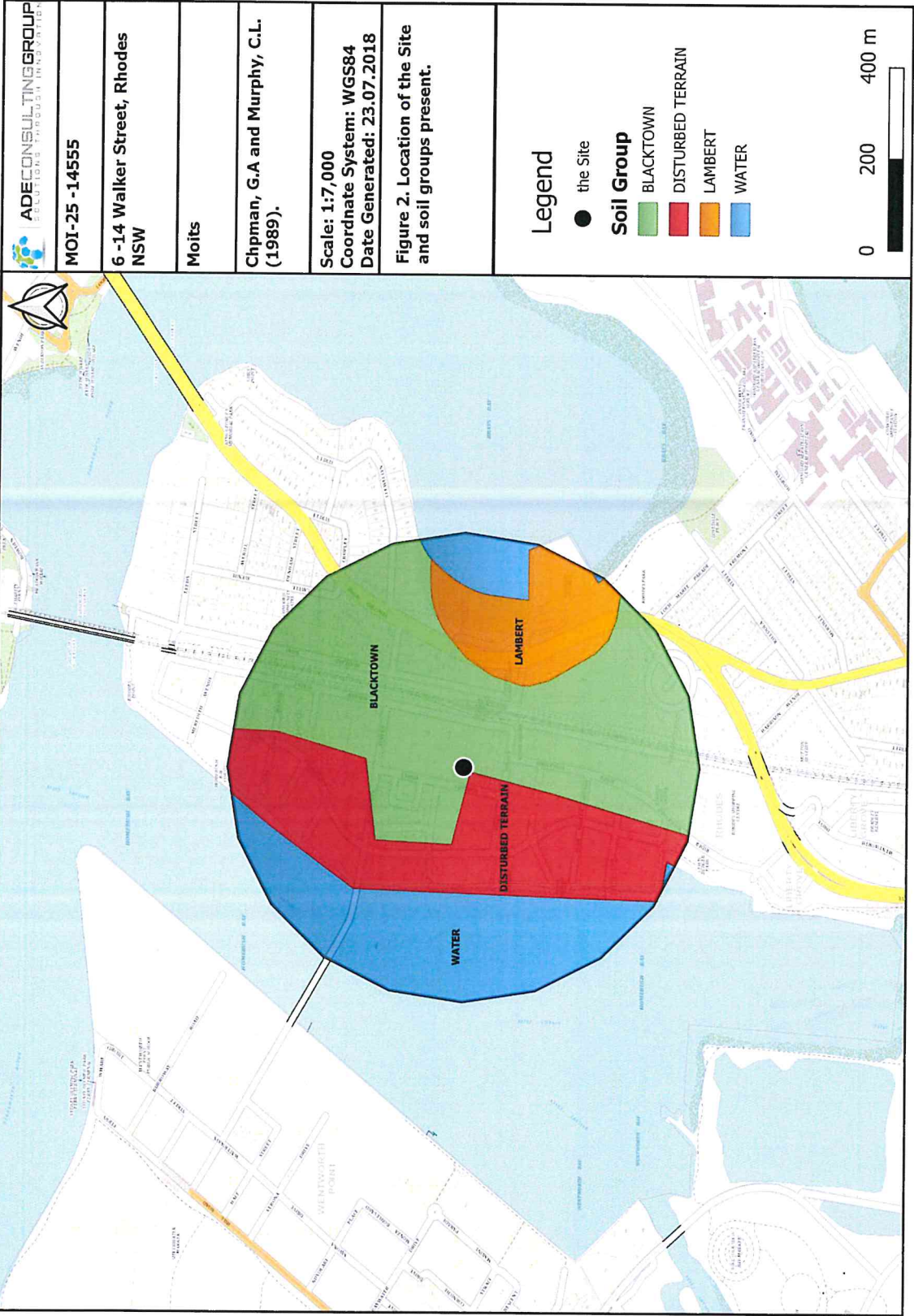
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ADE Consulting Group Pty Ltd
Unit 4 / 95 Salmon Street
Port Melbourne, VIC 3207

Telephone:
NSW: (02) 8541 7214
VIC: 1300 796 922

Internet:
site: ade.group
e-mail info@ADenvirotech.com.au

ABN:
14 617 358 808





New South Wales Office:
ADE Consulting Group Pty Ltd
Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

Victoria Office:
ADE Consulting Group Pty Ltd
Unit 4 / 95 Salmon Street
Port Melbourne, VIC 3207

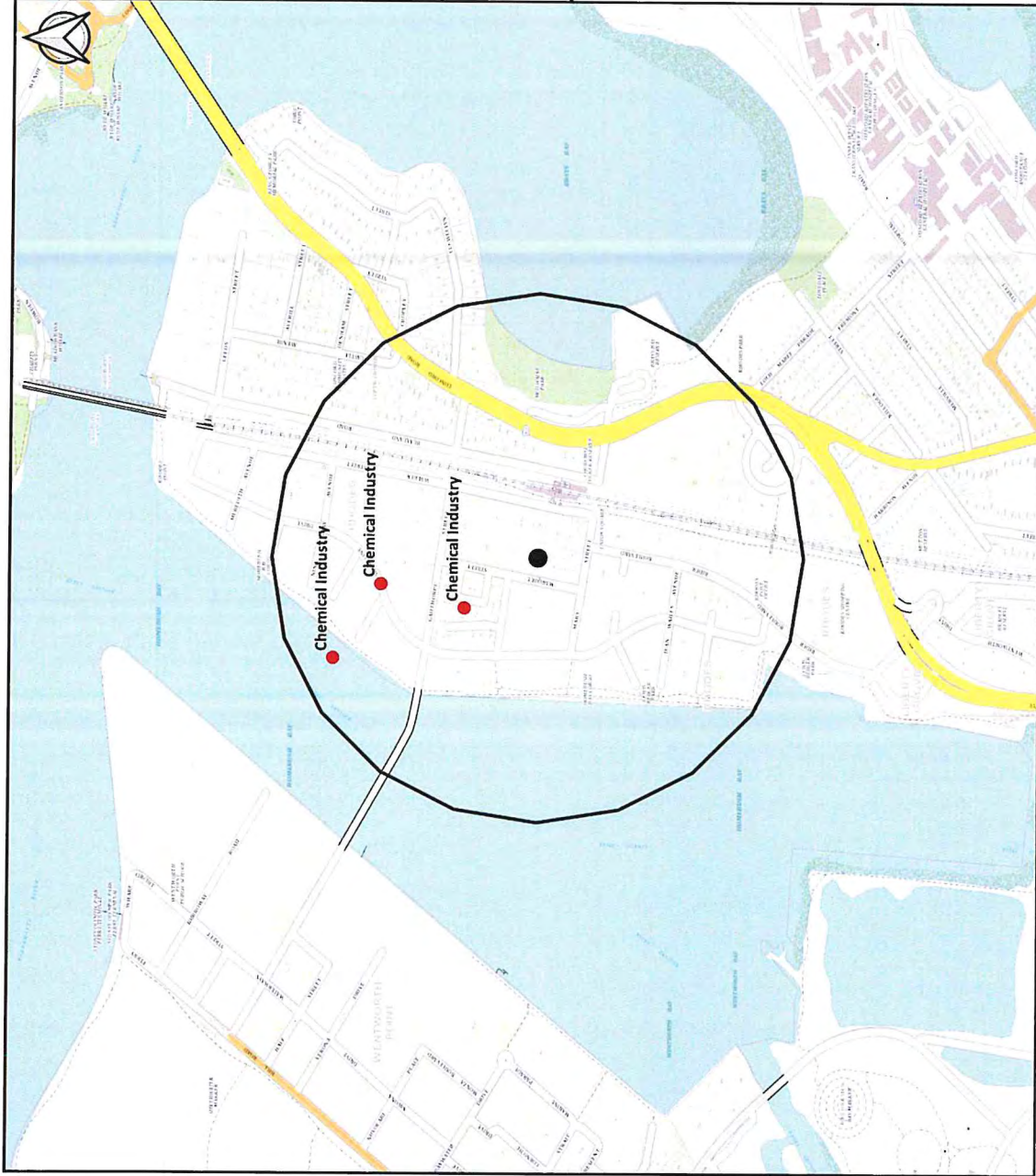
Telephone:
NSW: (02) 8541 7214
VIC: 1300 796 922

