

APPENDIX 2

CHARACTERISATION OF THE CAPPED WASTE STOCKPILE

Part 1 Characterisation of the Capped Waste Stockpile

Intended for
Hydro Aluminium Kurri Kurri Pty Ltd

Document type
Report

Date
April 2016

CAPPED WASTE STOCKPILE ASSESSMENT



CAPPED WASTE STOCKPILE ASSESSMENT

Revision	Final
Date	4/04/2016
Made by	Mark Tiedeman
Checked by	Kirsty Greenfield
Approved by	Fiona Robinson
Description	Ramboll Environ were engaged by Hydro to evaluate the waste characteristics within the Capped Waste Stockpile located at the Former Hydro Aluminium Kurri Kurri Smelter

Ref AS130456

This document is issued in confidence to Hydro Aluminium Kurri Kurri Pty Ltd for the purposes of providing a preliminary assessment of the composition of the Capped Waste Stockpile and the soil and groundwater conditions beneath the stockpile. It should not be used for any other purpose.

The report must not be reproduced in whole or in part except with the prior consent of Ramboll Environ Australia Pty Ltd and subject to inclusion of an acknowledgement of the source. No information as to the contents or subject matter of this document or any part thereof may be communicated in any manner to any third party without the prior consent of Ramboll Environ Australia Pty Ltd.

Whilst reasonable attempts have been made to ensure that the contents of this report are accurate and complete at the time of writing, Ramboll Environ Australia Pty Ltd disclaims any responsibility for loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this report.

© Ramboll Environ Australia Pty Ltd

CONTENTS

1.	INTRODUCTION	1
1.1	Background	1
1.2	Objectives	1
1.3	Scope of Work	1
2.	METHODOLOGY	3
2.1	Fieldwork	3
2.2	Soil Observations	3
2.3	Groundwater Sampling	4
2.4	Groundwater Observations	4
3.	ASSESSMENT CRITERIA	6
3.1	Soil	6
3.1.1	NEPM 2013	6
3.1.2	Waste Assessment	9
3.2	Groundwater	9
3.3	Potential Beneficial Uses	10
3.4	Appropriate Criteria for Groundwater	10
4.	QUALITY ASSURANCE AND QUALITY CONTROL	12
5.	RESULTS	15
5.1	Gas	15
5.2	Soil	15
5.3	Groundwater	20
6.	DISCUSSION	21
6.1	Stratigraphy and Hydrogeology	21
6.2	Evaluation of Stockpile Settlement	21
6.3	Volume of waste soils	22
6.4	Analysis of Wastes and Soils	22
6.5	Analysis of Groundwater	23
6.6	Preliminary Waste Classification	23
7.	CONCLUSION	24
8.	LIMITATIONS	25
8.1	User Reliance	25

APPENDICES

APPENDIX A

FIGURES

APPENDIX B

BORELOGS

APPENDIX C

PHOTOGRAPHS

APPENDIX D

Field Sheets

APPENDIX E

Calibration

APPENDIX F

Laboratory Reports

APPENDIX G

Results

APPENDIX H

1996 and 2016 stockpile surface Surveys

1. INTRODUCTION

This report presents the findings of the Capped Waste Stockpile Environmental Assessment, performed at the former Hydro Kurri Kurri Aluminium Smelter. The Smelter is located off Hart Road, Loxford, New South Wales (NSW), and is hereinafter referred to as 'the site'. The investigation was undertaken on the Capped Waste Stockpile located at the site, and is shown in **Figure 1** in **Appendix A**. This report provides information on the composition of the Capped Waste Stockpile, as well as an assessment of the soil and groundwater conditions beneath the Capped Waste Stockpile.

1.1 Background

The Capped Waste Stockpile (formally known as the Alcan Mound) is an on-site stockpile comprising mixed smelter wastes that were capped in 1995. The stockpile originated during early site operations between 1969 and 1992, when smelter wastes were stored within onsite storage facilities situated along the eastern smelter boundary. Approximately 100,000 m³ of mixed wastes including Spent Potlining was stored in this area. In the mid 1980's changes to legislation regarding the storage of aluminium smelter wastes resulted in the improvement of storage and waste management on the site. These improvements resulted in the consolidation of wastes into one stockpile and the capping of that stockpile, now referred to as the Capped Waste Stockpile.

Investigations commencing in the mid 1980's identified that the historical uncapped method of waste storage had resulted in leachate impacts to groundwater downgradient of the site and that a plume of leachate impacted groundwater was present extending approximately 250m to the north east of the Capped Waste Stockpile. The capping of the Capped Waste Stockpile in 1995 was designed to reduce ongoing leachate generation.

1.2 Objectives

The objective of the study is to provide a preliminary assessment of the composition of the Capped Waste Stockpile and the soil and groundwater conditions beneath the stockpile. The primary focus of the work was to identify the following:

- Thickness of gas buffer zone within the Capped Waste Stockpile;
- Composition of material within the Capped Waste Stockpile;
- Depth and composition of underlying natural material;
- Depth to leachate and groundwater;

The work also aimed to:

- Assess the groundwater conditions beneath the Capped Waste Stockpile; and
- Assess the soil conditions beneath the Capped Waste Stockpile.

1.3 Scope of Work

The scope of works comprised the following elements:

- Review of available borelogs for previously drilled bores adjacent to the Capped Waste Stockpile;
- Development of a health and safety methodology to safely drill within the waste stockpile;
- Drilling of six boreholes within the Capped Waste Stockpile via Sonic drill rig;
- Conversion of the six boreholes into groundwater monitoring wells;
- Log and photograph material encountered within the Capped Waste Stockpile;
- Sampling and analysis of materials within the waste profile for the purpose of waste characterisation;
- Soil sampling and analysis of natural soils beneath Capped Waste Stockpile;

- Survey of all six installed groundwater wells, including the top of casing elevations surveyed to Australian Height Datum (AHD);
- Development of all six newly installed groundwater monitoring wells;
- Groundwater sampling of the six newly installed groundwater monitoring wells for:
 - Water quality parameters; and
 - Laboratory analysis.
- Preparation of this factual report detailing:
 - Materials encountered within and beneath the Capped Waste Stockpile;
 - Groundwater conditions encountered;
 - Figures detailing sample locations; and
 - Data validation and interpretation of results.

2. METHODOLOGY

2.1 Fieldwork

The fieldwork methodology for soil sampling is outlined in Table 2.1 below:

Table 2.1: Soil Field Methodology	
Activity	Details
Soil Logging	Soil logging was undertaken by a suitably qualified and experienced environmental scientist from Ramboll Environ. The logging of the Capped Waste material was undertaken with the assistance of Hydro personnel experienced with the site's smelter wastes. The borelogs in Appendix B and Table 2.2 below provide a description of the capped waste stockpile composition.
Field monitoring	Monitoring of gas levels within the boreholes was undertaken between each 3m rod length. Gases of primary interest were ammonia and methane, though monitoring for oxygen, carbon dioxide, hydrogen sulfide and lower explosive limit was also undertaken. Wells were purged using nitrous oxides where gas levels reached health and safety trigger levels in accordance with the health and safety protocols.
Intrusive Investigation Method	All boreholes were drilled using sonic rig coring to the required depth of the investigations.
Soil Sampling	Soil sampling of the fill material, as well as the natural underlying soils was completed during the assessment. A minimum of five samples were collected for laboratory analysis from each of the six borehole locations. Soil samples were collected based on observations in the field. The borelogs in Appendix B show the depths of soil sampling.
Soil Screening	Screening of soil samples for the presence of volatile contaminants was not undertaken, as volatile contaminants were not the main chemicals of concern. Samples were selected for laboratory analysis based on visual observations in the field.
Decontamination	A hand trowel was the only non-disposable sampling equipment used. The hand trowel was decontaminated by washing in a Decon90 solution and rinsing with water between samples.
Disposal of Soil	Soil cores were collected in plastic sleeves and stored in core boxes onsite.

The locations of the boreholes are shown on **Figure 2** in **Appendix A**.

2.2 Soil Observations

Table 2.2 below provides a general composition of material encountered during the drilling of boreholes in the capped waste stockpile.

Table 2.2: Subsurface Conditions beneath the Capped Waste Stockpiles	
Depth (mbgs)	Lithology
0 – 0.5	Topsoil, SAND, brown, fine to medium grained, moist
0.5 – 1.6	CLAY, red and grey mottled, medium plasticity, dry (stockpile cap)
1.6 – 1.8	Gravel, dark grey / black, fine to medium grained (gas buffer layer)
1.8 – 12	Carbon, spent potlining (85 %), bath (5 %), and other material such as steel and clay (10 %)
>12	A mixture of sands and clays. Clays encountered were generally stiff with medium to high plasticity

A full description of material encountered is provided in the borelogs in **Appendix B**. **Photographs 1 to 7 in Appendix C** provide a further description of the material encountered.

2.3 Groundwater Sampling

The fieldwork methodology for groundwater sampling is outlined in Table 2.3 below:

Table 2.3: Groundwater Field Methodology	
Activity	Details
Well Installation	Groundwater wells were installed to target either groundwater within the capped waste stockpile, or groundwater beneath the stockpile. Wells installed below the base of the waste were sealed at the waste and natural soil interface. The wells were constructed using machine slotted 50 mm PVC screen from the base of the well to the top of the intercepted groundwater depth (where encountered) and screw threaded 50 mm PVC casing extended to the surface. The well annulus was backfilled with 2 mm graded sand to approximately 0.5 m past the top of the screen. This was followed by bentonite backfill for approximately 1 m, and then backfill with grout to the surface. Where the grout could not be effectively used as backfill due to large voids, bentonite backfill and soil cuttings were used in conjunction with grout. A lockable steel monument was installed with a concrete base over the well.
Well Development	Wells were developed by bailing the wells dry, or twelve well volumes with a bailer.
Well Gauging	Monitoring wells were gauged using an oil / water interface probe. The interface probe was decontaminated between each measurement.
Well Purging	Groundwater purging and sampling was completed a minimum of five days following well installation. At least 0.5 L was removed from each monitoring well (where water was encountered) using low flow peristaltic sampling equipment. Groundwater parameters, including pH, temperature, dissolved oxygen, redox potential and electrical conductivity were recorded using a water quality meter during purging. Field sheets are provided in Appendix D .
Sampling Methods	Following stabilisation of groundwater parameters, sampling was completed using low flow techniques.
Decontamination	A short length of silicone tubing used in the peristaltic pump was decontaminated using Decon90 and potable water. All other pump components were disposable.
Disposal of Water	Groundwater collected during purging and sampling was disposed of to the surge pond.
Monitoring Well Survey	Groundwater monitoring wells were surveyed following installation. A plan showing the survey is presented in Figure 3 in Appendix A .

2.4 Groundwater Observations

During the drilling of the new wells, groundwater was encountered within 5 of the 6 newly installed wells. The measured groundwater ranged between 12.19 and 13.21 mbgs.

The newly installed groundwater wells were gauged during groundwater sampling, as shown in **Table 2.4** below. Groundwater encountered within the newly installed monitoring wells was generally described as "turbid, brown". This description is consistent with other leachate impacted groundwater within the nearby proximity to the capped waste stockpile. **Photographs 8 and 9 in Appendix C** provide a further description of the groundwater encountered in MW206.

Table 2.4: Depth to Water (mAHD)					
Well ID	Screened Interval (mbgs)	Screened Material	Depth to base of waste (mbgs)	Depth to Water (mbgs) 2015	Depth of Well (mbgs)
MW201	4.5 – 10.5	Waste	10.5	-	10.47
MW202	14 - 15.5	Clayey SAND	12.0	12.19	15.42
MW203	12 – 14	Sandy CLAY	12.0	13.21	14.12
MW204	12.6 – 13.3	Clayey SAND	12.0	12.49	13.72
MW205	12 – 12.5	SAND	12.0	12.38	12.56
MW206	11.8 – 14.8	SAND and Waste	12.0	12.45	14.85

- No groundwater encountered.

Groundwater parameters were recorded during groundwater sampling, including pH, electrical conductivity (EC), redox potential, dissolved oxygen and temperature. This data is presented in Table 2.5 and field sheets are included in **Appendix D**.

Table 2.5: Groundwater Parameters						
Well ID	pH	EC (µS/cm)	DO (ppm)	Redox (Eh)	Temp (°C)	TDS (ppk)
MW201	DRY					
MW202	9.08	26,800	0.08	-276	21.2	17.1
MW203	9.16	17,500	0.15	-244	21.9	11.39
MW204	10.28	36,800	0.24	-147	22.3	23.9
MW205	DRY					
MW206	10.68	42,600	0.06	-363	23.4	27.8

The electrical conductivity within the groundwater monitoring wells ranged between 17,500 and 42,600 µS/cm. Additionally, the pH within the groundwater monitoring wells ranged from 9.08 and 10.68 pH units. Elevated pH, EC and TDS are indicative of leachate impacts.

3. ASSESSMENT CRITERIA

3.1 Soil

The criteria proposed for the assessment of soil contamination were sourced from the following references.

3.1.1 NEPM 2013

The variation to the National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) was approved on 19 June 2013 by the NSW EPA under the Contaminated Land Management Act 1997. NEPM (2013) provide revised health-based soil investigation levels (HILs) and ecological-based investigation levels (EILs) for various land uses. The NEPM 2013 also introduces health-based and ecological screening levels and management limits for petroleum hydrocarbons (HSLs and ESLs). The levels have been derived from recent assessments that more accurately define the exposure mechanisms and risks from sites contaminated with petroleum hydrocarbons.

The guidelines adopted for the site from the NEPM are as follows:

- HIL D – Health investigation level for commercial/industrial such as shops, offices, factories and industrial sites. The HILs are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are generic to all soil types and apply generally to a depth of 3 m below the surface for industrial use.

The NEPM (2013) commercial/industrial values were derived assuming a typical commercial or light industrial scenario, consisting of single or multistorey buildings where work areas are on the ground floor. NEPM (2013) assumed that the commercial/industrial facility is largely covered by handstand with some limited areas of unsurfaced ground (20% of site is unsurfaced). Opportunities for direct access to soil by employees was considered minimal but there is a potential for employees to inhale, ingest or come into direct contact with dust particles derived from the soil on the site. In absence of site specific details, the generic industrial site use exposure profiles are considered applicable.

- HSLs for commercial/industrial use - Health screening levels for soil vapour intrusion from petroleum hydrocarbons are guidelines that prevent accumulation of vapours at concentrations that may represent a health risk. The HSLs are derived for various depths and are for the same generic land uses as for the HILs. The guidelines are relevant where soils are beneath buildings or structures such as confined spaces;
- EIL for commercial/ industrial use – ecological investigations levels applicable for assessing risk to terrestrial ecosystems. EILs depend on specific soil physicochemical properties and generally apply to the top 2 m of soil.
- ESLs for commercial/ industrial use – ecological screening levels developed for selected petroleum hydrocarbon compounds and fractions and are applicable for assessing risk to terrestrial ecosystems. These are also generally applicable to the top 2m of soil.
- Management Limits where concentrations above these limits may indicate poor aesthetics, high odour and potentially explosive vapour. Management limits are to be applied after consideration of relevant ESLs and HSLs.

The applicable assessment criteria for heavy metals and polynuclear aromatic hydrocarbons (PAHs) in soil are presented in **Table 3.1**.

Table 3.1: Soil Assessment Criteria (mg / kg) – Health and Ecological Investigation Levels		
	HIL D	EIL
Aluminium	NL (site-specific) ²	-
Mercury (inorganic)	730	-
Fluoride	17,000 (site-specific) ¹	-
Cyanide (free)	1500	-
Carcinogenic PAHs (as BaP TEQ)	40	-
Total PAHs	4000	-
DDT	-	640
Naphthalene	-	370

1 Site-specific industrial fluoride value calculated in the *Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIRON 2013)*

2. NL: indicates that the site-specific risk-based aluminium screening criteria for industrial soil is a concentration greater than physically possible in soil, and therefore the criteria is defined as 'Non-Limiting' or NL (ENVIRON 2013).

The applicable assessment criteria for petroleum hydrocarbons in soil are presented in **Table 3.2** and **Table 3.3**.

Table 3.2: Soil Assessment Criteria for Vapour Intrusion - HSL D (mg / kg) - Sand				
	0 to <1m	1m to <2m	2m to <4m	4m +
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	230	NL	NL	NL
Naphthalene	NL	NL	NL	NL
Benzene	3	3	3	3
F1(4)	260	370	630	NL
F2(5)	NL	NL	NL	NL

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

2 (For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit >50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

3 To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

4 To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Table 3.3: ESLs and Management Limits for Petroleum Hydrocarbons in Soil			
TPH fraction	Soil texture	ESLs (mg / kg dry soil)	Management Limits ¹ (mg / kg dry soil)
		Commercial and Industrial	Commercial and Industrial
F1 C6-C10	Coarse	215*	700
F1 >C6-C10	Coarse	215	1000
F2 >C10-C16	Coarse	170	1000
F3 >C16-C34	Coarse	1700	3500
F4 >C34-C40	Coarse	3300	10 000
Benzene	Coarse	75	-
Toluene	Coarse	135	-
Ethylbenzene	Coarse	165	-
Xylenes	Coarse	180	-
Benzo(a)pyrene	Coarse	72 ⁵	-

1 Management limits are applied after consideration of relevant ESLs and HSLs.

2 Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

3 ESLs are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability.

4 To obtain F1, subtract the sum of BTEX from C6-C10 fraction.

5 Benzo(a)pyrene ESL criteria from Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and Other PAHs (Environmental and Human Health Effects) Scientific Criteria Document (revised)

NEPM (2013) includes a low reliability ecological screening criterion for benzo(a)pyrene of 1.4 mg/kg for commercial/industrial land use. This criterion has been adopted from Environment Canada (1999) benzo(a)pyrene soil quality guideline, which is based on toxicity data for a single invertebrate species (an earthworm). Environment Canada revised their benzo(a)pyrene soil quality guideline in 2010 using the Species Sensitivity Distribution method, which is the preferred method for the derivation of ecological investigation levels and can only be used where sufficient toxicity data are available that adhere to rigorous quality control requirements. Ramboll Environ has elected to use the revised Environment Canada soil quality guideline of 72 mg/kg, for commercial/industrial land use, as the most relevant ecological investigation level for benzo(a)pyrene at the Smelter Site as this guideline has been derived from a larger and more up-to-date toxicity database than the NEPM (2013) low reliability criterion.

NEPM (2013) do not provide criteria for fluoride in soils in Australia. Therefore, Ramboll Environ (2013) conducted a preliminary level Human Health Risk Assessment (HRA) specific to fluoride in order to derive a specific preliminary screening level for fluoride for the Hydro Aluminium Kurri Kurri Smelter. The screening levels are protective of the range of human receptors and are provided in **Table 3.4**.

Table 3.4: Site Specific Soil Assessment Guidelines for Fluoride (mg / kg)	
Preliminary screening levels	
Land Use	Preliminary screening level
Commercial/ industrial - soil	17,000mg/kg

Consistent with the guidance provided in the NEPM, the data was assessed against the above adopted site guidelines by:

- Comparing individual concentrations against the relevant guidelines and if discrete samples are in excess of the relevant guideline then;
- Comparing the 95% upper confidence limit of mean against the relevant guideline also ensuring that:
 - the standard deviation of the results is less than 50% of the relevant investigation or screening level, and
 - no single value exceeds 250% of the relevant investigation or screening level.

3.1.2 Waste Assessment

A preliminary waste characterisation has been undertaken to identify the likely classification of the fill material within the stockpile. The material has been screened against the NSW EPA Waste Classification guidelines, and the NSW EPA – Chemical Control Order in Relation to Aluminium Smelter Wastes Containing Fluoride and/or Cyanide.

3.1.2.1 NSW EPA Waste Classification Guidelines

The criteria to be used for the preliminary waste assessment of the stockpiled fill material for disposal off-site are the NSW EPA (2014) Waste Classification Guidelines. Part 1: Classifying Waste, 2014.

Waste classification is two tiered. The first set of guidelines is based on total contaminant concentrations, whereas the second set of guidelines is based on a leachable (TCLP) concentration and a total contaminant concentration. Material can be classified as General Solid Waste, Restricted Solid Waste, Hazardous Waste, and/or Special Waste by these guidelines.

'Special Waste' is a class of waste that has unique regulatory requirements, such as asbestos waste. If special waste is mixed with restricted solid or hazardous waste, it needs to be managed as both of those classifications as applicable.

3.1.2.2 NSW EPA – Chemical Control Order in Relation to Aluminium Smelter Wastes Containing Fluoride and/or Cyanide

Chemical control orders are a primary regulatory tool under the Environmentally Hazardous Chemicals Act 1985 (EHC Act) and are used by the EPA to selectively and specifically control particular chemicals of concern, and limit their potential or actual impact on the environment. Chemical control orders complement other environmental legislation by providing a rapid and flexible mechanism for responding to emerging chemical issues.

Chemical control order in relation to aluminium smelter wastes containing fluoride and/or cyanide (1986) sets controls on activities throughout the chemical's lifecycle through general requirements and by requiring that certain things be subject to particular licence conditions.

3.2 Groundwater

The assessment criteria proposed for the assessment of groundwater contamination are sourced from the following references:

- National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM 2013).
- National Health and Medical Research Council (2008) Guidelines for Managing Risks in Recreational Water.

- NSW DEC (2007) Guidelines for the Assessment and Management of Groundwater Contamination.
- ANZECC & ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

3.3 Potential Beneficial Uses

NSW DEC (2007) indicates that for assessing groundwater quality, it is first necessary to assess the beneficial uses of groundwater and surface water down gradient of the site.

The closest off-site surface water receptor is Swamp Creek which is located approximately 410 m to the south, and 530 m to the east of the capped waste stockpile. This creek is located within an area of the buffer zone that is used for farming. Swamp Creek discharges to the Wentworth Swamp which in turn discharges to the Hunter River approximately 15km north-east of the site near Maitland.

Surface water within Swamp Creek is described generally as neutral, ranging between pH 7.0 and 7.8 and conductivity being generally fresh, ranging from 626µS/cm to 1520µS/cm. This surface water body is considered to be a fresh water receptor.

Groundwater is expected to follow the topography and flow north-east towards surface water bodies that feed into the Hunter River.

According to the Office of Industry and Investment, NSW, there are 17 licensed groundwater abstractions (bores) located within the site, which are known to be associated with monitoring of groundwater impact. There are no other licensed groundwater bores within 2km of the site.

Potential beneficial uses of groundwater down gradient of the site include:

- Discharge into Swamp Creek, which supports aquatic ecosystems and potentially flows into the Hunter River;
- Recreational use of Swamp Creek for swimming and fishing; and
- Abstraction of surface water from Swamp Creek which may be used for stock watering and/or irrigation.

3.4 Appropriate Criteria for Groundwater

Based on the review of potential beneficial uses of groundwater and surface water, the criteria for protection of aquatic ecosystems, recreation, irrigation and stock watering will be used.

The investigation levels presented in ANZECC & ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality are considered applicable for the protection of aquatic ecosystems of receiving waters. ANZECC (2000) advocates a site-specific approach to developing guideline trigger values based on factors such as local biological effects data and the current levels of disturbance of the ecosystem. The guidelines present 'low risk trigger values' which are defined as concentrations of key performance parameters below which there is a low risk of adverse biological effects. If these trigger values are exceeded, then further action is required which may include further site-specific investigations to assess potential contamination or management/remedial action.

Low risk trigger values are presented in Table 3.4.1 of ANZECC (2000) for the protection of 80-99% of species in fresh and marine waters, with trigger values depending on the health of the receiving waters.

Groundwater results will be compared against trigger values for the protection of 95% of freshwater species where available (low reliability values are used in absence of high reliability values). ANZECC (2000) indicates there is currently insufficient data to derive a high reliability trigger value for TPH but propose a low reliability trigger value of 7 µg/L. This guideline is considered by industry to be overly conservative and is well below the TPH detection limit that most laboratories can achieve. Therefore the limit of reporting (LOR) will be adopted as a screening trigger for TPH.

Guidelines for Managing Risks in Recreational Water (2008) indicates that a qualitative assessment of recreational use can be undertaken using 10 times the concentrations of chemicals stipulated in the Australian Drinking Water Guidelines (2011). This is based on an assumed contribution for swimming equivalent to 10% of drinking water consumption.

Investigation levels for livestock drinking water are not available for organic contaminants, such as TPH and PAHs. In the absence of available investigation levels, human health drinking water levels will be used from NHMRC (2011) Australian Drinking Water Guidelines for screening criteria.

The Ramboll Environ (2013) Health Risk Assessment identified a preliminary screening criteria of 1,500 µg/L for fluoride for recreational use. This guideline value has been adopted in this evaluation as Swamp Creek, the closest surface water body, is used recreationally. The guideline that is protective of aquatic ecosystems has not been developed.

A summary of the assessment criteria for groundwater are provided in Table 3.5.

Table 3.5: Groundwater Assessment Criteria (µg/L)				
Contaminant	95 % Protection for Aquatic Ecosystems	Recreational use	Irrigation (long-term trigger value)	Stock Watering
Aluminium	55	9000 (site-specific)	5000	5000
Fluoride	-	1500 (site-specific)	1000	2000
Arsenic (AsIII)	24	100	100	500
Cadmium	2 (HMTV)	20	10	10
Chromium (CrIII)	27 (HMTV)	500 (as CrVI)	100	1000
Copper	12 (HMTV)	20,000	200	500
Lead	87 (HMTV)	100	2000	100
Nickel	97 (HMTV)	200	200	1000
Zinc	70 (HMTV)	30,000	2000	20,000
Mercury	0.6	10	2	2
TPH C6-C36	LOR	-	LOR	LOR
Benzene	950	10	-	-
Toluene	180 (LR)	250	-	800 (25)
Ethylbenzene	80 (LR)	30	-	300 (3)
Xylene	200	200	-	600 (20)
Benzo(a)pyrene	0.2 (LR)	0.1	-	0.01
Naphthalene	16	-	-	-
Phenanthrene	2	-	-	-
Fluoroanthene	1	-	-	-
Cyanide (free)	7	800	-	-

Notes:

HMTV: hardness modified trigger values calculated in accordance with ANZECC (2000) methodology

LR: low reliability trigger values

Site-specific: fluoride and aluminium recreational values are site-specific and were calculated in the Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIRON, 2013)

4. QUALITY ASSURANCE AND QUALITY CONTROL

The following quality assurance/quality control (QA/QC) procedures were employed during the sampling program:

- All samples were collected by personnel trained and experienced in the collection of soil groundwater samples for analysis, using standard industry techniques for sample collection;
- All reusable sampling equipment was decontaminated with Decon90 prior to sampling to minimise the opportunity for cross contamination;
- All samples were promptly placed in clean, laboratory-supplied containers appropriate for the required analyses and containing the appropriate preservative;
- All samples were labelled with unique names, identifying location and date;
 - All samples were immediately placed in chilled coolers;
 - All samples were sent to the laboratory under chain-of-custody (COC) protocols;
 - All samples were analysed within the recommended holding times;
 - The water quality meter, LELs, and PID were hired from a rental company who calibrated the equipment prior to hire. The LELs and PID were also calibrated in the field each day prior to use. The daily calibration results are provided in the Field Sheets in **Appendix D**. Calibration certificates from the equipment suppliers are shown in **Appendix E**;
- The following quality control samples were also collected and submitted for analysis:
 - Three soil intralaboratory field duplicate;
 - One soil interlaboratory field duplicate;
 - One groundwater intralaboratory field duplicate;
 - One groundwater rinsate blank for alkalinity, sulfate, chloride, sodium, potassium, aluminium, mercury, cyanide, fluoride, PCBs, PAHs, TPH, TRH, and BTEXN.

A quality assurance assessment for this report is presented in **Table 4.1** below. An assessment was made of data completeness, comparability, representativeness, precision and accuracy based on field and laboratory considerations. Laboratory reports are provided in **Appendix F**.

Table 4.1: QA/QC – Field and Laboratory Quality Assurance and Quality Control	
Field and Lab QA/QC	Ramboll Environ Comments
	Intralaboratory duplicate groundwater samples were analysed at a rate of 9%. Intralaboratory duplicate soil samples were analysed at a rate of 3%. One rinsate blank was collected from the LDPE tubing for the groundwater sampling. The water quality meter, LELs, PID were calibrated by the equipment supplier prior to hire of the equipment. The LELs and PID were calibrated daily in the field, with the exception of Day 1. Standard practice is to rely on pre-hire calibration for first day of use, or short periods of hire.

Table 4.1: QA/QC – Field and Laboratory Quality Assurance and Quality Control	
Field and Lab QA/QC	Ramboll Environ Comments
Field quality control results	Intralaboratory duplicate and rinsate blank results are presented in Table 3 and 4 in Appendix G. The rinsate blank results were all below the LOR, with the exception of aluminium. Aluminium (40 µg/L) was above the LOR (10 µg/L). Relative Percent Differences (RPDs) in soil were all below the RPD criteria with the exception of: MW202-13.5/QA101 - chloride, potassium, aluminium and fluoride (total). MW203-2.5/QA100 – sodium, fluoride (soluble), naphthalene, acenaphthene, fluorene, anthracene, fluoranthene, pyrene, and sum of PAHs; and MW204-2.5/QA101/QA201 – sodium, fluoride (soluble), phenanthrene, fluoranthene, pyrene, and sum of PAHs. In the instances listed above, the RPD for soil results between the primary and duplicate sample has been reported as greater than 30%. These discrepancies have been reviewed and are considered to be a result of sample heterogeneity. The highest concentration has been reported in each instance in order to be conservative. RPDs in groundwater were all below the RPD criteria with the exception of bicarbonate alkalinity and some PAH compounds.
NATA registered laboratory and NATA endorsed methods	ALS was used as the primary laboratory. Eurofins MGT was used as the secondary laboratory. The laboratory certificates are NATA stamped. Laboratory reports are provided in Appendix F .
Analytical methods	Summary analytical methods were included in the laboratory test certificates.
Holding times	Review of the CoCs and laboratory certificates indicate that holding times were predominantly met. Four samples were extracted for analysis 8 days out of holding time. Additionally, one sample was extracted and analysed 6 days out of holding time.
Practical Quantitation Limits (PQLs)	PQLs for all soil analytes were below the adopted screening criteria. PQLs for all groundwater analytes were below the adopted screening criteria, with the exception of ethylbenzene, and free cyanide.
Laboratory quality control samples	Laboratory quality control samples including duplicates, laboratory control samples, matrix spikes, surrogate spikes and blanks were undertaken by the laboratories at appropriate frequencies, with the exception of the following: Soil Moisture content duplicate (ES1536271); Cations and Major Anions duplicate (ES1535096, ES1535263); and Total Metals matrix spike (ES1535096, ES1535263, ES1535499 and ES1535624). Groundwater PAH/Phenols, PCB, TRH (semi-volatile) duplicate (ES1535970); and Dissolved metals, PAH/Phenols, PCBs, TRH (semi-volatile) matrix spikes (ES1535970).