Internet:
site: ade.group
e-mail: info@Adenvirotech.com.au

ABN:
14 617 358 808

Legend

- The Site
- EPA Notified Site



New South Wales Office:
ADE Consulting Group Pty Ltd
Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

Victoria Office:
ADE Consulting Group Pty Ltd
Unit 4 / 95 Salmon Street
Port Melbourne, VIC 3207

Telephone:
NSW: (02) 8541 7214
VIC: 1300 796 922

Internet:
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e-mail: info@ADenvirotech.com.au

ABN:
14 617 358 808



Contaminated land

[Home](#) [Contaminated land](#) [Record of notices](#)

- + Management of contaminated land
- + Consultants and site auditor scheme
- + Underground petroleum storage systems
- Guidelines under the CLM Act
- NEPM amendment
- + Further guidance
- Record of notices
- About the record
- Search the record
- Search tips
- Disclaimer

Search results

Your search for: Suburb: RHODES

Matched 77 notices relating to 5 sites.

Suburb	Address	Site Name	Search Again	Refine Search	Notices related to this site
RHODES	Walker STREET	Former Allied Feeds site			7 former
RHODES	Walker STREET	Former UCAL site			6 current and 48 former
RHODES	Oulton AVENUE	Homebush Bay sediments adjoining former Berger Paint factory			1 current and 11 former
RHODES		Homebush Bay Sediments adjoining the former UCAL and Allied Feeds sites			1 current and 4 former
RHODES	Mary STREET	Rhodes Waterside			2 former

Page 1 of 1

23 July 2018

Figure 4 - Image adapted from the NSW Office of Environment and Heritage (OEH) 'Contaminated Land – Record of Notices' listed by the NSW EPA under the *Contaminated Land Management Act 1997* which does not identify notices related to the Site (*Screenshot adapted from <http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx>, accessed on 23.07.2018*).

New South Wales Office:
ADE Consulting Group Pty Ltd
Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

Victoria Office:
ADE Consulting Group Pty Ltd
Unit 4 / 95 Salmon Street
Port Melbourne, VIC 3207

Telephone:
NSW: (02) 8541 7214
VIC: 1300 796 922

Internet:
site: ade.group@adenvirotech.com.au
e-mail: ade.group@adenvirotech.com.au

ABN:
14 617 358 808

Suburb	Site Name	Site Address	Contamination Activity Type	EPA Management Class	Latitude	Longitude
RAYMOND TERRACE	Former Motor Registry	53 William STREET	Other Petroleum	Regulation under CLM Act not required	-33.76286473	151.7445839
REDFERN	BP Service Station	116 Regent STREET	Service Station	Regulation under CLM Act not required	-33.89367876	151.1995256
REDFERN	Former Printing Works	101a Marriott	Other Industry	Regulation under CLM Act not required	-33.89512556	151.2113422
REDFERN	BP-branded Jasbe Surry Hills	411 Cleveland STREET	Service Station	Regulation under CLM Act not required	-33.89183974	151.2132466
REVESBY	Bituminous Products	33-35 Violet STREET	Chemical Industry	Contamination currently regulated under CLM Act	-33.93702092	151.0067896
REVESBY	Mirotona Pty Ltd	21 Marigold STREET	Chemical Industry	Contamination currently regulated under POEO Act	-33.93559608	151.0002207
REVESBY	Dorf Clark Industries	184-194 Milperra ROAD	Metal Industry	Regulation under CLM Act not required	-33.93387149	151.000553
REVESBY	Caltex Service Station Revesby	181 The River ROAD	Service Station	Regulation under CLM Act not required	-33.95573605	151.0171779
RHODES	Former Allied Feeds site adjoining the former UCAL and	Walker STREET	Other Industry	Contamination was addressed via the planning process (EP&A Act)	-33.82465376	151.0870401
RHODES	Allied Feeds sites	Homebush Bay	Chemical Industry	Ongoing maintenance required to manage residual contamination (CLM Act)	-33.8263749	151.0839216
RHODES	Former UCAL site	Walker STREET	Chemical Industry	Ongoing maintenance required to manage residual contamination	-33.82727505	151.0853195
RHODES	Homebush Bay sediments adjoining former Berger Paint	Oulton AVENUE	Chemical Industry	Ongoing maintenance required to manage residual contamination	-33.83535308	151.083238
RHODES	Former Glad factory site	10-16 Marquet STREET	Chemical Industry	Regulation under CLM Act not required	-33.82884048	151.0845716
RICHMOND	Caltex Richmond Service Station	98 March (Cnr East Market St) STREET	Service Station	Regulation under CLM Act not required	-33.59937966	150.7514483

Figure 5 - Image adapted from the 'List of NSW Contaminated Sites Notified to the EPA', which did not identify the Site as being contaminated site notified to the NSW EPA (screenshot adapted from epa.nsw.gov.au, accessed 23.07.2018).

New South Wales Office:
ADE Consulting Group Pty Ltd
Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

Victoria Office:
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Unit 4 / 95 Salmon Street
Port Melbourne, VIC 3207

Telephone:
NSW: (02) 8541 7214
VIC: 1300 796 922

Internet:
site: ade.group
e-mail info@ADenvirotech.com.au

ABN:
14 617 358 808

APPENDIX IV – ANALYTICAL REPORTS

New South Wales Office:
ADE Consulting Group Pty Ltd
Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

Victoria Office:
ADE Consulting Group Pty Ltd
Unit 4 / 95 Salmon Street
Port Melbourne, VIC 3207

Telephone:
NSW: (02) 8541 7214
VIC: 1300 796 922

Internet:
site: ade.group
e-mail info@ADenvirotech.com.au

ABN:
14 617 358 808



Sydney Laboratory Services

A division of A. D. Envirotech Australia Pty Ltd
Unit 4/10-11 Millennium Court,
Silverwater 2128
Ph: (02) 9648-6669

A.C.N. 093 452 950

Analysis report: MOI-25-14555-1

Customer: A. D. Envirotech Australia Pty. Ltd.
Attention: Joshua Panton & Nikolce Aleksieski

Sample Log In Details

Your reference: MOI-25-14555-1
No. of Samples: 16
Date Received: 23.07.2018
Date completed instructions received: 23.07.2018
Date of analysis: 23-24.07.2018

Report Details

Report Date: 24.07.2018
Method number:** ESA-MP-01
ESA-MP-02
ESA-P-ORG03
ESA-P-ORG07
ESA-P-ORG08
ESA-P-ORG09
ESA-P-ORG14
ESA-P-ORG15
ESA-P-12
ESA-ICP-01
ESA-ICP-02
ESA-P-16
ESA-P-21

Results Authorised By:

Dr Dominika Wojtalewicz (MRACI CCHEM)
Laboratory Manager/Chemist



Accreditation No.14664.

Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Tests not covered by NATA are denoted with *.

General Comments and Glossary

Tests not covered by NATA are denoted with *.

Samples are analysed on "as received" basis.