Table 4.1: QA/QC – Field and Laboratory Quality Assurance and Quality Control	
Field and Lab QA/QC	Ramboll Environ Comments
Laboratory quality control results	The results for method blanks, laboratory duplicates, laboratory control samples (LCS), matrix spikes and surrogates were considered to be within the limit of reporting, with the exception of: Soil Matrix spike recoveries for total cyanide (ES1535096, ES1535624), chloride (ES1535263), fluoride (ES1535499, ES1536271), and pyrene (ES1536271) were outside of acceptable limits due to high background concentrations; LCS recoveries for alkalinity (ES1535096, ES1535263), and 2-4 dichlorophenol, bis(2-chloroethyl)ether, hexachlorocyclopentadiene, and diazinon (ES1536271) were outside of the LCS acceptance criteria; and Duplicate RPDs were outside of the acceptable limits for mercury (ES1535263), benzo(a)pyrene, sum of PAHs (ES1535499, ES1535624), benz(a)anthracene, benzo(a)pyrene, benzo(b+j)&benzo(k)fluoranthene, fluoranthene, and pyrene (ES1536271). Groundwater Matrix recoveries for sulfate and Fluoride (ES1535970) due to high background concentrations; and Surrogate recovery for 2.4.6-Tribromophenol (ES1535970). These outliers are not considered to affect the quality of the data.

Overall it is considered that the completed investigation works and the data obtained adequately complied with the requirements of NEPM Amendment 2013. Minor exceedences of some quality control parameters are considered acceptable given the variability of the materials, the high inorganic content and the purpose of the data evaluation. In general, the Data Quality Indicators of completeness, comparability, representativeness, precision and accuracy outlined above have been met. It is considered that the data are of suitable quality to meet the project objectives.

5. RESULTS

5.1 Gas

Table 5.1 below provides a summary of the gas concentrations encountered during the drilling works.

Table 5.1: Gas Concentrations Recorded During Drilling							
Well	Depth (mbgs)	O₂ (%)	CO (ppm)	NH₃ (ppm)	LEL¹ (%)	H₂S (ppm)	Comments
MW201	3	20.1	30	0	0	-	-
	6	16.0	OR*	208	16	-	-
	9	3.2	OR*	OR**	69	-	-
MW202	3	5.1	925	0	53	-	-
	6	17.0	300	0	0	-	-
	9	16.0	215	0	0	-	-
	12	15.2	250	0	0	-	-
	15	12	120	0	0	-	-
MW203	3	20.1	40	0	0	0	-
	6	18.0	350	0	30	0	-
	9	15.0	350	0	23	0	-
	12	16.0	300	3	25	0	-
	15	19.0	125	0	3	0	-
MW204	3	20.0	OR*	OR**	70	-	-
	6	20.1	125	0	3	-	-
	9	5.2	625	OR**	4	-	-
	12	4.6	867	OR**	3	-	-
MW205	3	7.0	1,436	-	36	1.0	-
	6	16.1	62	-	4	1.0	-
	9	18.1	55	-	3	0	-
	12	18.0	45	-	2	0	Water in rods – possibly blocking gas
	15	18.0	35	-	1	1.0	Water in rods – possibly blocking gas
MW206	3	20.1	505	OR**	27	-	-
	6	18.9	216	35	4	-	-
	9	17.0	57	0	3	-	-
	12	17.2	47	0	4	-	Water in rods – possibly blocking gas
	15	18.2	52	0	5	-	Water in rods – possibly blocking gas

*OR – Over Range. Range for Carbon Monoxide 0 - 1,500 ppm.

**OR – Over Range. Range for Ammonia 0 - 500 ppm.

¹Note: Lower explosive limit (LEL) calibrated to Methane.

The concentrations detected should be considered indicative only. It is considered likely that the water used during the drilling process may have prevented gases from entering the borehole at certain locations and depths.

5.2 Soil

A summary of the soil results from the assessment are provided in Table 5.2 below. Soil samples from the capped waste stockpile and underlying natural soils were analysed for chemicals of concern including cyanide, fluoride, aluminium, petroleum hydrocarbons, PAHs and asbestos. A

full list of soil results are provided in **Table 1** in **Appendix G**, and the laboratory reports are provided in **Appendix F**.

Table 5.2: Chemical Concentrations in waste materials and underlying soils					
Analyte	Units	Number of Samples Analysed	Min	Max	No. above GL
Waste materials					
pH Value	pH Unit	18	6.3	11.4	N/A
Electrical Conductivity @ 25°C	µS/cm	0	0	0	N/A
Asbestos	presence	19	No	Yes	6
Aluminium	mg/kg	0	0	0	N/A
Mercury	mg/kg	0	0	0	0
Total Cyanide	mg/kg	18	14	158	0
Total Cyanide (ZHE Leachate)	mg/L	18	0.198	8.54	0
Fluoride (total)	mg/kg	0	0	0	N/A
Fluoride (soluble)	mg/kg	18	184	21100	3
Fluoride (TCLP Leachate)	mg/L	18	68.9	909	15
Total Polychlorinated biphenyls	mg/kg	0	0	0	0
Naphthalene	mg/kg	6	<0.5	8.1	0
Benzo(a)pyrene	mg/kg	6	<0.5	832	3
Sum of polycyclic aromatic hydrocarbons	mg/kg	6	0.5	6320	2
Benzo(a)pyrene TEQ (half LOR)	mg/kg	6	0.6	1210	3
C6 C10 Fraction minus BTEX (F1)	mg/kg	0	0	0	0
>C16 C34 Fraction	mg/kg	0	0	0	0
>C34 C40 Fraction	mg/kg	0	0	0	0
>C10 C16 Fraction minus Naphthalene (F2)	mg/kg	0	0	0	0
Benzene	mg/kg	0	0	0	0
Toluene	mg/kg	0	0	0	0
Ethylbenzene	mg/kg	0	0	0	0
Total Xylenes	mg/kg	0	0	0	0
Sum of BTEX	mg/kg	0	0	0	N/A
Naphthalene	mg/kg	0	0	0	0
Volatile Organic Compounds	mg/kg	7	various	various	N/A
Dibenzofuran	mg/kg	6	<0.5	44.4	N/A
Carbazole	mg/kg	6	<0.5	50.5	N/A
Natural materials immediately beneath waste					
pH Value	pH Unit	6	9.7	10.5	N/A
Electrical Conductivity @ 25°C	µS/cm	6	1750	5250	N/A
Asbestos	presence	0			
Aluminium	mg/kg	6	3330	103000	N/A
Mercury	mg/kg	6	<0.1	0.1	0
Total Cyanide	mg/kg	6	26	734	0

Table 5.2: Chemical Concentrations in waste materials and underlying soils					
Analyte	Units	Number of Samples Analysed	Min	Max	No. above GL
Total Cyanide (ZHE Leachate)	mg/L	0			
Fluoride (total)	mg/kg	6	490	69000	N/A
Fluoride (soluble)	mg/kg	1	2700	2700	0
Fluoride (TCLP Leachate)	mg/L	0			
Total Polychlorinated biphenyls	mg/kg	6	<0.1	0.1	0
Naphthalene	mg/kg	6	<0.5	<0.5	0
Benzo(a)pyrene	mg/kg	6	<0.5	60	0
Sum of polycyclic aromatic hydrocarbons	mg/kg	6	12.5	475	0
Benzo(a)pyrene TEQ (half LOR)	mg/kg	6	0.6	93.2	1
C6 C10 Fraction minus BTEX (F1)	mg/kg	6	<10	<10	0
>C16 C34 Fraction	mg/kg	6	<100	2340	1
>C34 C40 Fraction	mg/kg	6	<100	1120	0
>C10 C16 Fraction minus Naphthalene (F2)	mg/kg	6	<50	<50	0
Benzene	mg/kg	6	<0.2	<0.2	0
Toluene	mg/kg	6	<0.5	<0.5	0
Ethylbenzene	mg/kg	6	<0.5	<0.5	0
Total Xylenes	mg/kg	6	<0.5	<0.5	0
Sum of BTEX	mg/kg	6	<0.2	<0.2	N/A
Naphthalene	mg/kg	6	<1	<1	0
Volatile Organic Compounds	mg/kg	1	various	various	N/A
Dibenzofuran	mg/kg	1	3.5	3.5	N/A
Carbazole	mg/kg	1	6.6	6.6	N/A
Natural soils > 0.5m below wastes					
pH Value	pH Unit	6	9.2	10.5	N/A
Electrical Conductivity @ 25°C	µS/cm	6	100	4030	N/A
Asbestos	presence	0	N/A	N/A	0
Aluminium	mg/kg	6	4460	16100	N/A
Mercury	mg/kg	6	<0.1	<0.1	0
Total Cyanide	mg/kg	6	4	60	0
Total Cyanide (ZHE Leachate)	mg/L	0			
Fluoride (total)	mg/kg	6	90	2140	N/A
Fluoride (soluble)	mg/kg	3	574	2360	0
Fluoride (TCLP Leachate)	mg/L	0			
Total Polychlorinated biphenyls	mg/kg	6	<0.1	<0.1	0
Naphthalene	mg/kg	9	<0.5	<0.5	0
Benzo(a)pyrene	mg/kg	9	<0.5	<0.5	0
Sum of polycyclic aromatic hydrocarbons	mg/kg	9	<0.5	2.3	0
Benzo(a)pyrene TEQ (half LOR)	mg/kg	9	0.6	0.6	0
C6 C10 Fraction minus BTEX (F1)	mg/kg	6	<10	<10	0

Table 5.2: Chemical Concentrations in waste materials and underlying soils					
Analyte	Units	Number of Samples Analysed	Min	Max	No. above GL
>C16 C34 Fraction	mg/kg	6	<100	<100	0
>C34 C40 Fraction	mg/kg	6	<100	<100	0
>C10 C16 Fraction minus Naphthalene (F2)	mg/kg	6	<50	<50	0
Benzene	mg/kg	6	<0.2	<0.2	0
Toluene	mg/kg	6	<0.5	<0.5	0
Ethylbenzene	mg/kg	6	<0.5	<0.5	0
Total Xylenes	mg/kg	6	<0.5	<0.5	0
Sum of BTEX	mg/kg	6	<0.2	<0.2	N/A
Naphthalene	mg/kg	6	<1	<1	0
Volatile Organic Compounds	mg/kg	0			N/A

A summary of the initial waste classification of soil are provided in **Table 5.3** below. A full list of waste classification results are provided in **Table 5** in **Appendix G**.

Table 5.3: Summary of Waste Classification Results							
Chemical	SCC1 General solid waste mg/kg	SCC2 Restricted solid waste mg/kg	TCLP1¹ Solid waste mg/L	TCLP2² Restricted Solid Waste mg/L	Chemical Control Order	Maximum SCC Value (mg/kg)	Maximum leachate concentration (mg/L)
Asbestos	--	--	--	--	--	Present	--
pH (pH units)	--	--	--	--	--	11.4	--
Electrical Conductivity (µS/cm)	--	--	--	--	--	7,900	--
Aluminium	--	--	--	--	--	--	--
Fluoride (soluble)	10,000	40,000	150	600	150	21,000	909
Total Cyanide	5,900	23,600	16	64	10	734	8.54
Mercury	50	200	0.2	0.8	--	<0.1	--
Calcium (Exchangeable)	--	--	--	--	--	22.8*	
Potassium	--	--	--	--	--	1,600	--
Sodium	--	--	--	--	--	40,000	--
Magnesium (Exchangeable)	--	--	--	--	--	0.4*	--
Total Alkalinity as CaCO ₃	--	--	--	--	--	7,420	--
Bicarbonate Alkalinity as CaCO ₃	--	--	--	--	--	5,320	--
Carbonate Alkalinity as CaCO ₃	--	--	--	--	--	5,510	--
Sulfate as SO ₄ 2-	--	--	--	--	--	2,480	--
Chloride	--	--	--	--	--	1,180	--
TPH C6-C9	650	2600	N/A	N/A	--	<10	--
TPH C10-36	10,000	40,000	N/A	N/A	--	510	--
Benzene	18	72	0.5	2	--	<0.2	--
Toluene	518	2073	14.4	57.6	--	<0.5	--
Ethyl benzene	1080	4320	30	120	--	<0.5	--
Xylene	1800	7200	50	200	--	<0.5	--
Benzo(a)pyrene	10	23	0.04	0.16	--	832	0.0007
Total PAHs	200	800	N/A	N/A	--	6,320	0.522
PCBs	<50	<50	--	--	--	0.1	--

5.3 Groundwater

A summary of the groundwater results from the assessment are provided in **Table 5.4** below. Results summary tables for groundwater are provided in **Table 2** in **Appendix G**, and the laboratory reports are provided in **Appendix F**.

Table 5.4: Summary of Groundwater Results						
Location	Date	Total Cyanide µg/L	Soluble Fluoride mg/L	TPH C6 - C36 µg/L	Naphthalene µg/L	Fluoranthrene µg/L
95 % Protection for Aquatic Ecosystems		-	-	LOR	16	1
Recreational Use		-	1.5	-	-	-
Irrigation (long-term trigger value)		-	1.0	LOR	-	-
MW202	11/11/15	7.81	1,880	350	1.4	<1.0
MW203	11/11/15	-	2.0	-	-	-
MW204	11/11/15	227	1,380	-	-	-
MW206	11/11/15	223	1,720	2,010	38.8	8.8

LOR – limit of reporting

6. DISCUSSION

6.1 Stratigraphy and Hydrogeology

Field work undertaken for the waste stockpile characterisation found topsoil to extend to approximately 0.5m, overlying up to 1.1m of capping clays. Clays were underlain by gravels comprising the gas collection layer. Topsoil, clays and gravels were not observed to contain waste materials.

Drilling was progressed through the waste using sonic drill methods and was found to refuse in many locations. Voids were present within the waste and gas emission coincident with the occurrence of voids was evident. Well purging was found successful in most instances to remove gas concentrations however on one occasion the bore hole required venting overnight to allow gas to mitigate prior to further progression.

The depth of fill within the boreholes drilled within the Capped Waste Stockpile was approximately 12 mbgs, with the exception of MW201 where fill was encountered up to approximately 10.5 mbgs. Undisturbed core samples were retrieved from the bore holes for inspection, including review by Hydro personnel experienced in site waste types. Wastes were predominantly black in colour and differentiation of material types was difficult. Generally, wastes encountered comprised of a varied mixture of solid carbon, spent pot lining, refractory bricks, bath (cryolite), steel, and other various waste materials.

Fill materials encountered throughout the six borehole were generally dry, with water present at the base of the wastes. Water was encountered within only four of the six groundwater monitoring wells. Groundwater was limited within the stockpile and in most cases was present just above the waste and natural surface interface. Clay was found to underlie the waste through the central and western portion. A shallow lens of sand was found beneath the eastern portion of the site, and found to extend to depths of >18 mbgs at the central eastern well MW206.