Samples were delivered chilled

Samples were preserved in correct manner

Sample containers for volatile analysis were received with minimal headspace

Samples were analysed within holding time

Some samples have been subcontracted

Yes

Yes

Yes

Yes

No

1. All samples are tested in batches of 20.
2. All results for soil samples are reported per gram of dry soil, unless otherwise stated.
3. However surrogate standards are added to samples due to PAH and BTEX analysis and recoveries are calculated, samples' results are not corrected for standards recoveries.
4. Analysis of VOC in water samples are performed on unfiltered waters (as received), spiked with surrogate
5. If heterogenous or insufficient material provided LCS is used as matrix spike for QA/QC purposes.
6. Duplicate sample and matrix spike recoveries may not be prepared on smaller jobs, however, were analysed at a frequency
7. QA/QC samples shown within the report that states the word "BATCH"; Batch Blank, Matrix Spike and Duplicate were prepared on samples from outside of reported job.

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.

Surr. (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.

INS: Insufficient sample for this test

>: Greater than

LCS: Laboratory Control Sample

NT: Not tested

<: Less than

RPD: Relative Percent Difference

NA: Test not required

PQL: Practical Quantitation Limit

Laboratory Acceptance Criteria

Matrix Spikes and LCS: Generally 70-130% for inorganics/metals, 60-140% for organics is acceptable.
Matrix heterogeneity may result in matrix spike analyses falling outside these limits.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the PQL : No Limit

Results between 10-20 times the PQL : RPD must lie between 0-50%

Results >20 times the PQL : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.



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****Methods Number Description:**

ESA-MP-01	Determination of metals by MP-AES
ESA-MP-02	Digestion of soil samples for MP-AES analysis
ESA-MP-03	Preparation of water samples for metals determination by MP-AES
ESA-MP-04	TCLP for inorganic contaminants
ESA-MP-05	Digestion of paint and dust samples for lead content determination
ESA-MP-06	Digestion of air filters
ESA-MP-07	Digestion of swabs for determination of lead content in dust
ESA-P-ORG02	Analysis of PAHs by GC-MS
ESA-P-ORG03	Analysis of TRH and TPH by GC-FID
ESA-P-ORG04	Separatory funnel extraction of PAHs from water matrices including TCLP extracts
ESA-P-ORG05	Separatory funnel extraction of TRH and TPH from water matrices
ESA-P-ORG06	Silica gel clean up of soil and water extracts, prior analysis for STPH
ESA-P-ORG07	Extraction of BTEX and VTRX from soil matrices
ESA-P-ORG08	Analysis of soil extracts and waters by P&T GCMS
ESA-P-ORG09	Extraction of TRH from solid matrices
ESA-P-ORG14	Extraction of PCB (Aroclor) OCP OPP and PAH from soil matrices
ESA-P-ORG15	Analysis of PCB OCP OPP and PAH by GCMS
AS 1289.4.3.1	Determination of the pH value of a soil-Electrometric method
AS 1289.3.6.1	Determination of the particle size distribution of a soil - Standard method of analysis by sieving
T276	NSW RMS Test Method T 276 Foreign materials content of recycled crushed concrete
*Texture Assessment based on; Salinity Notes, Number 8, Oct 2000, ISSN 1 325-4448, "How to Texture soils & Test for Salinity"	
ESA-P-16	Procedure for measurement of Electrical Conductivity EC
ESA-P-12	Moisture by classical in-house method; Procedure for gravimetric moisture determination
ESA-ICP-01	Determination of metals by ICP-OES
ESA-ICP-02	Digestion of Soil samples for ICP-OES analysis
ESA-ICP-03	Preparation and analysis of leachates for inorganic contaminants (Method EPA 1311, AS 4439)
ESA-ICP-04	Digestion of paint
ESA-ICP-05	Digestion of Air Filters
ESA-ICP-06	Digestion of Swabs
ESA-P-21	Test method for determination of pH value
*pH FOX Test -Determination of Acid Sulfate Soils Field pH	

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Lab ID	PQL (mg/kg)	14555-C1	14555-C2	14555-C3	14555-C4	14555-C5
Sample Name		14555-WAC1.TP1	14555-WAC1.TP2	14555-WAC1.TP3	14555-WAC1.TP4	14555-WAC1.TP5
PAH						
Acenaphthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Acenaphthylene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Anthracene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[a]anthracene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[a]pyrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[b]fluoranthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[g,h,i]perylene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[k]fluoranthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chrysene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Dibenzo[a,h]anthracene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Fluoranthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Fluorene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Indeno[1,2,3-cd]pyrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Naphthalene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Phenanthrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Pyrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
p-Terphenyl-d14	surr.	95%	103%	108%	101%	112%
OCPs						
aldrin	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
a-BHC	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
b-BHC	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
d-BHC	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
g-BHC (lindane)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
cis-chlordane	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-chlordane	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDD	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDE	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDT	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dieldrin	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
endosulfan I	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
endosulfan II	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
endosulfan sulfate	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
endrin	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
endrin aldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
endrin ketone	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
heptachlor	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
heptachlor epoxide	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
hexachlorobenzene	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
methoxychlor	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TCMX	surr.	109%	119%	118%	114%	116%
OPPs						
chlorpyrifos	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
chlorpyrifos methyl	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
diazinon	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
fenchlorphos	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
methyl parathion	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
prophos	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
tributylphosphorotrithioite	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB						
Aroclor 1016	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1221	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1232	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1242	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1248	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1254	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1260	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-fluorobiphenyl	surr.	91%	97%	94%	93%	92%

Lab ID	PQL (mg/kg)	14555-C1	14555-C2	14555-C3	14555-C4	14555-C5
Sample Name		14555-WAC1.TP1	14555-WAC1.TP2	14555-WAC1.TP3	14555-WAC1.TP4	14555-WAC1.TP5
TRH						
C6-C10	35	<35	<35	<35	<35	<35
>C10-C16	50	<50	<50	<50	71	<50
>C16-C34	100	<100	<100	<100	<100	<100
>C34-C40	100	<100	<100	<100	<100	<100
BTEX						
Benzene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	1	<1	<1	<1	<1	<1
m, p- Xylene(s)	2	<2	<2	<2	<2	<2
o-Xylene	1	<1	<1	<1	<1	<1
Fluorobenzene	surr.	114%	113%	115%	111%	115%
Metals						
Mercury	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Metals / ICP-OES						
Arsenic	5	<5	<5	<5	<5	5.4
Cadmium	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	5	<5	7.8	<5	<5	7.7
Copper	5	7.3	31	31	59	26
Nickel	10	<10	16	14	26	18
Lead	10	<10	15	17	24	17
Zinc	5	22	78	51	110	67
Moisture	%	2%	3%	2%	3%	2%
pH (average for 3 measurements)		8.5	8.6	8.8	8.7	8.6
EC	[dS/m]	0.038	0.037	0.028	0.045	0.032

Lab ID	PQL (mg/kg)	14555-C6	14555-C7	14555-C8	14555-C9	14555-C10
Sample Name		14555-WAC1.TP6	14555-WAC1.TP7	14555-WAC1.TP8	14555-WAC1.TP9	14555-WAC1.TP10
PAH						
Acenaphthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Acenaphthylene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Anthracene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[a]anthracene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[a]pyrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[b]fluoranthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[g,h,i]perylene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[k]fluoranthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chrysene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Dibenzo[a,h]anthracene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Fluoranthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Fluorene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Indeno(1,2,3-cd)pyrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Naphthalene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Phenanthrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Pyrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
p-Terphenyl-d14	surr.	102%	104%	110%	105%	94%
OCPs						
aldrin	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
a-BHC	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
b-BHC	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
d-BHC	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
g-BHC (lindane)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
cis-chlordane	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-chlordane	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDD	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDE	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDT	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dieldrin	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
endosulfan I	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
endosulfan II	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
endosulfan sulfate	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
endrin	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
endrin aldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
endrin ketone	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
heptachlor	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
heptachlor epoxide	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
hexachlorobenzene	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
methoxychlor	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TCMX	surr.	109%	110%	112%	110%	107%
OPPs						
chlorpyrifos	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
chlorpyrifos methyl	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
diazinon	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
fenchlorphos	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
methyl parathion	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
prophos	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
tributylphosphorotrithioite	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB						
Aroclor 1016	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1221	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1232	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1242	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1248	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1254	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1260	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-fluorobiphenyl	surr.	86%	91%	92%	91%	88%