6.2 Evaluation of Stockpile Settlement

A landform survey of the capped waste stockpile was completed during surveying of the wells for comparison to the 1996 survey. Comparison with the 1996 survey found settlement has occurred, as outlined in **Table 6.1**. Settlement is most noticeable on the southern side of the capped waste stockpile, with the toe of the southern bank settling 0.9m over 19 years compared to settlement of between 0.5m and 0.67m on the western, northern and eastern sides. Gas vent 6, located on the southern side of the top of the stockpile, settled 1.72m, the largest settlement on the top of the stockpile by approximately 0.7m. The 1996 survey and the 2015 survey are included in **Appendix H**.

Table 6.1: Comparison of 1996 Survey to 2015 Survey			
Location	1996 Survey (mAHD)	2015 Survey (mAHD)	Difference (m)
Access Gate, western side	15.45	14.78	0.67
Toe of bank, northern side	15.59	15.10	0.49
Toe of bank, eastern side	15.96	15.40	0.56
Toe of bank, southern side	15.76	14.88	0.90
Gas Vent 1*	26.08	25.18	0.90
Gas Vent 2*	26.33	25.50	0.83
Gas Vent 3*	25.94	24.89	1.05
Gas Vent 4*	26.15	25.28	0.87
Gas Vent 5*	26.45	25.60	0.85
Gas Vent 6*	26.13	24.41	1.72
Gas Vent 7*	26.18	25.19	0.99
Gas Vent 8*	26.14	25.23	0.91
Gas Vent 9*	25.68	24.74	0.94
Gas Vent 10*	25.53	24.58	1.05
Gas Vent 11*	25.15	24.25	0.90
Gas vent 12*	24.77	23.90	0.87

* Natural Surface

6.3 Volume of waste soils

Based on survey information and the depth of wastes the estimate of volume is calculated to be between 95000 and 115000 cum. The estimated volume of underlying impacted soils is approximately 25000 cum.

6.4 Analysis of Wastes and Soils

Soil analytical results were compared to site adopted human health and ecological criteria. This comparison found the following chemicals of concern to be above the human health criteria:

- Asbestos in soil samples from MW201, MW202 and MW203. Amosite was detected in these three locations at depths ranging between 6 and 9 mbgs. Chrysotile was detected in MW203 at 7 mbgs;
- Soluble fluoride in soil samples from MW202 at a depth of 2 mbgs and in MW203 and MW204 at a depth of 9 mbgs;
- Benzo(a)pyrene TEQ in soil samples from MW201 at 3 mbgs, MW205 and MW206 at 11 mbgs and MW206 at 12 mbgs;
- Total PAHs in soil samples from MW205 and MW206 at a depth of 11 mbgs.

The following chemicals of concern were above the ecological criteria:

- Benzo(a)pyrene in soil samples from MW201 at 3 mbgs and MW205 and MW206 at 11 mbgs.
- Petroleum hydrocarbon fraction >C16-C34 in MW206 at 12m BGL.

Chemicals of concern, including total cyanide, aluminium, mercury, light fraction petroleum hydrocarbons (C6-C9) and BTEX, were not detected at concentrations exceeding the site criteria.

Table 5.2 includes a comparison of the total and leachable cyanide and fluoride concentrations to the site criteria and the allowable concentrations in the Chemical Control Order. This comparison shows that leachable cyanide concentrations do not exceed the allowable concentration in the Chemical Control Order. The maximum soluble fluoride concentration of 21,100mg/kg marginally exceeds the site criteria of 17,000mg/kg. The maximum leachable

fluoride concentration of 909mg/L was approximately six times the allowable concentration of 150mg/L in the Chemical Control Order.

A volatile organic compound (VOC) and semi-volatile organic compound (sVOC) screen was undertaken on six soil samples from within the waste materials. All results were below the LOR, with the exception of Dibenzofuran in MW205-11.3 (7.5 mg/kg) and MW206-11.0 (44.4 mg/kg) and Carbazole in MW204-2.5 (1.1mg/kg), MW205-11.3 (46.7 mg/kg) and MW206-11.0 (50.5 mg/kg).

Natural underlying soils from each of the six boreholes were analysed for a range of chemicals of concern. Analysis of natural underlying soils found PAHs from the waste materials have impacted the underlying sands and clays immediately below the base of the waste materials. At borehole MW206, the natural sands at the interface with the waste materials (12 mbgs) have a concentration of total PAHs that exceeds the human health criteria. PAH concentrations from the soil sample at 13m BGL were less than the laboratory detection limit, indicating that the leaching of PAHs from the waste materials into underlying natural soils is limited to less than 1m in depth.

6.5 Analysis of Groundwater

Analysis of groundwater identified the following:

- Fluoride concentrations exceeded all groundwater use criteria in the wells analysed;
- Aluminium concentrations exceeded ANZECC (2000) protection of 95% of aquatic ecosystems criteria in the wells analysed;
- Naphthalene, phenanthrene and fluoranthene in well MW206 exceeding ANZECC (2000) protection of 95% of aquatic ecosystems criteria;
- Petroleum hydrocarbons (C6-C36 fraction) exceeded groundwater use criteria for irrigation (long term trigger value), stock watering and ANZECC (2000) protection of 95% of aquatic ecosystems criteria in the wells analysed;
- Benzene in well MW202 was detected at a concentration exceeding the recreational use guideline however was well below the adopted guideline for vapour intrusion;
- Free cyanide concentrations did not exceed the site use criteria in any of the wells sampled.

6.6 Preliminary Waste Classification

Materials within the stockpile are intended to remain capped and are considered waste disposal under the Protection of the Operations Act 1979. In accordance with the NSW Waste Classification Guidelines, waste classification was undertaken. Following the classification hierarchy, material within the capped waste stockpile was considered to be Hazardous Special Wastes on the basis of elevated concentrations of leachable fluoride, benzo(a)pyrene and total PAHs and the presence of asbestos fibres.

The leachable concentrations of fluoride exceed the leachable fluoride guidelines provided in the Chemical Control Order in relation to Aluminium Smelter Wastes Containing Fluoride and/or Cyanide.

7. CONCLUSION

The assessment involved an intrusive site investigation which targeted the capped waste stockpile. The intrusive works were completed between 26th October and the 5th November 2015. The intrusive works comprised the drilling of six soil bores to a maximum depth of 18.0 mbgs, and the conversion of all six locations to permanent groundwater monitoring wells for the purpose of groundwater measurement and sampling. Groundwater monitoring wells were sampled on 11th November 2015.

The scope of the investigation was limited when considering the volume of waste contained however, the findings of the investigation are consistent with historical knowledge of the waste materials and groundwater behaviour and composition. On this basis the investigation further corroborates site knowledge and increases certainty regarding the stockpile contents.

Analysis of soil samples identified concentrations of soluble fluoride, asbestos and PAHs above the adopted site criteria. Elevated concentrations of TRH, Benzene, Cyanide, Anilines and Benzidines, Sodium, Chloride and Potassium were also identified throughout the fill materials.

The groundwater results indicate concentrations of Fluoride, Aluminium, Naphthalene, Phenanthrene, Fluoranthene, and TPH C6-C36 above the relevant site criteria.

The following key findings have been made during the assessment:

- The depth of the fill material in the six boreholes ranged between approximately 10.5 and 12 mbgs;
- The natural soils underlying the wastes generally comprised a mixture of Clays and Sands. Clays encountered during the works were considered to be firm to very stiff. A band of coarse grained sands (>5.4 m in thickness) was identified in MW206. This sand was identified to contain leachate impacted groundwater. A band of coarse grained sand (0.5 m in thickness) was also identified at location MW206;
- Elevated gas concentrations of Carbon Monoxide, Ammonia, and Methane were detected within the capped waste stockpile. Oxygen deficient concentrations as low as 3.2 % were also detected. Health and safety considerations for the identified gas are recommended for any work intrusive works;
- The fill material encountered during the drilling works was generally dry, indicating that the current stockpile cap is effective at reducing infiltration through the wastes. Leachate impacted groundwater was encountered within the underlying natural soils in four of the six groundwater monitoring wells installed;
- Soil sampling found asbestos fibres in three of the six boreholes. It is recommended that health and safety considerations for asbestos is made prior to any disturbance of the fill material within the stockpile, as well as transporting, and/or crushing the material;
- Chemical analysis of the waste materials for contaminants of concern classified the materials as 'Hazardous' and 'Special' waste on the basis of elevated total and leachable fluorides, total PAHs and asbestos fibre content; and
- Impacts to underlying natural soils are limited to shallow PAH impacts extending to less than 1.0m in to underlying soils.

8. LIMITATIONS

Ramboll Environ Australia Pty Ltd (Ramboll Environ) prepared this report in accordance with the scope of work as outlined in our proposal to Hydro Aluminium Kurri Kurri Pty Ltd dated 11th September 2016 and in accordance with our understanding and interpretation of current regulatory standards.

A representative program of sampling and laboratory analyses was undertaken as part of this investigation, based on past and present known uses of the site. While every care has been taken, concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. We cannot therefore preclude the presence of materials that may be hazardous. Site conditions may change over time. This report is based on conditions encountered at the site at the time of the report and Ramboll Environ disclaims responsibility for any changes that may have occurred after this time.

The conclusions presented in this report represent Ramboll Environ's professional judgment based on information made available during the course of this assignment and are true and correct to the best of Ramboll Environ's knowledge as at the date of the assessment.

Ramboll Environ did not independently verify all of the written or oral information provided to ENVIRON during the course of this investigation. While Ramboll Environ has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ramboll Environ was itself complete and accurate.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

8.1 User Reliance

This report has been prepared exclusively for Hydro Aluminium Kurri Kurri Pty Ltd and may not be relied upon by any other person or entity without Ramboll Environ's express written permission.

APPENDIX A

FIGURES



Hydro: Capped Waste Stockpile Assessment

Site Location



Hydro: Capped Waste Stockpile Assessment

Groundwater Well Assessment

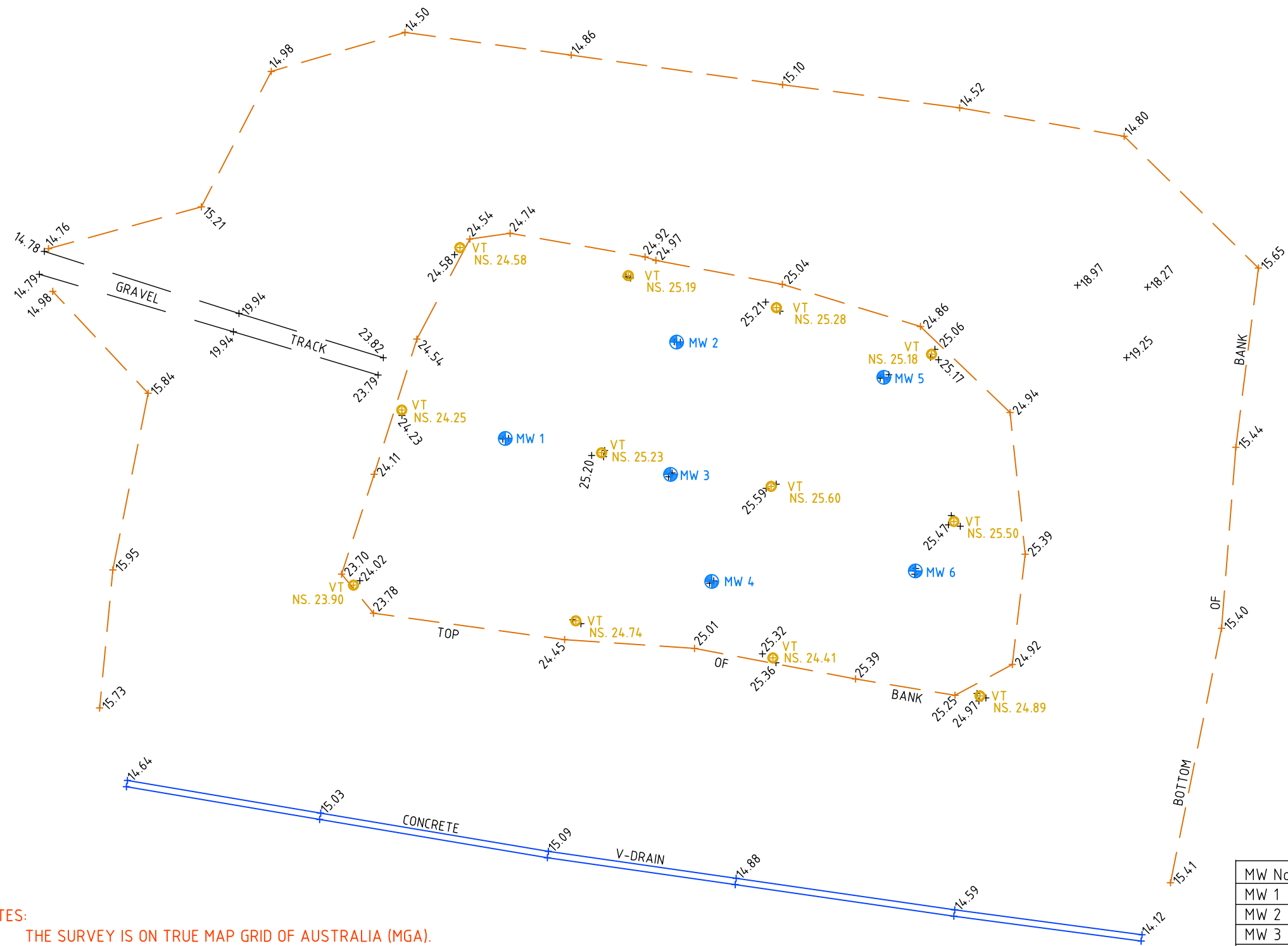


ENVIRON

JOB NO: AS130456

DATE: March 2016

FIGURE 2



- NOTES:
1. THE SURVEY IS ON TRUE MAP GRID OF AUSTRALIA (MGA).
 2. ALL REDUCED LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD).
 3. ORIGIN OF LEVELS FROM P.M.37964 R.L.19.455.
 4. ALL MONITORING WELLS REDUCED LEVELS HAVE BEEN TAKEN FROM THE TOP OF THE PVC PIPE.

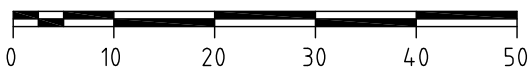
LEGEND

---	TOP & TOE OF BANKS
VT	VENT
MW	MONITORING WELL
NS	NATURAL SURFACE

MONITORING WELL CO-ORDINATES (M.G.A)

MW No.	EASTING	NORTHING	TOP PIPE RL.	NS
MW 1	358079.60	6371095.88	25.60	24.97
MW 2	358106.45	6371110.98	26.02	25.48
MW 3	358105.50	6371090.25	26.03	25.40
MW 4	358111.95	6371073.48	25.86	25.35
MW 5	358138.92	6371105.46	26.27	25.55
MW 6	358143.85	6371075.13	26.07	25.42

Bar Scale 1: 750 (A3)



THIS PLAN IS COPYRIGHT AND SHALL REMAIN THE PROPERTY OF DE WITT CONSULTING. THE CLIENT NAMED ON THE PLAN IS GRANTED A LICENCE TO USE THE INFORMATION. USING THE INFORMATION CONTAINED IN THIS PLAN IS PROHIBITED UNLESS WRITTEN APPROVAL IS GRANTED BY DE WITT CONSULTING. THE PLAN AND INFORMATION MAY ONLY BE USED FOR THE PURPOSE FOR WHICH THE PLAN WAS DESIGNED.



de Witt Consulting
planning ■ surveying ■ project management

HUNTER REGION
7 Canberra Street Charlestown NSW 2290
P 02 4942 5441 F 02 4942 5301
E admin@de Witt Consulting.com.au

WESTERN REGION
87 Herbert Street Gulgong
PO Box 232 Gulgong NSW 2852
P 02 6374 2911 F 02 6374 2922
ABN 23 104 067 405

TITLE

PLAN SHOWING
LOCATION OF MONITORING WELLS AND LEVELS

H		
G		
F		
E		
D		
C		
B		
A	22.02.2016	INITIAL ISSUE
Ed.	Date	Amendment

JOB ADDRESS: HYDRO ELECTRICITY SMELTER, KURRI KURRI
CLIENT: RAMBOLL ENVIRON

SCALE: 1:750 (A3)
SURVEY DATE: 17.02.2016
PLAN DATE: 19.02.2016
DATUM: AHD
CAD REF: 6455-DE-160217.mjo

ORIGIN OF LEVELS
P.M.37964
RL.19.455 (AHD)

DRAWN JG
SURVEYOR CM
CHECKED CM / WS
APPROVED WS

DRAWING REF: 6455-DET-19.02.2016.DWG

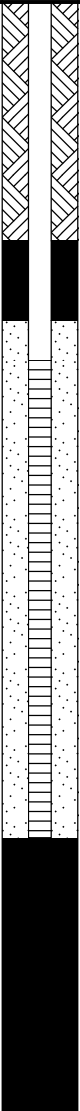
PLAN No
001
JOB REF:
6455

SHEET No
1/1

APPENDIX B

BORELOGS

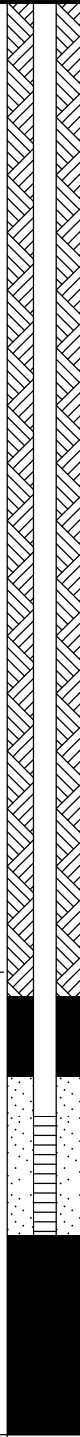
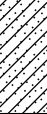
CLIENT <u>Hydro Aluminium Kurri Kurri</u>	PROJECT NAME <u>Groundwater Well Installation</u>
PROJECT NUMBER <u>AS130456</u>	PROJECT LOCATION <u>Capped Waste Stockpile</u>
DATE STARTED <u>26/10/15</u>	COMPLETED <u>26/10/15</u>
R.L. SURFACE _____	DATUM _____
DRILLING CONTRACTOR <u>Terratest</u>	SLOPE <u>90°</u>
EQUIPMENT <u>Sonic</u>	BEARING <u>---</u>
HOLE LOCATION _____	HOLE SIZE _____
LOGGED BY <u>MT</u>	CHECKED BY _____
NOTES _____	

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
Sonic				0			TOPSOIL; SAND; brown, moist, fine to medium grained		
				1			CLAY; red and grey mottled, dry, medium plasticity		
				2			GRAVEL; grey, medium grained (gas buffer layer)		
				3			FILL; carbon and SPL ~85%, Bath ~5%, other (steel and clay) ~10%, dry	MW201 - 3.0m	CO 30ppm, O2 20.1%, LEL 0%, NH3 0ppm
				4					
				6				MW201 - 6.0m	CO OR (>1500ppm), O2 16%, LEL 16%. NH3 208ppm
				8					
				10				MW201 - 9.0m	CO OR (>1500ppm), O2 3.2%, LEL 69%, NH3 OR (>500ppm)
				12			Sandy CLAY; moist, light and dark brown mottled, medium plasticity, residual	MW201 - 11.5m	
				14				MW201 - 14m	
							Borehole MW201 terminated at 14m		
				16					
				18					

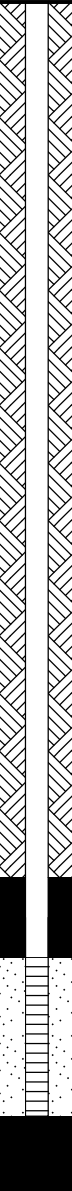
CLIENT Hydro Aluminium Kurri Kurri PROJECT NAME Groundwater Well Installation
 PROJECT NUMBER AS130456 PROJECT LOCATION Capped Waste Stockpile

DATE STARTED 4/11/15 COMPLETED 4/11/15 R.L. SURFACE _____ DATUM _____
 DRILLING CONTRACTOR Terratest SLOPE 90° BEARING ---
 EQUIPMENT Sonic HOLE LOCATION _____
 HOLE SIZE _____ LOGGED BY MT CHECKED BY _____

NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
Sonic				0			TOPSOIL; SAND; light brown, moist, fine grained	MW202 - 2.0m	CO 925ppm, O2 5.1%, LEL 53%, NH3 0ppm
				1			CLAY; brown/red mottled, medium plasticity, moist		
				2			GAS BUFFER LAYER CARBON AND SPL (~85%), Bath ~5%, other (steel and clay) ~10%		
				4				MW202 - 6.5m	CO 300ppm, O2 17.0%, LEL 0%, NH3 0ppm
				6					
				8					
				10				MW202 - 9.8m	CO 215ppm, O2 16%, LEL 0%, NH3 0ppm
				12					
				14			CLAY; grey, medium plasticity, stiff, moist, residual	MW202 - 12.0m MW202 - 13.5m	CO 250ppm, O2 15.2%, LEL 0%, NH3 0ppm
				16			Clayey SAND; light grey/light brown mottled, fine to medium grained, wet, residual		
				18			CLAY; light brown with grey and orange mottling, medium plasticity, stiff, moist, residual		
							Borehole MW202 terminated at 18m		CO 120ppm, O2 12%, LEL 0%, NH3 0ppm

CLIENT <u>Hydro Aluminium Kurri Kurri</u>	PROJECT NAME <u>Groundwater Well Installation</u>
PROJECT NUMBER <u>AS130456</u>	PROJECT LOCATION <u>Capped Waste Stockpile</u>
DATE STARTED <u>28/10/15</u>	COMPLETED <u>28/10/15</u>
DRILLING CONTRACTOR <u>Terratest</u>	R.L. SURFACE _____
EQUIPMENT <u>Sonic</u>	DATUM _____
HOLE SIZE _____	SLOPE <u>90°</u>
LOGGED BY <u>MT</u>	BEARING <u>---</u>
NOTES _____	HOLE LOCATION _____
CHECKED BY _____	

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
Sonic				0			Clayey SAND; brown, moist, fine to medium grained	MW203 - 2.5m	CO 40ppm, O2 20.1%, LEL 0%, H2S 0ppm
				1			CLAY; brown, orange and grey mottled, dry, stiff, medium plasticity		
				2			GRAVEL; black, fine grained, (gas buffer layer)		
				2			FILL; Carbon and SPL ~85%, Bath ~5%, Other (steel and clay) ~10%, dry	MW203 - 7.0m	CO 350ppm, O2 18%, LEL 30%, NH3 0, H2S 0ppm
				4					
				6					
				8					
				10				MW203 - 9.0m	CO 350ppm, O2 15%, LEL 23%, NH3 0ppm
				12					
				12			Sandy CLAY; dark grey, moist, low plasticity, tree roots present, residual	MW203 - 12.5m	CO 300ppm, O2 16%, LEL 25%, NH3 0ppm
				14			SANDY CLAY; light brown, moist, medium plasticity, becoming stiff, residual		
				14.5				MW203 - 14.5m	
				16			Borehole MW203 terminated at 15m		CO 125ppm, O2 19%, LEL 3%, NH3 0ppm
				18					

CLIENT Hydro Aluminium Kurri Kurri PROJECT NAME Groundwater Well Installation
 PROJECT NUMBER AS130456 PROJECT LOCATION Capped Waste Stockpile

DATE STARTED 11/11/15 COMPLETED 11/11/15 R.L. SURFACE _____ DATUM _____
 DRILLING CONTRACTOR Terratest SLOPE 90° BEARING ---
 EQUIPMENT Sonic HOLE LOCATION _____
 HOLE SIZE _____ LOGGED BY MT CHECKED BY _____

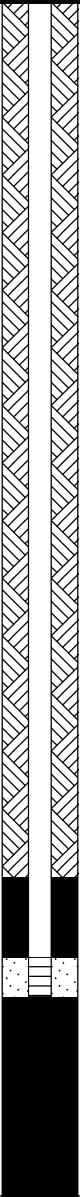
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
Sonic							TOPSOIL; SAND, brown, moist, fine grained	MW204 - 2.5m	CO OR (>1500ppm), O2 2.0%, LEL 70%, NH3 OR (>500ppm)
							CLAY; brown and orange/red mottled, moist, medium plasticity, stiff		
				2			GRAVEL, light grey, fine grained (<8mm), gas buffer layer		
							FILL; Carbon and SPL ~85%, Bath ~5%, Other (steel and clay) ~10%, dry	MW204 - 4.0m	
								MW204 - 6.0m	
								MW204 - 9.0m	
								MW 204 - 12.2m	
							Sandy CLAY; brown/grey mottled, dry, low-medium plasticity, stiff (tree roots present), residual	MW204 - 14.0m	
							Clayey SAND; light brown/grey mottled, wet, fine to medium grained, residual		
							Sandy CLAY; light brown/grey mottled, moist, medium plasticity, stiff, residual		
							Clayey SAND; light brown/grey mottled, moist, fine-medium grained, residual		
							Sandy CLAY; light brown/grey mottled, moist, medium plasticity, stiff, residual		
					18			Borehole MW204 terminated at 18m	

CLIENT Hydro Aluminium Kurri Kurri **PROJECT NAME** Groundwater Well Installation
PROJECT NUMBER AS130456 **PROJECT LOCATION** Capped Waste Stockpile

DATE STARTED 29/10/15 **COMPLETED** 30/10/15 **R.L. SURFACE** _____ **DATUM** _____
DRILLING CONTRACTOR Terratest **SLOPE** 90° **BEARING** ---
EQUIPMENT Sonic **HOLE LOCATION** _____
HOLE SIZE _____ **LOGGED BY** MT **CHECKED BY** _____

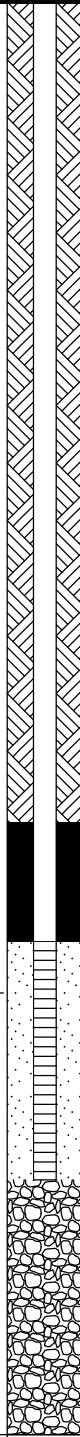
NOTES _____

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
Sonic							TOPSOIL; Clayey SAND; brown, dry, fine grained	MW205 - 5.5m	CO 1436ppm, O2 7%, LEL 36%, H2S 1.0ppm
							CLAY; brown and red mottled, moist, low plasticity with gravel		
				2			GRAVEL; dark grey, fine to medium grained, gas buffer layer		
							FILL; Carbon and SPL, ~85% bath ~10%, 2nd cut SPL (refractory brick), other (steel, clay) ~5%, dry		
				4					
				6					
				8					
				10					
				12					
							SAND; grey, fine to medium grained, wet, pieces of tree roots and organic matter present, residual		
							Sandy CLAY; light brown, stiff, dry, residual	MW205 - 12.2m	CO 45ppm, O2 18%, LEL 2%, H2S 0ppm
				14				MW205 - 14.5m	CO 35ppm, O2 18%, LEL 1%, H2S 1ppm
				16			Borehole MW205 terminated at 15m		
				18					

CLIENT Hydro Aluminium Kurri Kurri PROJECT NAME Groundwater Well Installation
 PROJECT NUMBER AS130456 PROJECT LOCATION Capped Waste Stockpile

DATE STARTED 3/11/15 COMPLETED 3/11/15 R.L. SURFACE _____ DATUM _____
 DRILLING CONTRACTOR Terratest SLOPE 90° BEARING ---
 EQUIPMENT Sonic HOLE LOCATION _____
 HOLE SIZE _____ LOGGED BY MT CHECKED BY _____

NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
Sonic				0			TOPSOIL; SAND; brown, fine grained, dry Silty CLAY; light brown/red mottled, high plasticity	MW206 - 3.0m	CO 505ppm, O2 20.1%, LEL 27%, NH3 OR (>500ppm)
				2			GRAVEL; dark grey, fine to medium grained, gas buffer layer		
				4			FILL; Carbon/SPL ~85%, Bath ~5%, other (steel and clay) ~10% Predominantly black carbon and carbon dust. Small sections of white (bath), small sections of red brick (SPL 2nd cut), very hard, dry		
				6				MW206 - 7.0m	CO 216ppm, O2 18.9%, LEL 4%, NH3 35ppm
				8					
				10					
				11				MW206 - 11.0m	CO 57ppm, O2 17%, LEL 3%, NH3 0ppm
				12			Becoming wet		
				12.5			SAND; light grey with black mottling, fine grained, residual	MW206 - 12.0m	CO 47ppm, O2 17.2%, LEL 4%, NH3 0ppm
				13			SAND; light brown/grey, fine to medium grained, tree roots present, residual	MW206 - 13.0m	
				14			Becoming clayey Coarse grained at 13.8m Fine-medium grained at 13.9m	MW206 - 13.5m	
				15				MW206 - 15.0m	CO 52ppm, O2 18.2%, LEL 5%, NH3 0ppm
				16					
				17			SAND; dark grey, wet, coarse grained, residual		
				18			Borehole MW206 terminated at 18m		

APPENDIX C

PHOTOGRAPHS



Photo 1: Sandy CLAY encountered beneath capped waste at borehole location MW201

Title:	Targeted Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Hydro Aluminium, Loxford NSW	FR	AS130456	March 2016
Client:	Hydro Aluminium Kurri Kurri Pty Ltd			



Photo 2: CLAY encountered beneath capped waste at borehole location MW202

Title:	Targeted Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Hydro Aluminium, Loxford NSW	FR	AS130456	March 2016
Client:	Hydro Aluminium Kurri Kurri Pty Ltd	RAMBOLL ENVIRON		



Photo 3: Steel encountered at borehole location MW202.

Title:	Targeted Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Hydro Aluminium, Loxford NSW	FR	AS130456	March 2016
Client:	Hydro Aluminium Kurri Kurri Pty Ltd	RAMBOLL ENVIRON		



Photo 4: Bath and waste material encountered at location MW203.

Title:	Targeted Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Hydro Aluminium, Loxford NSW	FR	AS130456	March 2016
Client:	Hydro Aluminium Kurri Kurri Pty Ltd	RAMBOLL ENVIRON		



Photo 5: Sandy CLAY encountered beneath capped waste at borehole location MW203



Photo 6: Waste material encountered from approximately 11.5 to 12.0 mbgs. Waste at approximately 11.8 mbgs was noted to be wet.