Lab ID	PQL (mg/kg)	14555-C6	14555-C7	14555-C8	14555-C9	14555-C10
Sample Name		14555-WAC1.TP6	14555-WAC1.TP7	14555-WAC1.TP8	14555-WAC1.TP9	14555-WAC1.TP10
TRH						
C6-C10	35	<35	<35	<35	<35	<35
>C10-C16	50	<50	<50	<50	<50	<50
>C16-C34	100	<100	<100	<100	<100	<100
>C34-C40	100	<100	<100	<100	<100	<100
BTEX						
Benzene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	1	<1	<1	<1	<1	<1
m, p- Xylene(s)	2	<2	<2	<2	<2	<2
o-Xylene	1	<1	<1	<1	<1	<1
Fluorobenzene	surr.	113%	111%	110%	111%	112%
Metals						
Mercury	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Metals / ICP-OES						
Arsenic	5	8.7	<5	<5	<5	<5
Cadmium	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	5	7.5	7.5	5.2	<5	9.2
Copper	5	32	18	20	26	52
Nickel	10	20	14	14	19	25
Lead	10	19	13	<10	22	27
Zinc	5	80	48	31	58	84
Moisture	%	1%	2%	3%	2%	3%
pH (average for 3 measurements)		8.7	9.1	9.2	8.8	8.8
EC	[dS/m]	0.025	0.038	0.050	0.048	0.050

Lab ID	PQL (mg/kg)	14555-C11	14555-C12	14555-C13	14555-C14	14555-C15	14555-C16
Sample Name		14555-WAC1.TP11	14555-WAC1.TP12	14555-WAC1.TP13	14555-WAC1.TP14	14555-WAC1.TP15	14555-WAC1.TP16
PAH							
Acenaphthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Acenaphthylene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Anthracene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[a]anthracene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[a]pyrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[b]fluoranthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[g,h,i]perylene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Benzo[k]fluoranthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chrysene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Dibenzo[a,h]anthracene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Fluoranthene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Fluorene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Indeno(1,2,3-cd)pyrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Naphthalene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Phenanthrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Pyrene	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
p-Terphenyl-d14	surr.	107%	104%	104%	102%	104%	103%
OCPs							
aldrin	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
a-BHC	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
b-BHC	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
d-BHC	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
g-BHC (lindane)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
cis-chlordane	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-chlordane	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDD	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDE	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDT	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
dieldrin	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
endosulfan I	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
endosulfan II	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
endosulfan sulfate	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
endrin	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
endrin aldehyde	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
endrin ketone	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
heptachlor	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
heptachlor epoxide	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
hexachlorobenzene	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
methoxychlor	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TCMX	surr.	110%	111%	106%	105%	107%	109%
OPPs							
chlorpyrifos	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
chlorpyrifos methyl	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
diazinon	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
fenchlorphos	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
methyl parathion	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
prophos	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
tributylphosphorotriothioite	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PCB							
Aroclor 1016	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1221	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1232	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1242	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1248	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1254	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor 1260	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-fluorobiphenyl	surr.	92%	93%	88%	89%	89%	95%

Lab ID	PQL (mg/kg)	14555-C11	14555-C12	14555-C13	14555-C14	14555-C15	14555-C16
Sample Name		14555-WAC1.TP11	14555-WAC1.TP12	14555-WAC1.TP13	14555-WAC1.TP14	14555-WAC1.TP15	14555-WAC1.TP16
TRH							
C6-C10	35	<35	<35	<35	<35	<35	<35
>C10-C16	50	<50	<50	<50	63	<50	63
>C16-C34	100	<100	<100	<100	<100	<100	<100
>C34-C40	100	<100	<100	<100	<100	<100	<100
BTEX							
Benzene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	1	<1	<1	<1	<1	<1	<1
m, p- Xylene(s)	2	<2	<2	<2	<2	<2	<2
o-Xylene	1	<1	<1	<1	<1	<1	<1
Fluorobenzene	surr.	111%	113%	110%	117%	111%	111%
Metals							
Mercury	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Metals / ICP-OES							
Arsenic	5	<5	<5	<5	<5	<5	<5
Cadmium	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	5	5.9	8.8	6.6	<5	7.1	<5
Copper	5	36	49	15	11	29	13
Nickel	10	17	32	13	<10	16	11
Lead	10	17	29	14	<10	12	10
Zinc	5	89	100	51	27	44	41
Moisture	%	3%	3%	1%	2%	2%	2%
pH (average for 3 measurements)		8.3	8.7	8.8	8.8	9.5	8.7
EC	[dS/m]	0.032	0.037	0.033	0.046	0.077	0.034

Lab ID	PQL (mg/kg)	Batch Blank 1	Batch Blank spike 1	Batch Matrix spike 1	Batch Duplicate 1- Value 1	Batch Duplicate 1- Value 2	Batch Duplicate 1
Sample Name							
PAH							
Acenaphthene	0.3	<0.3	98%	93%	<0.3	<0.3	ACCEPT
Acenaphthylene	0.3	<0.3	NT	NT	<0.3	<0.3	ACCEPT
Anthracene	0.3	<0.3	109%	105%	<0.3	<0.3	ACCEPT
Benzo[a]anthracene	0.3	<0.3	NT	NT	<0.3	<0.3	ACCEPT
Benzo[a]pyrene	0.3	<0.3	NT	NT	<0.3	<0.3	ACCEPT
Benzo[b]fluoranthene	0.3	<0.3	NT	NT	<0.3	<0.3	ACCEPT
Benzo[g,h,i]perylene	0.3	<0.3	NT	NT	<0.3	<0.3	ACCEPT
Benzo[k]fluoranthene	0.3	<0.3	NT	NT	<0.3	<0.3	ACCEPT
Chrysene	0.3	<0.3	NT	NT	<0.3	<0.3	ACCEPT
Dibenzo[a,h]anthracene	0.3	<0.3	NT	NT	<0.3	<0.3	ACCEPT
Fluoranthene	0.3	<0.3	100%	99%	<0.3	<0.3	ACCEPT
Fluorene	0.3	<0.3	NT	NT	<0.3	<0.3	ACCEPT
Indeno(1,2,3-cd)pyrene	0.3	<0.3	NT	NT	<0.3	<0.3	ACCEPT
Naphthalene	0.3	<0.3	98%	96%	<0.3	<0.3	ACCEPT
Phenanthrene	0.3	<0.3	102%	100%	<0.3	<0.3	ACCEPT
Pyrene	0.3	<0.3	100%	100%	<0.3	<0.3	ACCEPT
p-Terphenyl-d14	surr.		100%	94%	97%	94%	
OCPs							
aldrin	0.1	<0.1	100%	101%	<0.1	<0.1	ACCEPT
a-BHC	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
b-BHC	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
d-BHC	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
g-BHC (lindane)	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
cis-chlordane	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
trans-chlordane	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
4,4'-DDD	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
4,4'-DDE	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
4,4'-DDT	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
dieldrin	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
endosulfan I	0.2	<0.2	NT	NT	<0.2	<0.2	ACCEPT
endosulfan II	0.2	<0.2	NT	NT	<0.2	<0.2	ACCEPT
endosulfan sulfate	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
endrin	0.2	<0.2	77%	66%	<0.2	<0.2	ACCEPT
endrin aldehyde	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
endrin ketone	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
heptachlor	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
heptachlor epoxide	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
hexachlorobenzene	0.1	<0.1	106%	103%	<0.1	<0.1	ACCEPT
methoxychlor	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
TCMX	surr.		105%	104%	112%	110%	
OPPs							
chlorpyrifos	0.1	<0.1	100%	98%	<0.1	<0.1	ACCEPT
chlorpyrifos methyl	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
diazinon	0.1	<0.1	100%	96%	<0.1	<0.1	ACCEPT
fenchlorphos	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
methyl parathion	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
prophos	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
tributylphosphorothioite	0.1	<0.1	NT	NT	<0.1	<0.1	ACCEPT
PCB							
Aroclor 1016	0.5	<0.5	98%	94%	<0.5	<0.5	ACCEPT
Aroclor 1221	0.5	<0.5	NT	NT	<0.5	<0.5	ACCEPT
Aroclor 1232	0.5	<0.5	NT	NT	<0.5	<0.5	ACCEPT
Aroclor 1242	0.5	<0.5	NT	NT	<0.5	<0.5	ACCEPT
Aroclor 1248	0.5	<0.5	NT	NT	<0.5	<0.5	ACCEPT
Aroclor 1254	0.5	<0.5	NT	NT	<0.5	<0.5	ACCEPT
Aroclor 1260	0.5	<0.5	NT	NT	<0.5	<0.5	ACCEPT
2-fluorobiphenyl	surr.		88%	88%	90%	87%	

Lab ID	PQL (mg/kg)	Batch Blank 1	Batch Blank spike 1	Batch Matrix spike 1	Batch Duplicate 1- Value 1	Batch Duplicate 1- Value 2	Batch Duplicate 1
Sample Name							
TRH							
C6-C10	35	<35	NT	NT	<35	<35	ACCEPT
>C10-C16	50	<50	106%	103%	<50	<50	ACCEPT
>C16-C34	100	<100	NT	NT	<100	<100	ACCEPT
>C34-C40	100	<100	NT	NT	<100	<100	ACCEPT
BTEX							
Benzene	0.5	<0.5	106%	114%	<0.5	<0.5	ACCEPT
Toluene	0.5	<0.5	107%	114%	<0.5	<0.5	ACCEPT
Ethylbenzene	1	<1	107%	116%	<1	<1	ACCEPT
m, p- Xylene(s)	2	<2	105%	116%	<2	<2	ACCEPT
o-Xylene	1	<1	108%	116%	<1	<1	ACCEPT
Fluorobenzene	surr.		105%	104%	113%	111%	
Metals							
Mercury	0.2	<0.2	94%	98%	<0.2	<0.2	ACCEPT
Metals / ICP-OES							
Arsenic	5	<5	92%	99%	5.1	<5	ACCEPT
Cadmium	0.3	<0.3	93%	95%	<0.3	<0.3	ACCEPT
Chromium	5	<5	97%	101%	13	13	ACCEPT
Copper	5	<5	95%	99%	11	6.9	ACCEPT
Nickel	10	<10	97%	104%	<10	<10	ACCEPT
Lead	10	<10	102%	101%	18	20	ACCEPT
Zinc	5	<5	97%	100%	31	33	ACCEPT
Moisture	%						
pH (average for 3 measurements)							
EC	[dS/m]						

Lab ID	PQL (mg/kg)	Duplicate 2- Value 1	Duplicate 2- Value 2	Duplicate 2
Sample Name				
PAH				
Acenaphthene	0.3	<0.3	<0.3	ACCEPT
Acenaphthylene	0.3	<0.3	<0.3	ACCEPT
Anthracene	0.3	<0.3	<0.3	ACCEPT
Benzo[a]anthracene	0.3	<0.3	<0.3	ACCEPT
Benzo[a]pyrene	0.3	<0.3	<0.3	ACCEPT
Benzo[b]fluoranthene	0.3	<0.3	<0.3	ACCEPT
Benzo[g,h,i]perylene	0.3	<0.3	<0.3	ACCEPT
Benzo[k]fluoranthene	0.3	<0.3	<0.3	ACCEPT
Chrysene	0.3	<0.3	<0.3	ACCEPT
Dibenzo[a,h]anthracene	0.3	<0.3	<0.3	ACCEPT
Fluoranthene	0.3	<0.3	<0.3	ACCEPT
Fluorene	0.3	<0.3	<0.3	ACCEPT
Indeno(1,2,3-cd)pyrene	0.3	<0.3	<0.3	ACCEPT
Naphthalene	0.3	<0.3	<0.3	ACCEPT
Phenanthrene	0.3	<0.3	<0.3	ACCEPT
Pyrene	0.3	<0.3	<0.3	ACCEPT
p-Terphenyl-d14	surr.	110%	102%	
OCPs				
aldrin	0.1	<0.1	<0.1	ACCEPT
α-BHC	0.1	<0.1	<0.1	ACCEPT
β-BHC	0.1	<0.1	<0.1	ACCEPT
δ-BHC	0.1	<0.1	<0.1	ACCEPT
γ-BHC (lindane)	0.1	<0.1	<0.1	ACCEPT
cis-chlordane	0.1	<0.1	<0.1	ACCEPT
trans-chlordane	0.1	<0.1	<0.1	ACCEPT
4,4'-DDD	0.1	<0.1	<0.1	ACCEPT
4,4'-DDE	0.1	<0.1	<0.1	ACCEPT
4,4'-DDT	0.1	<0.1	<0.1	ACCEPT
dieldrin	0.1	<0.1	<0.1	ACCEPT
endosulfan I	0.2	<0.2	<0.2	ACCEPT
endosulfan II	0.2	<0.2	<0.2	ACCEPT
endosulfan sulfate	0.1	<0.1	<0.1	ACCEPT
endrin	0.2	<0.2	<0.2	ACCEPT
endrin aldehyde	0.1	<0.1	<0.1	ACCEPT
endrin ketone	0.1	<0.1	<0.1	ACCEPT
heptachlor	0.1	<0.1	<0.1	ACCEPT
heptachlor epoxide	0.1	<0.1	<0.1	ACCEPT
hexachlorobenzene	0.1	<0.1	<0.1	ACCEPT
methoxychlor	0.1	<0.1	<0.1	ACCEPT
TCMX	surr.	112%	107%	
OPPs				
chlorpyrifos	0.1	<0.1	<0.1	ACCEPT
chlorpyrifos methyl	0.1	<0.1	<0.1	ACCEPT
diazinon	0.1	<0.1	<0.1	ACCEPT
fenchlorphos	0.1	<0.1	<0.1	ACCEPT
methyl parathion	0.1	<0.1	<0.1	ACCEPT
prophos	0.1	<0.1	<0.1	ACCEPT
tributylphosphorotrithioite	0.1	<0.1	<0.1	ACCEPT
PCB				
Aroclor 1016	0.5	<0.5	<0.5	ACCEPT
Aroclor 1221	0.5	<0.5	<0.5	ACCEPT
Aroclor 1232	0.5	<0.5	<0.5	ACCEPT
Aroclor 1242	0.5	<0.5	<0.5	ACCEPT
Aroclor 1248	0.5	<0.5	<0.5	ACCEPT
Aroclor 1254	0.5	<0.5	<0.5	ACCEPT
Aroclor 1260	0.5	<0.5	<0.5	ACCEPT
2-fluorobiphenyl	surr.	92%	90%	

Lab ID	PQL (mg/kg)	Duplicate 2- Value 1	Duplicate 2- Value 2	Duplicate 2
Sample Name				
TRH				
C6-C10	35	<35	<35	ACCEPT
>C10-C16	50	<50	<50	ACCEPT
>C16-C34	100	<100	<100	ACCEPT
>C34-C40	100	<100	<100	ACCEPT
BTEX				
Benzene	0.5	<0.5	<0.5	ACCEPT
Toluene	0.5	<0.5	<0.5	ACCEPT
Ethylbenzene	1	<1	<1	ACCEPT
m, p- Xylene(s)	2	<2	<2	ACCEPT
o-Xylene	1	<1	<1	ACCEPT
Fluorobenzene	surr.	112%	110%	
Metals				
Mercury	0.2	<0.2	<0.2	ACCEPT
Metals / ICP-OES				
Arsenic	5	<5	<5	ACCEPT
Cadmium	0.3	<0.3	<0.3	ACCEPT
Chromium	5	5.2	5.6	ACCEPT
Copper	5	20	24	ACCEPT
Nickel	10	14	16	ACCEPT
Lead	10	<10	12	ACCEPT
Zinc	5	31	34	ACCEPT
Moisture	%			
pH (average for 3 measurements)				
EC	[dS/m]			