Title:	Targeted Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Hydro Aluminium, Loxford NSW	FR	AS130456	March 2016
Client:	Hydro Aluminium Kurri Kurri Pty Ltd			



Photo 7: SAND encountered beneath capped waste at borehole location MW206

Title:	Targeted Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Hydro Aluminium, Loxford NSW	FR	AS130456	March 2016
Client:	Hydro Aluminium Kurri Kurri Pty Ltd	RAMBOLL ENVIRON		



Photo 8: Leachate encountered at location MW206

Title:	Targeted Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Hydro Aluminium, Loxford NSW	FR	AS130456	March 2016
Client:	Hydro Aluminium Kurri Kurri Pty Ltd			



Photo 9: Leachate encountered at location MW203

Title:	Targeted Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Hydro Aluminium, Loxford NSW	FR	AS130456	March 2016
Client:	Hydro Aluminium Kurri Kurri Pty Ltd	RAMBOLL ENVIRON		

APPENDIX D

FIELD SHEETS

Groundwater Sampling Field Parameter Form

[illegible]

Groundwater Sampling Field Parameter Form

Ref. Number: <i>CWS 020 monitoring well installed</i>		Date: <i>11/11/15</i>	
Project: <i>AS130456</i>		Well Number: <i>WPM 202</i>	
Location: <i>Mt 202 CWS</i>		Sampler(s): <i>mt</i>	

Field Measurements			
Organic vapours in well:	<i>-</i>	ppm	Measurement Device: <i>PID / LEL</i>
Depth to Groundwater:	<i>12.73</i>	m	Measurement Device: <i>Interface Probe</i>
Correction:	<i>-</i>	m	
Groundwater Elevation:	<i>-</i>	m	
Depth to Immiscible Layer:	<i>-</i>	m	Measurement Device: <i>IP</i>
Thickness to Immiscible Layer:	<i>-</i>	m	
Well Depth:	<i>15.96</i>	m	
Thickness to Groundwater Column:	<i>-</i>	m	
Well Diameter:	<i>-</i>	mm	

Well Purging	
Volume to be purged = (TD-WL)/SWL x 1.9625 x # volumes to be purged.	
Volume in 50mm dia well is approximately 2L per metre:	
If purging:	If developing:
3 volumes to be purged: SWL x 5.9 = <i>L</i>	10 volumes to be purged: SWL x 19.6 = <i>L</i>
Water Level Depth: <i>m</i>	Purge Method: <i>Bailer / Pump</i>
# Well Volumes to be purged:	Well Volume to be purged: <i>L</i>
Observations during purging (turbidity, colour, sheen, odour):	
<i>* Depth to water @ end of readings (13:30pm) - 15.05m.</i>	

Well Sampling							
Method: ☐ Micro-Purge ☐ Peristaltic ☐ Bailer							
Start Sampling:				End Sampling:			
Sample Appearance:							
TIME	TEMP (°C)	SPEC. COND.	pH	DO	Redox	TDS	Comments (appearance, odour, etc)
<i>13:20</i>	<i>23.2</i>	<i>30.6ms</i>	<i>9.11</i>	<i>0.94</i>	<i>-173</i>	<i>20.2</i>	<i>Brown - leachate</i>
<i>13:26</i>	<i>21.3</i>	<i>26.8ms</i>	<i>9.08</i>	<i>0.08</i>	<i>-274</i>	<i>17.6 ppm</i>	<i>" "</i>
<i>13:28</i>	<i>21.2</i>	<i>26.8ms</i>	<i>9.08</i>	<i>0.08</i>	<i>-276</i>	<i>17.1 ppm</i>	<i>" "</i>

Miscellaneous Field Comments	
Well Head Integrity: <i>None</i>	
Samples Filtered: <i>metals</i>	
Weather Condition: <i>Hot, sunny</i>	
Other: <i>GHO collected samples in addition to leachate Evolon.</i>	

Groundwater Sampling Field Parameter Form

Ref. Number: <u>AS130456</u>		Date: <u>11/11/2015</u>	
Project: <u>CWS low monitoring installation.</u>		Well Number: <u>NW203</u>	
Location: <u>~~NW203~~ CWS.</u>		Sampler(s): <u>MT</u>	

Field Measurements			
Organic vapours in well:	<u>—</u>	ppm	Measurement Device: <u>Interface probe PIP/IEL</u>
Depth to Groundwater:	<u>13.84</u>	m	Measurement Device: <u>Interface probe.</u>
Correction:	<u>—</u>	m	
Groundwater Elevation:	<u>—</u>	m	
Depth to Immiscible Layer:	<u>—</u>	m	Measurement Device: <u>IP</u>
Thickness to Immiscible Layer:	<u>—</u>	m	
Well Depth:	<u>14.75</u>	m	
Thickness to Groundwater Column:	<u>—</u>	m	
Well Diameter:	<u>50</u>	mm	

Well Purging	
Volume to be purged = (TD-WL)/SWL x 1.9625 x # volumes to be purged.	
Volume in 50mm dia well is approximately 2L per metre:	
If purging:	If developing:
3 volumes to be purged: SWL x 5.9 = <u> </u> L	10 volumes to be purged: SWL x 19.6 = <u> </u> L
Water Level Depth: <u> </u> m	Purge Method: <u>Bailer / Pump</u>
# Well Volumes to be purged: <u> </u>	Well Volume to be purged: <u> </u> L
Observations during purging (turbidity, colour, sheen, odour):	

Well Sampling							
Method:		☒ Micro-Purge		☐ Peristaltic		☐ Bailer	
Start Sampling: <u>12:15</u>		End Sampling: <u>13:00</u>					
Sample Appearance:							
TIME	TEMP (°C)	SPEC. COND.	pH	DO	Redox	TDS	Comments (appearance, odour, etc)
<u>12:05</u>	<u>22.5</u>	<u>17.51ms</u>	<u>9.15</u>	<u>0.52</u>	<u>-215</u>	<u>11.28ppm</u>	
<u>12:08</u>	<u>22.1</u>	<u>17.50ms</u>	<u>9.16</u>	<u>0.36</u>	<u>-226</u>	<u>11.35ppm</u>	
<u>12:10</u>	<u>21.9</u>	<u>17.50ms</u>	<u>9.16</u>	<u>0.15</u>	<u>-244</u>	<u>11.39ppm</u>	<u>Water level - brown.</u>
<u>Purged dry - approx 200ml collected in unpreserved bottle.</u>							

Miscellaneous Field Comments	
Well Head Integrity: <u>New</u>	
Samples Filtered <u>None</u> No.	
Weather Condition: <u>Hot, Sunny.</u>	
Other:	

Groundwater Sampling Field Parameter Form

Ref. Number: AS130456						Date: 11/11/15						
Project: AWS AW Manly Well Installation.						Well Number: MW204						
Location: Murrumbidgee Creek						Sampler(s): NT						
Field Measurements												
Organic vapours in well:						-	ppm		Measurement Device: PID / LEL			
Depth to Groundwater:						13.00	m		Measurement Device: Interface Probe.			
Correction:						-	m					
Groundwater Elevation :						-	m					
Depth to Immiscible Layer:						-	m		Measurement Device: IP.			
Thickness to Immiscible Layer:						-	m					
Well Depth:						14.23	m					
Thickness to Groundwater Columnn:						-	m					
Well Diameter:						50	mm					
DRY C 14:40												
Well Purging												
Volume to be purged = (TD-WL)/SWL x 1.9625 x # volumes to be purged.												
Volume in 50mm dia well is approximately 2L per metre:												
If purging:						If developing:						
3 volumes to be purged: SWL x 5.9 =						L	10 volumes to be purged: SWL x 19.6 =					
Water Level Depth:						m	Purge Method: Bailer / Pump					
# Well Volumes to be purged:						Well Volume to be purged:						
							L					
Observations during purging (turbidity, colour, sheen, odour):												
Only 2 x Plastic unpreserved 1 x cyanide												
Well Sampling												
Method: ☒ Micro-Purge ☐ Peristaltic ☐ Bailer												
Start Sampling:						14:40	End Sampling: 15:00					
Sample Appearance: Leachate - brown.												
TIME	TEMP (°C)	SPEC. COND.	pH	DO	Redox	TDS	Comments (appearance, odour, etc)					
14:25	24.4	37.1ms	10.24	0.83	-96	24.0 ppk	Leachate - brown.					
14:28	23.7	37.2ms	10.25	0.64	-101	24.2	"					
14:33	22.4	36.8ms	10.27	0.24	-143	23.9	"					
14:35	22.3	36.8ms	10.28	0.24	-147	23.9.	"					
Miscellaneous Field Comments												
Well Head Integrity: New												
Samples Filtered Metals.												
Weather Condition: Hot, Sunny												
Other:												

Groundwater Sampling Field Parameter Form

Ref. Number: A3130456						Date: 11 / 8 / 15.																	
Project: CWS Gw monitoring well installation.						Well Number: MW205																	
Location: CWS.						Sampler(s): MT																	
Field Measurements																							
Organic vapours in well:						— ppm						Measurement Device: P10 / LER											
Depth to Groundwater:						13.10 m						Measurement Device: Interface probe.											
Correction:						— m																	
Groundwater Elevation :						— m																	
Depth to Immiscible Layer:						— m						Measurement Device: IP.											
Thickness to Immiscible Layer:						— m																	
Well Depth:						13.28 m																	
Thickness to Groundwater Column:						— m																	
Well Diameter:						50 mm																	
Well Purging																							
Volume to be purged = (TD-WL)/SWL x 1.9625 x # volumes to be purged.																							
Volume in 50mm dia well is approximately 2L per metre:																							
If purging:						If developing:																	
3 volumes to be purged: SWL x 5.9 =						L						10 volumes to be purged: SWL x 19.6 =						L					
Water Level Depth:						m						Purge Method: Bailer / Pump											
# Well Volumes to be purged:												Well Volume to be purged:						L					
Observations during purging (turbidity, colour, sheen, odour):																							
Well Sampling																							
Method:						☒ Micro-Purge						☐ Peristaltic						☐ Bailer					
Start Sampling:						Not Sampled						End Sampling:											
Sample Appearance:																							
TIME		TEMP (°C)		SPEC. COND.		pH		DO		Redox		TDS		Comments (appearance, odour, etc)									
Miscellaneous Field Comments																							
Well Head Integrity:																							
Samples Filtered																							
Weather Condition:																							
Other:																							

Groundwater Sampling Field Parameter Form

[illegible]

APPENDIX E

CALIBRATION

Gas Calibration Certificate



Instrument **MX6**
Serial No. **1203HBW-015**
Sensors **O2, LEL, H2S, CO, CH4**

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments				
Battery	Charge Condition	✓					
	Fuses	✓					
	Capacity	✓					
	Recharge OK?	✓					
Switch/keypad	Operation	✓					
Display	Intensity	✓					
	Operation (segments)	✓					
Grill Filter	Condition	✓					
	Seal	✓					
Pump	Operation						
	Filter						
	Flow						
	Valves, Diaphragm						
PCB	Condition	✓					
Connectors	Condition	✓					
Sensor				Low	High	TWA	STEL
	O2		✓	19.5%	23.5%	N/A	N/A
	LEL		✓	5% LEL	10% LEL	N/A	N/A
	H2S		✓	10ppm	20ppm	10ppm	15ppm
	CO		✓	30ppm	60ppm	90ppm	400ppm
	CH4		✓	1.00%	1.00%	N/A	N/A
Alarms	Beeper	✓					
	Settings	✓					
Software	Version						
Datalogger	Operation						
Download	Operation						
Other tests:							

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Diffusion mode		Aspirated mode				
Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No	Instrument Reading	
O2		Fresh Air			20.9%	
LEL		50% LEL	NATA	SY74	50% LEL	
H2S		25ppm H2S	NATA	SY74	25ppm H2S	
CO		100ppm CO	NATA	SY74	100ppm CO	
CH4 IR		60% CH4	NIST	SY87	60% CH4	

Calibrated by:

SB.

Sophie Boler

Calibration date: 26-Oct-15

Next calibration due: 23-Apr-16

Gas Calibration Certificate

Instrument MX6
Serial No. 12041QS-004
Sensors O2, LEL, CO, NH3, NO2



airmet

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad	Operation	✓				
Display	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation					
	Filter					
	Flow					
	Valves, Diaphragm					
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	O2 LEL CO NH3 NO2	✓ ✓ ✓ ✓ ✓	Low	High	TWA	STEL
			19.5%	23.5%	N/A	N/A
			5% LEL	10% LEL	N/A	N/A
			90ppm	400ppm	30ppm	60ppm
			75ppm	125ppm	25ppm	35ppm
			9ppm	15ppm	3ppm	55ppm
Alarms	Beeper	✓				
	Settings	✓				
Software	Version					
Datalogger	Operation					
Download	Operation					
Other tests:						

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Diffusion mode Aspirated mode

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No	Instrument Reading
O ₂		20.9% Vol		Fresh Air	20.9% Vol
LEL		50% LEL (Methane)	NIST	SY74	50% LEL
CO		100ppm CO	NIST	SY74	100ppm
NH3		25ppm NH3	NIST	SY70	23ppm
NO2		5ppm NO2	NIST	Lot#976936	4.8ppm

Calibrated by:

Joanna Wong

Calibration date:

21/10/2015

Next calibration due:

18/04/2016

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-105423



Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad	Operation	✓				
Display	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation	✓				
	Filter	✓				
	Flow	✓				
	Valves, Diaphragm	✓				
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	PID	✓	10.6 ev			
Alarms	Beeper	✓	Low	High	TWA	STEL
	Settings	✓	50ppm	100ppm	N/A	N/A
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:						

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp	T6573	100ppm Isobutylene	NIST	SY64		100.2 ppm

Calibrated by: DJ Darren Jing

Calibration date: 27/10/2015

Next calibration due: 26/11/2015

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-105892



Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad Display	Operation	✓				
	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation	✓				
	Filter	✓				
	Flow	✓				
	Valves, Diaphragm	✓				
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	PID	✓	10.6 ev			
Alarms	Beeper	✓	Low	High	TWA	STEL
	Settings	✓	50ppm	100ppm		
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:						

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		100ppm Isobutylene	NIST	SY64		100.1ppm

Calibrated by: DJ Darren Jing

Calibration date: 20/10/2015

Next calibration due: 19/11/2015

APPENDIX F

LABORATORY REPORTS



CHAIN OF CUSTODY

ALS Laboratory please tick →

GADELAIDE 21 Burns Road Pooraka SA 5033
Ph: 08 8360 0600 E: adelaide@alsglobal.com

OSBRY GANE 2 Byn Street Stafford QLD 4053
Ph: 07 543 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callamandah Drive Clinton QLD 4680
Ph: 07 7471 6600 E: gladstone@alsglobal.com

CHADWY 78 Harbours Road Mackay QLD 4740
Ph: 07 4944 0177 E: mackay@alsglobal.com

QUELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGE 1/23 Sydney Road Mudgee NSW 2850
Ph: 02 6372 6735 E: mudgee.mel@alsglobal.com

NEWCASTLE 5/535 Midland Road Mayfield West NSW 2304
Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

QINCH RA 4/13 Geary Place North Nowra NSW 2541
Ph: 02 4423 2053 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6060
Ph: 08 9209 7635 E: samples.perth@alsglobal.com

SYDNEY 277-280 Woodpark Road Smithfield NSW 2154
Ph: 02 8784 8166 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-16 Desma Court Coole QLD 4818
Ph: 07 4788 0800 E: townsville.environmental@alsglobal.com

WOLLONGONG 88 Kenny Drive Wollongong NSW 2500
Ph: 02 4225 5125 E: wollongong@alsglobal.com