APPENDIX V – CHAIN OF CUSTODY

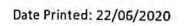
New South Wales Office:
ADE Consulting Group Pty Ltd
Unit 6 / 7 Millennium Court
Silverwater, NSW 2128

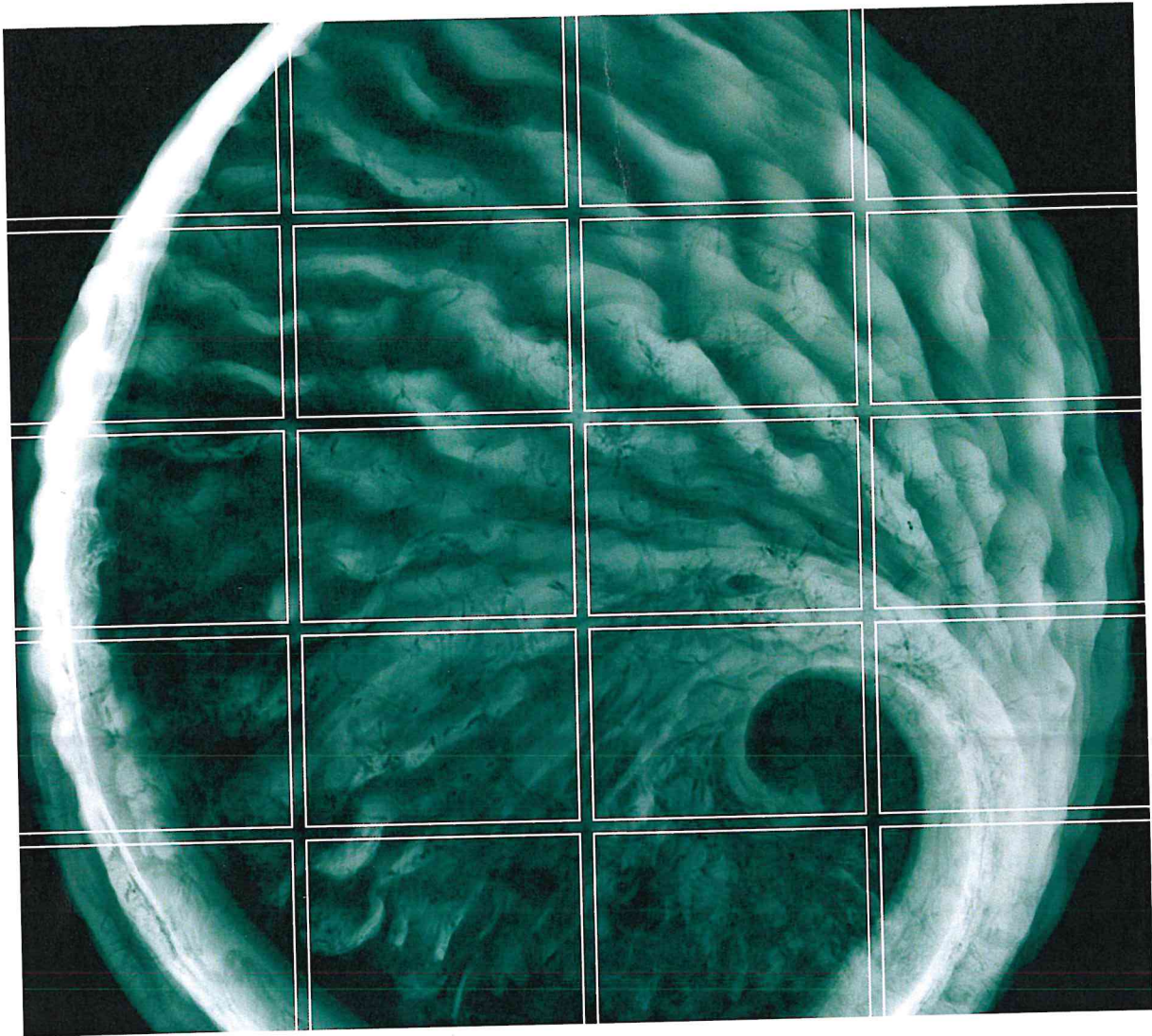
Victoria Office:
ADE Consulting Group Pty Ltd
Unit 4 / 95 Salmon Street
Port Melbourne, VIC 3207

Telephone:
NSW: (02) 8541 7214
VIC: 1300 796 922

Internet:
site: ade.group
e-mail info@ADenvirotech.com.au

ABN:
14 617 358 808

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Waste Classification

ACE Civil Pty Ltd
13-19 Glen St, Eastwood, NSW 2122

Date: 05/02/2019
Project No.: 0475405

Project name: 13-19 Glen St, Eastwood, NSW 2122
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1 Introduction

ERM Services Australia Pty Ltd (ERM), was commissioned by ACE Civil Pty Ltd to conduct a Waste Classification assessment of soils at 13-19 Glen St, Eastwood, NSW 2122 (the Site), refer to Table 1 for site identification details.

Table 1. *Site Identification Summary*

Item	Details
Address	13- 19 Glen St, Eastwood, NSW 2122
Local Government Authority	Ryde City Council
Lot/ DP	Lot 13 /DP8043 -13 Glen street Lot 14 /DP8043 - 15 Glen street Lot 15 /DP8043 -17 Glen street Lot 16 /DP8043 - 19 Glen street
Land Zoning	R4 – High Density Residential B4 - Mixed Use
Locality Map	Refer to Figure 1 – Site Location
Date of fieldwork	24/01/2019
Volume of material	40,000m ³
Surface Area	3,363m ² Refer to Figure 2
Material status	In-situ natural materials
Material description	Red/grey clay, Orange/grey clay and Grey/Orange Clayey Shale..

1.1 Objectives

The objective of this assessment was to classify the soils within the subject area in accordance with the NSW Environment Protection Authority (EPA) Waste Classification Guidelines. Part 1: Classifying Waste (2014), Schedule 1, Section 50 of the Protection of the Environment Operations (POEO) Act 1997. Classification of soils is required in order to determine whether the material is suitable for reuse at Penrith Lakes Development Corporation (PLDC) as VENM.

The scope of this investigation included the following:

- Inspection of subject area.
- Collection of soil samples for analysis at a NATA accredited laboratory.
- Screening of analytical results against NSW EPA Waste Classification Guidelines (2014) and Schedule 1, Section 50 of the Protection of the Environment Operations (POEO) Act 1997
- Preparation of a report documenting the investigation process

2 Desktop Study

2.1 Site Observations

A review of online aerial photography was conducted using Sixmaps (<https://maps.six.nsw.gov.au/>), Nearmaps (<http://maps.au.nearmap.com/>) and Google Earth. The earliest available photograph from 1943 indicates that prior to redevelopment works, the Site was comprised of low density residential properties. The surrounding land use is as follows:

- To the north lies the St Kevins Catholic Church, which has existed since at least 2002, formally residential housing.
- Adjacent properties on both the Western and Eastern boundaries were redeveloped into high density residential properties in February, 2017, prior to that both comprised of low-density residential properties.
- Eastwood train station is located approximately 300m to the East of the site.

No contamination risks such as service stations or heavy industrial properties were noted within 500m of the site.

The 1:250,000 Sydney Geological Series Sheet S1 indicates that Shale and Sandstone of the Wianamatta group underlies the site.

2.2 Acid Sulphate Soils

Review of the Australian Soil Resource Information System indicates there are no known occurrences of acid sulfate soil (ASS) in the vicinity of the site. During the date of inspection, no ASS indicators were noted.

2.3 Salinity and Aggressivity of Soils

A review of online database was conducted using NSW Planning portal (<https://au.nearmap.com>) on the 4th of February 2019 indicates that there are no concerns regarding salinity on or near the site.

2.4 NSW EPA Contaminated Land Register

A search was conducted of all records pertaining to section 58 of the Contaminated Land Management Act 1997 (NSW) and revealed that the site is not encumbered by any notices from the NSW EPA with regard to contaminated land.

2.5 Waste Classification Types

In accordance with land use Health Investigation Levels defined in the National Environment Protection (Assessment of Site Contamination) Amendment Measure (No. 1) ('NEPM', NEPC, 2013), soils being excavated from the sites may remain on site if they comply with the nominated criteria. Alternatively, if soils are to be excavated and disposed off-site, they will require Waste Classification in accordance with the NSW EPA Waste Classification Guidelines (2014) or the applicable NSW EPA Resource Recovery Exemption. Several possible waste types for the site are listed below:

Virgin Excavated Natural Material (VENM)

Schedule 1, Section 50 of the Protection of the Environment Operations (POEO) Act 1997 defines VENM as natural material (such as clay, gravel, sand, soil or rock fines):

- a. That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities, and
- b. That does not contain any sulfidic ores or soils or any other waste.

Excavated Natural Material (ENM)

The EPA has the authority under the POEO Regulation to make certain materials exempt from being classified as waste. One such exemption relevant to development sites is ENM. ENM is naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

- a. Been excavated from the ground;
- b. Contains at least 98% (by weight) natural material; and
- c. Does not meet the definition of Virgin Excavated Natural Material in the Act.

Excavated natural material does not include material located in a hotspot; that has been processed; or that contains asbestos, acid sulphate soils (ASS), potential ASS or sulfidic ores.

At the time the excavated natural material is received at the premises, the material must meet all chemical and other material requirements for excavated natural material which are required on or before the supply of excavated natural material under 'the excavated natural material order 2014.

General Solid Waste (non-putrescible)

General Solid Waste (GSW) is any waste or soil that complies with the definition of GSW within the Waste Classification Guidelines (NSW EPA, 2014) and exceeds the licensed threshold criteria of any recycling facility. GSW is compared to the 'CT1' criteria and may be re-classified if the Toxicity Characteristics Leaching Procedure (TCLP) is conducted. This procedure allows the soil/material been classified to be compared to the 'SCC1' criteria, if compliant with the 'TCLP1' criteria.

Restricted Solid Waste

Restricted Solid Waste (RSW) is any waste or soil that complies with the definition of RSW within the Waste Classification Guidelines (NSW EPA, 2014) and exceeds the licensed threshold criteria of any recycling facility. RSW is compared to the 'CT2' criteria and may be re-classified if TCLP is conducted. This procedure allows the soil/material been classified to be compared to the 'SCC2' criteria, if compliant with the 'TCLP2' criteria.

Hazardous Waste

Hazardous Waste is any waste or soil that exceeds the 'CT2' and 'SCC2' criteria but may be re-classified if TCLP is conducted.

Special Waste – Asbestos

Special Waste is a class of waste that has unique regulatory requirements. The potential environmental impacts of special waste need to be managed to minimise the risk of harm to the environment and human health. Special waste falls into one of the chemical classifications above.

2.6 Waste Classification Criteria

The characterisation of materials for off-site beneficial reuse or disposal will be performed in accordance with:

- Waste Classification Guidelines (NSW EPA, 2014);
- Excavated Natural Material Order (NSW EPA, 2014) and Excavated Natural Material Exemption (NSW EPA, 2014);
- Protection of the Environment Operations Act 1997 (NSW) and associated regulations; and
- PLDC Penrith Lakes Importation Protocol (2018), ref 0448886_Pj0949 issued August 2018
- All other relevant resource recovery orders, resource recovery exemptions and approvals issued by the NSW EPA.

A selection of criteria from the aforementioned sources are summarised in Table 3. Any criterion not listed can be found in the relevant guidelines and reference documents.

3 Sampling Analysis & Quality Plan

3.1 VENM Assessment

On the 24th of January 2019 ERM conducted an inspection of the site and in-situ natural material. Visual inspection of the surface material and test pits revealed three distinct material types, each occurring in homogenous stratum across the site. Considering this, no contaminated soil is expected to be found below natural material. The subject material is also considered to be 'non-putrescible'. Ten samples were taken of the in-situ material from nine test pit locations for analysis. In accordance with the • PLDC Penrith Lakes Importation Protocol (2018) sample rate, for a volume of 40,000m³, ten samples are required. A stockpile of approximately 1000m³ containing brown sandy loam with trace with trace amounts of building materials was observed towards the eastern boundary of the site. Additionally, fill materials approximately 0.2m in thickness were observed to be covering the North West section of the site.. **This classification applies only to the in-situ material proposed to be excavated within the nominated area identified in Figure 2.**

On the 1st February 2019 ERM conducted a follow up inspection of the site to confirm all overlying and stockpiled fill material had been removed. All fill materials were confirmed to be removed from the Site. No anthropological contamination indicators, such as staining, odours and/or building materials were present at the time of the inspection.

Refer to Photos 5 and 6 of **Appendix A – Photographic Gallery**

3.2 Sampling Justification

A total of 10 samples were collected for this investigation. Samples were collected systematically, in-situ, through nine test pit locations excavated to depths ranging from 0.5-4m below ground level (bgl). Samples were collected at various depths using an excavator as outlined in **Table 2**. Samples were collected within the area identified in **Figure 2 – Site Layout**.

The following field procedures were implemented as part of field QAQC:

- Collection of ten primary samples from nine test pits across the Site;
- Collection of one duplicate sample from the in-situ material;
- Decontamination of all sampling equipment between each sample; and,
- Collection of photographs of subject material

Sample Containers: Soil samples for chemical analyses were generally collected in accordance with the Sampling Design Guidelines (NSW EPA, 1995), NEPM (NEPC, 2013) and AS4482.1-2005. Collected soil samples were immediately transferred to sample containers of appropriate composition (glass jars for chemical analysis, plastic bags for asbestos). Job number; sample identification number; sample details and date of sampling were recorded on sample labels affixed to the sample containers. Samples were then placed immediately into a chilled esky to prevent the loss of potential volatile components

Decontamination: all equipment used in the sampling program was decontaminated prior to use and between samples to prevent cross contamination. Decontamination of equipment involved:

- Cleaning equipment in potable water to remove gross contamination;
- Cleaning in a solution of Decon 90; and,
- Rinsing in clean demineralised water then wiping with clean lint free cloths.

Chain of Custody: samples were recorded on a chain of custody form. The soil samples were transported under standard chain-of-custody protocols to Envirolab Services Pty Ltd and Australian Safer Environment and Technology Pty Ltd for analysis. Both laboratories are NATA accredited. Copies of the chain of custody forms, signed by laboratory, that acknowledged sample receipt date and time, samples received in good condition and properly chilled and documentation received in proper order, are provided in **Appendix B** - Nata certified Analytical Data.

3.3 Analysis

Soil samples were analysed for the following analytes:

- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethyl-Benzene, Xylenes (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Heavy Metals: Arsenic (As), Chromium (Cr), Cadmium (Cd), Copper, (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Zinc (Zn);
- Organochlorine Pesticides (OCP);
- Organophosphorus Pesticides (OPP);
- Polychlorinated Biphenyls (PCB);
- Asbestos;
- pH;
- EC, and;
- Chloride (Cl) and Sulfate (SO₄⁻).