CLIENT: <u>Ramboll Environ</u>	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Elements)	☒ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: <u>Newcastle</u>	ALSO QUOTE NO.:	☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: <u>CWS</u>	PROJECT NO.: <u>AG30456</u>		Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER:	PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	Random Sample Temperature on Receipt: 'C
PROJECT MANAGER: <u>Mark Tiedeman</u>	CONTACT PH:		Other comment:
AMPLER: <u>Mark Tiedeman</u>	SAMPLER MOBILE: <u>0410822410</u>	RELINQUISHED BY: <u>[Signature]</u>	RECEIVED BY: <u>Frank MS</u>
OC Emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: <u>2/12/15 14:50</u>	DATE/TIME: <u>4/12/15 11:00</u>
mail Reports to (will default to PM if no other addresses are listed): <u>greenfield@ramboll.com.au</u>		mail Invoice to (will default to PM if no other addresses are listed):	
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:			

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required).						Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Soluble Fluoride	Cyanide	Sulfide	pH	Cation Exchange	SVOL	Comments on likely contaminant levels, dilutions, or samples requiring specific QC
1	MW201-3.0	2/12/15	S		1	X	X	X	X	X	X	Subcon / Forward Lab / Split WO
2	MW201-6.0				1	X	X	X	X	X	X	Lab / Analysis: <u>MGT/PA201</u>
3	MW201-9.0				1	X	X	X	X	X	X	Organised By / Date:
4	MW202-2.0				1	X	X	X	X	X	X	Relinquished By / Date:
5	MW202-6.5				1	X	X	X	X	X	X	Connote / Courier:
6	MW202-9.8				1	X	X	X	X	X	X	WO No:
7	MW203-2.5				1	X	X	X	X	X	X	Attach By PO, Internal Sheet:
8	MW203-7.0				1	X	X	X	X	X	X	
9	MW203-9.0				1	X	X	X	X	X	X	
10	MW204-2.5				1	X	X	X	X	X	X	
11	MW204-6.0				1	X	X	X	X	X	X	
12	MW204-9.0				1	X	X	X	X	X	X	
TOTAL					12	12	12	12	12	12	12	

for Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airtight Unpreserved Plastic; VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulfate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airtight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulfate Bore; B = Unpreserved Bag; LI = Liquid Nitrogen Preserved Bottle; STT = Sterile Sodium Thiosulfate Preserved Bottle;



CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADLAIDE 21 Burns Road Pourke SA 5095
Ph: 08 8359 0800 E: adelaide@alsglobal.com

BRISBANE 2 Byth Street Stafford QLD 4053
Ph: 07 5243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 45 Callender Drive Clinton QLD 4680
Ph: 07 7471 5800 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740
Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 8500 E: samples.melbourne@alsglobal.com

MUDGEE 129 Sydney Road Mudgee NSW 2850
Ph: 02 8372 8738 E: mudgee@alsglobal.com

NEWCASTLE 5/585 Midland Road Mayfield NSW 2304
Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

NOOWRA 4/13 Geary Place North Nowra NSW 2541
Ph: 02 4423 2083 E: nowra@alsglobal.com

PERTH 10 Had Way Malaga WA 6060
Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-280 Woodpark Road Strathfield NSW 2154
Ph: 02 971 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Deane Court Bohle QLD 4814
Ph: 07 4798 0800 E: townsville.environment@alsglobal.com

WOLLONGONG 66 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT:	TURNAROUND REQUIREMENTS:		☐ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):	
FFICE:	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)			
PROJECT:	PROJECT NO.:	ALS QUOTE NO.:		
ORDER NUMBER:	PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:		
PROJECT MANAGER:	CONTACT PH:			
AMPLER:	SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY:	RECEIVED BY:
OC Emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME:	DATE/TIME:	DATE/TIME:
mail Reports to (will default to PM if no other addresses are listed):		mail Invoice to (will default to PM if no other addresses are listed):		
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:				

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED Including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Soluble Fluoride	Cyanide	Sodium	pH	Cation Exchange	sVOC		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
13	MW205-5.5	2/12/15	S		1	X	X	X	X	X			
14	MW205-9.0				1	X	X	X	X	X			
15	MW205-11.3				1	X	X	X	X	X	X		
16	MW206-3.0				1	X	X	X	X	X			
17	MW206-7.0				1	X	X	X	X	X			
18	MW206-11.0				1	X	X	X	X	X	X		
19	QA100				1	X	X	X	X	X			
20	QA201				1	X	X	X	X	X			
21	QA201				1	X	X	X	X	X			
22	Refraction Composite				1	X	X	X	X	X			Forward to MGT.
TOTAL					10	10	10	10	10	10			

For Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic;
VDA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugol's Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

Sample Receipt Advice

Company name: **Environ Sydney**
Contact name: Mark Tiedeman
Project name: CWS
Project ID: AS130456
COC number: Not provided
Turn around time: 5 Day
Date/Time received: Dec 7, 2015 11:05 AM
Eurofins | mgt reference: **482416**

Sample information

- ☒ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ☒ All samples have been received as described on the above COC.
- ☒ COC has been completed correctly.
- ☒ Attempt to chill was evident.
- ☒ Appropriately preserved sample containers have been used.
- ☒ All samples were received in good condition.
- ☒ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ☒ Appropriate sample containers have been used.
- ☒ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Charl Du Preez on Phone : +61 (2) 9900 8400 or by e.mail: charldupreez@eurofins.com.au

Results will be delivered electronically via e.mail to Mark Tiedeman - mtiedeman@environcorp.com.

Company Name: Environ Sydney
Address: PO Box 560
North Sydney
NSW 2060
Project Name: CWS
Project ID: AS130456

Order No.:
Report #: 482416
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Dec 7, 2015 11:05 AM
Due: Dec 14, 2015
Priority: 5 Day
Contact Name: Mark Tiedeman

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Cyanide (total)	Fluoride (soluble)	pH (1:5 Aqueous extract)	Sodium	Moisture Set	Cation Exchange Capacity
Laboratory where analysis is conducted										
Melbourne Laboratory - NATA Site # 1254 & 14271					X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217										
Brisbane Laboratory - NATA Site # 20794										
External Laboratory										
Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
QA201	Dec 02, 2015		Soil	S15-De06849	X	X	X	X	X	X

Certificate of Analysis

Environ Sydney
PO Box 560
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention: Mark Tiedeman

Report **482416-S**
Project name CWS
Project ID AS130456
Received Date Dec 07, 2015

Client Sample ID			QA201
Sample Matrix			Soil
Eurofins mgt Sample No.			S15-De06849
Date Sampled			Dec 02, 2015
Test/Reference	LOR	Unit	
Conductivity (1:5 aqueous extract at 25°C)	10	uS/cm	7900
Cyanide (total)	5	mg/kg	< 5
Fluoride (soluble)	20	mg/kg	110
pH (1:5 Aqueous extract)	0.1	pH Units	6.3
% Moisture	0.1	%	19
Alkali Metals			
Sodium	5	mg/kg	40000
Ion Exchange Properties			
Cation Exchange Capacity	0.05	meq/100g	70

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.

A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Conductivity (1:5 aqueous extract at 25°C) - Method: LTM-INO-4030	Melbourne	Dec 09, 2015	7 Day
Ion Exchange Properties	Melbourne	Dec 10, 2015	
Cyanide (total) - Method: LTM-INO-4020 Total Free WAD Cyanide by CFA	Melbourne	Dec 09, 2015	14 Day
Fluoride (soluble) - Method: LM-LTM-INO-4300 (Fluoride by Ion Chromatography)	Melbourne	Dec 14, 2015	28 Day
pH (1:5 Aqueous extract) - Method: LTM-GEN-7090 pH in soil by ISE	Melbourne	Dec 09, 2015	7 Day
Alkali Metals - Method: USEPA 6010 Alkali Metals	Melbourne	Dec 09, 2015	180 Day
% Moisture - Method: LTM-GEN-7080 Moisture	Melbourne	Dec 07, 2015	14 Day

Company Name: Environ Sydney
Address: PO Box 560
North Sydney
NSW 2060
Project Name: CWS
Project ID: AS130456

Order No.:
Report #: 482416
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Dec 7, 2015 11:05 AM
Due: Dec 14, 2015
Priority: 5 Day
Contact Name: Mark Tiedeman

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Cyanide (total)	Fluoride (soluble)	pH (1:5 Aqueous extract)	Sodium	Moisture Set	Cation Exchange Capacity
Laboratory where analysis is conducted										
Melbourne Laboratory - NATA Site # 1254 & 14271					X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217										
Brisbane Laboratory - NATA Site # 20794										
External Laboratory										
Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
QA201	Dec 02, 2015		Soil	S15-De06849	X	X	X	X	X	X

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Conductivity (1:5 aqueous extract at 25°C)				uS/cm	< 10			10	Pass	
Cyanide (total)				mg/kg	< 5			5	Pass	
Method Blank										
Ion Exchange Properties										
Cation Exchange Capacity				meq/100g	< 0.05			0.05	Pass	
LCS - % Recovery										
Cyanide (total)				%	95			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
				Result 1						
Cyanide (total)	M15-De08343	NCP	%	83				70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
				Result 1	Result 2	RPD				
Conductivity (1:5 aqueous extract at 25°C)	M15-De06832	NCP	uS/cm	190	220	13		30%	Pass	
Cyanide (total)	M15-De08330	NCP	mg/kg	< 5	< 5	<1		30%	Pass	
pH (1:5 Aqueous extract)	M15-De06832	NCP	pH Units	4.7	4.6	pass		30%	Pass	
% Moisture	M15-De06831	NCP	%	12	11	7.0		30%	Pass	
Duplicate										
Alkali Metals										
Sodium	S15-De06849	CP	mg/kg	40000	35000	15		30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Charl Du Preez	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)



Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Eurofins | mgt shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins | mgt be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CERTIFICATE OF ANALYSIS

Work Order	: ES1535096	Page	: 1 of 5
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR NEIL WOODBRIDGE	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: nrwoodbridge@environcorp.com	E-mail	:
Telephone	: +61 02 99548114	Telephone	: +61-2-8784 8555
Facsimile	: ---	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ---	Date Samples Received	: 02-Nov-2015 13:55
C-O-C number	: ---	Date Analysis Commenced	: 03-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 10-Nov-2015 10:23
Site	: ---		
Quote number	: ---	No. of samples received	: 5
		No. of samples analysed	: 5

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Dian Dao		Sydney Inorganics
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics



General Comments

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- ED037 (Alkalinity): Analysed on 1:5 leachate; LOR in mg/kg adjusted accordingly.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW203_12.5	MW205_12.2	MW201_11.5	MW205_14.5	MW203_14.5
Client sampling date / time					[29-Oct-2015]	[30-Oct-2015]	[27-Oct-2015]	[30-Oct-2015]	[29-Oct-2015]
Compound	CAS Number	LOR	Unit		ES1535096-001	ES1535096-002	ES1535096-003	ES1535096-004	ES1535096-005
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		10.5	10.3	9.7	9.2	10.0
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		2210	3490	1750	100	1080
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		16.9	13.4	20.1	11.6	18.7
ED037: Alkalinity									
Total Alkalinity as CaCO3	----	1	mg/kg		1320	1100	788	39	341
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg		726	420	394	39	131
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg		594	682	394	<5	210
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		2140	1890	380	100	460
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		660	130	550	40	780
ED093S: Soluble Major Cations									
Sodium	7440-23-5	10	mg/kg		3450	3880	2990	170	1860
Potassium	7440-09-7	10	mg/kg		770	20	1310	100	760
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		15100	3330	10400	4530	4460
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	1	mg/kg		532	58	734	<1	4
EK040T: Fluoride Total									
Fluoride	16984-48-8	40	mg/kg		1700	830	490	200	90
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		2.6	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW203_12.5	MW205_12.2	MW201_11.5	MW205_14.5	MW203_14.5
Client sampling date / time					[29-Oct-2015]	[30-Oct-2015]	[27-Oct-2015]	[30-Oct-2015]	[29-Oct-2015]
Compound	CAS Number	LOR	Unit		ES1535096-001	ES1535096-002	ES1535096-003	ES1535096-004	ES1535096-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluoranthene	206-44-0	0.5	mg/kg		6.6	1.6	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		6.4	1.6	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		2.8	1.3	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		2.8	1.4	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		3.3	2.0	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		0.9	0.8	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		2.8	1.8	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		1.7	0.9	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		1.9	1.1	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		32.3	12.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		3.7	2.3	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		4.0	2.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		4.2	2.8	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW203_12.5	MW205_12.2	MW201_11.5	MW205_14.5	MW203_14.5
Client sampling date / time					[29-Oct-2015]	[30-Oct-2015]	[27-Oct-2015]	[30-Oct-2015]	[29-Oct-2015]
Compound	CAS Number	LOR	Unit		ES1535096-001	ES1535096-002	ES1535096-003	ES1535096-004	ES1535096-005
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
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	1330-20-7	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
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		123	120	118	122	130
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		85.0	88.2	84.6	85.4	89.8
2-Chlorophenol-D4	93951-73-6	0.5	%		83.4	86.4	97.7	88.4	92.3
2,4,6-Tribromophenol	118-79-6	0.5	%		105	92.3	80.4	90.2	72.8
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		90.6	91.4	92.7	89.6	93.3
Anthracene-d10	1719-06-8	0.5	%		99.1	104	112	105	113
4-Terphenyl-d14	1718-51-0	0.5	%		81.7	82.9	87.7	96.2	89.1
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		95.2	104	112	111	110
Toluene-D8	2037-26-5	0.2	%		107	116	122	119	110
4-Bromofluorobenzene	460-00-4	0.2	%		96.2	101	107	105	128

QUALITY CONTROL REPORT

Work Order	: ES1535096	Page	: 1 of 9
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR NEIL WOODBRIDGE	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: nrwoodbridge@environcorp.com	E-mail	:
Telephone	: +61 02 99548114	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 02-Nov-2015
C-O-C number	: ----	Date Analysis Commenced	: 03-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 10-Nov-2015
Site	: ----	No. of samples received	: 5
Quote number	: ----	No. of samples analysed	: 5

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

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



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Dian Dao		Sydney Inorganics
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics



General Comments

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

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

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

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002 : pH (Soils) (QC Lot: 264944)									
ES1535096-003	MW201_11.5	EA002: pH Value	----	0.1	pH Unit	9.7	9.7	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 266096)									
ES1535092-031	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.6	8.5	0.00	0% - 20%
ES1535092-024	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.3	8.2	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 267262)									
ES1535035-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	7.1	5.8	19.5	0% - 20%
ES1535091-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	3.6	3.6	0.00	0% - 20%
EA010: Conductivity (QC Lot: 264945)									
ES1535096-003	MW201_11.5	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	1750	2030	15.0	0% - 20%
EA010: Conductivity (QC Lot: 266095)									
ES1535092-031	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	711	610	15.3	0% - 20%
ES1535092-024	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	496	502	1.20	0% - 20%
EA010: Conductivity (QC Lot: 267263)									
ES1535035-001	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	104	99	5.03	0% - 20%
ES1535091-001	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	592	658	10.6	0% - 20%
EA055: Moisture Content (QC Lot: 264991)									
ES1535089-007	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	11.5	11.7	1.93	0% - 50%
ES1535100-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	8.4	7.1	16.2	No Limit
ED037: Alkalinity (QC Lot: 269509)									
ES1535096-001	MW203_12.5	ED037: Total Alkalinity as CaCO3	----	1	mg/kg	1320	1310	1.05	0% - 20%
ED040S: Soluble Major Anions (QC Lot: 267266)									
ES1535160-004	Anonymous	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	180	210	14.2	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 264947)									
ES1535096-003	MW201_11.5	ED045G: Chloride	16887-00-6	10	mg/kg	550	500	8.76	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 266098)									
ES1535092-031	Anonymous	ED045G: Chloride	16887-00-6	10	mg/kg	440	450	3.71	0% - 20%
ES1535092-024	Anonymous	ED045G: Chloride	16887-00-6	10	mg/kg	390	370	4.34	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 267267)									
ES1535160-004	Anonymous	ED045G: Chloride	16887-00-6	10	mg/kg	70	60	23.2	No Limit
ED093S: Soluble Major Cations (QC Lot: 266097)									
ES1535092-034	Anonymous	ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.00	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	180	190	0.00	0% - 50%
ES1535092-024	Anonymous	ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.00	No Limit