Samples were analysed for the above analytes to comply with the NSW EPA (2014) Waste Classification Guidelines to ensure there was no cross contamination from the overlying fill material. All chemical soil samples were sent to Envirolab Services Sydney for analysis and all asbestos samples were sent to Australian Safer Environment & Technology Pty Ltd.

4 Results

4.1 Observations

Three natural material types were encountered on site along with fill material during the time of sampling. No asbestos containing material, odours or staining were identified in the subject material. This fill material has since been removed and all exposed surfaces are natural clays. Refer to **Table 2**– Material Description.

Table 2. *Material Descriptions*

Sample ID	Material Description	Sampled Depth (m BGL)
V1	Red/grey clay	3
V2	Orange/grey clay	3
V3	Red/grey clay	1.5
V4	Orange/grey clay	1.5
V5	Grey/Orange Clayey Shale	2
V6	Grey/Orange Clayey Shale	2
V7	Red/grey clay	0.5
V8	Red/grey clay	0.5
V9	Red/grey clay	0.5
V10	Orange/grey clay	4

Refer to **Appendix A** – Photographic Gallery (Photo 3 and 4).

4.2 Analytical Results

There were no detections above the laboratory limit of reporting (LOR) for BTEX, volatile and semi-volatile TRH, PAH, OCs, OPs, PCBs or asbestos in any of the samples collected. Detections above the LOR were recorded for all heavy metals with the exception of cadmium. The material was also analysed for salinity. Results indicated the material in V1, 5 and 7 was non- saline with a maximum pH of 5.7 and EC of 0.048ds/m.

Refer to **Appendix B** – NATA Certified Analytical Data.

As it is proposed to import the material to the PLDC site the material was assessed against the PLDC VENM importation criteria. Ten samples were collected meeting the required sample rate to import 40,000m³ of natural materials. Refer to **Table 3**. All samples analysed reported concentrations below the PLDC VENM importation criteria. The results are presented below in **Table 4** and a summary of results can be found in **Appendix C** – Data Summary Table.

Table 3: Waste Classification Criteria (mg/kg)

Analyte	PLDC VENM Criteria ¹	
	Ave. Conc	Max Conc
BTEX		
Benzene	0.2	0.2
Toluene	0.5	0.5
Ethylbenzene	1	1
Xylenes (total)	1.5	1.5
Total Recoverable Hydrocarbons		
C6 – C10	25	25
>C10 – C36 6	100	100
Polycyclic Aeromantic Hydrocarbons		
PAH (total)	1	1
B(a)P	-	0.5
Heavy Metals		
Arsenic	20	40
Cadmium	0.5	3
Chromium	75	100
Copper	55	200
Lead	50	100
Mercury	0.5	1
Nickel	15	60
Zinc	120	300
Physical Parameters		
pH (pH units)	5-9	4.5-10
Foreign Materials	None	None
EC (dS/m)	--	--

-- No applicable as these contaminants are only assessed using Specific Contaminant Concentrations

a. Penrith Lakes Importation Protocol, ref 0448886_Pj0949 issued August 2018. **Section 3.3.**

Table 4 – Summary of VENM Results (Samples: V1-V10)

Analytes	PLDC VENM Import Criteria (mg/kg) (Ave/Max)	Average Concentration (n=10)	Max Concentration (V1-10)
Heavy Metals(mg/Kg)			
Arsenic	20/40	6.8	12
Cadmium	0./3	Nd	Nd
Chromium	75/100	6.5	10
Copper	55/200	25.1	44
Lead	50/100	17.4	58
Mercury	0.5/1	N/A	0.1
Nickel	15/60	5.2	11
Zinc	120/300	34.7	73
PAH (mg/Kg)			
BaP	-	Nd	Nd
Total PAHs	1/1	Nd	Nd
TRH			
F1	25/25	Nd	Nd
F2	50/50	Nd	Nd
F3	100/100	Nd	Nd
F4	100/100	Nd	Nd
PCB	0.1/0.1	Nd	Nd
Pesticides			
Moderately Harmful	N/A	Nd	Nd
Scheduled Chemicals	0.1/0.1	Nd	Nd
Asbestos			
Bonded	None	Nd	Nd
AF/FA	None	Nd	Nd
Texture & Salinity			
Texture			Medium Clay/Clay Loam
ECe (dS/m)		<2	<2
Class			Non Saline
Soil Aggressivity			
pH (pH units)	4.5 to 10	5.5	Max (5.7) Min (5.3)
Chloride (mg/Kg)		<10	<10
Sulphate (mg/Kg)		32	56

N/A: Unable to calculate a statistical value due to insufficient Data

5 Discussion

ERM conducted an investigation of the in-situ soils in accordance with NSW EPA (2014) Waste Classification Guidelines and the PLDC Penrith Lakes Import Protocol. The material assessed in this investigation consisted of 40,000m³ of Red/grey clay, Orange/grey clay and Grey/Orange Clayey Shale. During an inspection on the 24th of January 2019 a large stockpile of fill materials was observed in the eastern section of the site as well as overlying fill material in the northern section of the site. Nine test pits were excavated and a total of ten samples were collected of the in-situ natural materials in accordance with the PLDC Penrith Lakes Import Protocol in order to classify the 40,000m³ of material. ERM reinspected the site on the 1st of February 2019 and confirmed this stockpiled material to be removed, leaving only the natural clays exposed on site.

Refer to **Figure 2 – Site Layout** and **Appendix A – Photographic Gallery**.

A total of ten samples were collected from the in-situ natural materials. During the Site inspection and sampling, no signs of discoloration, staining, odours or foreign materials were observed which would indicate potential contamination or signs that the materials were not VENM.

There were no detections above the LOR for BTEX, TRH, PAH, Pesticides, PCBs or Asbestos. Detections above the LOR were reported for heavy metals, however the reported concentrations of heavy metals complied with the PLDC import criteria and did not exceed the NSW EPA (2014) Waste classification criteria and were considered to be consistent with natural background concentrations for the region.

A desktop review, visual inspection and sampling assessment determined that the in-situ soil is suitable to be classified as VENM as defined by the Protection of the Environment Operations (Waste) Regulation 2014 and NSW EPA (2014) Waste Classification Guidelines, with no evidence found of contamination from manufactured chemicals or with process residues as a result of industrial, commercial, mining or agricultural activities.

6 Conclusions & Recommendations

Based on the information provided, the 40,000 m³ of in-situ material located in the Site, strictly limited to the in-situ Red/grey clay, Orange/grey clay and Grey/Orange Clayey Shale complies with the definition of VENM provided in the POEO Act 1997 and is suitable to be received by sites able to receive VENM as per their DA requirements or a landfill facility licensed to accept this material. No fill materials are covered under this classification.

If any unexpected finds of potentially contaminated material is uncovered during excavation, or material observed to be different to the material described in this report is encountered, then these materials should be excavated separately with a clearance provided by a contaminated land professional.

7 Limitations

ERM Services Australia Pty Ltd (ERM) acts in all professional matters as a faithful advisor to the Client and exercises all reasonable skill and care in the provision of its professional services. Reports are commissioned by and prepared for the exclusive use of the Client. They are subject to and issued in accordance with the agreement between the Client and ERM. ERM is not responsible for any liability and accepts no responsibility whatsoever arising from the misapplication or misinterpretation by third parties of the contents of its reports. Reports cannot be copied or reproduced in whole or part for any purpose without the prior written agreement of ERM.

The conclusions presented in this report are relevant to the present condition of the Site and the state of legislation currently enacted as at the date of this report. ERM do not make any representation or warranty that the conclusions in this report will be applicable in the future as there may be changes in the condition of the Site, applicable legislation or other factors that would affect the conclusions contained in this report.

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