Page : 4 of 9
 Work Order : ES1535096
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED093S: Soluble Major Cations (QC Lot: 266097) - continued									
ES1535092-024	Anonymous	ED093S: Sodium	7440-23-5	10	mg/kg	330	320	0.00	0% - 20%
ED093S: Soluble Major Cations (QC Lot: 267265)									
ES1535200-015	Anonymous	ED093S: Potassium	7440-09-7	10	mg/kg	<10	<10	0.00	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	<10	<10	0.00	No Limit
ES1535200-011	Anonymous	ED093S: Potassium	7440-09-7	10	mg/kg	40	40	0.00	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	140	140	0.00	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 265031)									
ES1535011-005	Anonymous	EG005T: Aluminium	7429-90-5	50	mg/kg	10800	11000	2.14	0% - 20%
ES1535103-001	Anonymous	EG005T: Aluminium	7429-90-5	50	mg/kg	9580	10500	9.49	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 265032)									
ES1535011-005	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	<0.1	0.00	No Limit
ES1535103-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 265046)									
ES1535096-001	MW203_12.5	EK026SF: Total Cyanide	57-12-5	1	mg/kg	532	602	12.2	0% - 20%
EK040T: Fluoride Total (QC Lot: 268929)									
ES1535218-013	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	120	130	0.00	No Limit
ES1535096-005	MW203_14.5	EK040T: Fluoride	16984-48-8	40	mg/kg	90	90	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 269668)									
ES1535096-001	MW203_12.5	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 264794)									
ES1535096-001	MW203_12.5	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	2.8	2.7	5.82	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	2.8	3.0	5.55	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	3.7	3.9	4.65	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	3.3	3.2	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	1.9	1.8	6.68	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	0.9	1.0	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	2.8	2.6	9.70	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	6.6	5.8	11.9	0% - 50%
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	1.7	1.6	8.75	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	2.6	2.6	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	6.4	6.7	5.70	0% - 50%

Page : 5 of 9
 Work Order : ES1535096
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 264794) - continued									
ES1535096-001	MW203_12.5	EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	32.3	31.0	4.11	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 264579)									
ES1535096-001	MW203_12.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1535158-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 264795)									
ES1535096-001	MW203_12.5	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 264579)									
ES1535096-001	MW203_12.5	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1535158-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 264795)									
ES1535096-001	MW203_12.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 264579)									
ES1535096-001	MW203_12.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	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
ES1535158-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

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

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EA010: Conductivity (QCLot: 264945)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	96.2	70	130
EA010: Conductivity (QCLot: 266095)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	99.0	70	130
EA010: Conductivity (QCLot: 267263)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	102	70	130
ED037: Alkalinity (QCLot: 269509)								
ED037: Total Alkalinity as CaCO3	----	1	mg/kg	<1	200 mg/kg	# 248	87	112
ED040S: Soluble Major Anions (QCLot: 264946)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	150 mg/kg	118	80	120
ED040S: Soluble Major Anions (QCLot: 266099)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	150 mg/kg	101	80	120
ED040S: Soluble Major Anions (QCLot: 267266)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	150 mg/kg	104	80	120
ED045G: Chloride by Discrete Analyser (QCLot: 264947)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	109	75	125
				<10	5000 mg/kg	94.4	79	117
ED045G: Chloride by Discrete Analyser (QCLot: 266098)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	95.8	75	125
				<10	5000 mg/kg	94.0	79	117
ED045G: Chloride by Discrete Analyser (QCLot: 267267)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	99.0	75	125
				<10	5000 mg/kg	92.5	79	117
ED093S: Soluble Major Cations (QCLot: 264943)								
ED093S: Potassium	7440-09-7	10	mg/kg	<10	50 mg/kg	107	80	120
ED093S: Sodium	7440-23-5	10	mg/kg	<10	50 mg/kg	106	80	112
ED093S: Soluble Major Cations (QCLot: 266097)								
ED093S: Potassium	7440-09-7	10	mg/kg	<10	50 mg/kg	116	80	120
ED093S: Sodium	7440-23-5	10	mg/kg	<10	50 mg/kg	95.4	80	112
ED093S: Soluble Major Cations (QCLot: 267265)								
ED093S: Potassium	7440-09-7	10	mg/kg	<10	50 mg/kg	99.5	80	120
ED093S: Sodium	7440-23-5	10	mg/kg	<10	50 mg/kg	99.1	80	112
EG005T: Total Metals by ICP-AES (QCLot: 265031)								



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EG005T: Total Metals by ICP-AES (QCLot: 265031) - continued								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	6134 mg/kg	107	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 265032)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	75.6	70	105
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 265046)								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	20 mg/kg	123	70	130
EK040T: Fluoride Total (QCLot: 268929)								
EK040T: Fluoride	16984-48-8	40	mg/kg	<40	950 mg/kg	82.7	69	107
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 269668)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	95.0	62	126
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 264794)								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	98.6	79	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	97.4	77	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	99.3	79	123
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	95.3	73	121
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	98.0	76	122
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	89.4	70	118
	205-82-3							
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	87.8	72	114
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	91.7	77	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	95.2	81	123
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	91.3	72	113
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	92.5	79	123
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	96.2	77	123
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	92.4	71	113
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	91.7	80	124
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	99.6	79	123
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	95.2	79	125
EP080/071: Total Petroleum Hydrocarbons (QCLot: 264579)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	107	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 264795)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	102	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	110	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	108	64	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 264579)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	108	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 264795)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	102	70	130



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 264795) - continued								
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	120	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	90.6	63	131
EP080: BTEXN (QCLot: 264579)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	102	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	106	58	118
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	104	60	120
	106-42-3							
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	87.7	62	138
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	109	60	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	104	62	128

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 264947)							
ES1535096-003	MW201_11.5	ED045G: Chloride	16887-00-6	1250 mg/kg	113	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 266098)							
ES1535092-021	Anonymous	ED045G: Chloride	16887-00-6	1250 mg/kg	109	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 267267)							
ES1535096-002	MW205_12.2	ED045G: Chloride	16887-00-6	1250 mg/kg	109	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 265032)							
ES1535011-006	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	89.5	70	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 265046)							
ES1535096-001	MW203_12.5	EK026SF: Total Cyanide	57-12-5	20 mg/kg	# Not Determined	70	130
EK040T: Fluoride Total (QCLot: 268929)							
ES1535218-013	Anonymous	EK040T: Fluoride	16984-48-8	400 mg/kg	85.5	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 269668)							
ES1535096-001	MW203_12.5	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	100.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 264794)							
ES1535096-001	MW203_12.5	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	94.6	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	94.7	70	130

Page : 9 of 9
 Work Order : ES1535096
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 264579)							
ES1535096-001	MW203_12.5	EP080: C6 - C9 Fraction	----	32.5 mg/kg	113	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 264795)							
ES1535096-001	MW203_12.5	EP071: C10 - C14 Fraction	----	523 mg/kg	107	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	105	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	126	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 264579)							
ES1535096-001	MW203_12.5	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	113	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 264795)							
ES1535096-001	MW203_12.5	EP071: >C10 - C16 Fraction	----	860 mg/kg	91.2	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	118	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	113	52	132
EP080: BTEXN (QCLot: 264579)							
ES1535096-001	MW203_12.5	EP080: Benzene	71-43-2	2.5 mg/kg	100	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	96.4	70	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	96.8	70	130
			106-42-3				
		EP080: Naphthalene	91-20-3	2.5 mg/kg	86.7	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	99.2	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	99.0	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1535096	Page	: 1 of 9
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR NEIL WOODBRIDGE	Telephone	: +61-2-8784 8555
Project	: AS130456 CWS GW INSTALLATION	Date Samples Received	: 02-Nov-2015
Site	: ----	Issue Date	: 10-Nov-2015
Sampler	: MARK TIEDEMAN	No. of samples received	: 5
Order number	: ----	No. of samples analysed	: 5

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

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
ED037: Alkalinity	QC-269509-002	----	Total Alkalinity as CaCO3	----	248 %	87-112%	Recovery greater than upper control limit
Matrix Spike (MS) Recoveries							
EK026SF: Total CN by Segmented Flow Analyser	ES1535096--001	MW203_12.5	Total Cyanide	57-12-5	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Cations - soluble by ICP-AES	0	1	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	0	1	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
Total Metals by ICP-AES	0	5	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved (EA002) MW201_11.5	27-Oct-2015	03-Nov-2015	03-Nov-2015	✔	03-Nov-2015	03-Nov-2015	✔
Soil Glass Jar - Unpreserved (EA002) MW203_12.5, MW203_14.5	29-Oct-2015	04-Nov-2015	05-Nov-2015	✔	04-Nov-2015	04-Nov-2015	✔
Soil Glass Jar - Unpreserved (EA002) MW205_12.2, MW205_14.5	30-Oct-2015	05-Nov-2015	06-Nov-2015	✔	05-Nov-2015	05-Nov-2015	✔



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA010: Conductivity							
Soil Glass Jar - Unpreserved (EA010) MW201_11.5	27-Oct-2015	03-Nov-2015	03-Nov-2015	✔	03-Nov-2015	01-Dec-2015	✔
Soil Glass Jar - Unpreserved (EA010) MW203_12.5, MW203_14.5	29-Oct-2015	04-Nov-2015	05-Nov-2015	✔	04-Nov-2015	02-Dec-2015	✔
Soil Glass Jar - Unpreserved (EA010) MW205_12.2, MW205_14.5	30-Oct-2015	05-Nov-2015	06-Nov-2015	✔	05-Nov-2015	03-Dec-2015	✔
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103) MW201_11.5	27-Oct-2015	----	----	----	03-Nov-2015	10-Nov-2015	✔
Soil Glass Jar - Unpreserved (EA055-103) MW203_12.5, MW203_14.5	29-Oct-2015	----	----	----	03-Nov-2015	12-Nov-2015	✔
Soil Glass Jar - Unpreserved (EA055-103) MW205_12.2, MW205_14.5	30-Oct-2015	----	----	----	03-Nov-2015	13-Nov-2015	✔
ED037: Alkalinity							
Soil Glass Jar - Unpreserved (ED037) MW201_11.5	27-Oct-2015	07-Nov-2015	24-Apr-2016	✔	09-Nov-2015	24-Apr-2016	✔
Soil Glass Jar - Unpreserved (ED037) MW203_12.5, MW203_14.5	29-Oct-2015	07-Nov-2015	26-Apr-2016	✔	09-Nov-2015	26-Apr-2016	✔
Soil Glass Jar - Unpreserved (ED037) MW205_12.2, MW205_14.5	30-Oct-2015	07-Nov-2015	27-Apr-2016	✔	09-Nov-2015	27-Apr-2016	✔
ED040S : Soluble Sulfate by ICPAES							
Soil Glass Jar - Unpreserved (ED040S) MW201_11.5	27-Oct-2015	03-Nov-2015	24-Nov-2015	✔	03-Nov-2015	01-Dec-2015	✔
Soil Glass Jar - Unpreserved (ED040S) MW203_12.5, MW203_14.5	29-Oct-2015	04-Nov-2015	26-Nov-2015	✔	04-Nov-2015	02-Dec-2015	✔
Soil Glass Jar - Unpreserved (ED040S) MW205_12.2, MW205_14.5	30-Oct-2015	05-Nov-2015	27-Nov-2015	✔	05-Nov-2015	03-Dec-2015	✔
ED045G: Chloride by Discrete Analyser							
Soil Glass Jar - Unpreserved (ED045G) MW201_11.5	27-Oct-2015	03-Nov-2015	24-Nov-2015	✔	03-Nov-2015	01-Dec-2015	✔
Soil Glass Jar - Unpreserved (ED045G) MW203_12.5, MW203_14.5	29-Oct-2015	04-Nov-2015	26-Nov-2015	✔	04-Nov-2015	02-Dec-2015	✔
Soil Glass Jar - Unpreserved (ED045G) MW205_12.2, MW205_14.5	30-Oct-2015	05-Nov-2015	27-Nov-2015	✔	05-Nov-2015	03-Dec-2015	✔
ED093S: Soluble Major Cations							
Soil Glass Jar - Unpreserved (ED093S) MW201_11.5	27-Oct-2015	03-Nov-2015	24-Apr-2016	✔	03-Nov-2015	24-Apr-2016	✔
Soil Glass Jar - Unpreserved (ED093S) MW203_12.5, MW203_14.5	29-Oct-2015	04-Nov-2015	26-Apr-2016	✔	04-Nov-2015	26-Apr-2016	✔
Soil Glass Jar - Unpreserved (ED093S) MW205_12.2, MW205_14.5	30-Oct-2015	05-Nov-2015	27-Apr-2016	✔	05-Nov-2015	27-Apr-2016	✔



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) MW201_11.5	27-Oct-2015	03-Nov-2015	24-Apr-2016	✓	05-Nov-2015	24-Apr-2016	✓
Soil Glass Jar - Unpreserved (EG005T) MW203_12.5, MW203_14.5	29-Oct-2015	03-Nov-2015	26-Apr-2016	✓	05-Nov-2015	26-Apr-2016	✓
Soil Glass Jar - Unpreserved (EG005T) MW205_12.2, MW205_14.5	30-Oct-2015	03-Nov-2015	27-Apr-2016	✓	05-Nov-2015	27-Apr-2016	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) MW201_11.5	27-Oct-2015	03-Nov-2015	24-Nov-2015	✓	04-Nov-2015	24-Nov-2015	✓
Soil Glass Jar - Unpreserved (EG035T) MW203_12.5, MW203_14.5	29-Oct-2015	03-Nov-2015	26-Nov-2015	✓	04-Nov-2015	26-Nov-2015	✓
Soil Glass Jar - Unpreserved (EG035T) MW205_12.2, MW205_14.5	30-Oct-2015	03-Nov-2015	27-Nov-2015	✓	04-Nov-2015	27-Nov-2015	✓
EK026SF: Total CN by Segmented Flow Analyser							
Soil Glass Jar - Unpreserved (EK026SF) MW201_11.5	27-Oct-2015	03-Nov-2015	10-Nov-2015	✓	05-Nov-2015	17-Nov-2015	✓
Soil Glass Jar - Unpreserved (EK026SF) MW203_12.5, MW203_14.5	29-Oct-2015	03-Nov-2015	12-Nov-2015	✓	05-Nov-2015	17-Nov-2015	✓
Soil Glass Jar - Unpreserved (EK026SF) MW205_12.2, MW205_14.5	30-Oct-2015	03-Nov-2015	13-Nov-2015	✓	05-Nov-2015	17-Nov-2015	✓
EK040T: Fluoride Total							
Pulp Bag (EK040T) MW201_11.5	27-Oct-2015	04-Nov-2015	24-Nov-2015	✓	06-Nov-2015	24-Nov-2015	✓
Pulp Bag (EK040T) MW203_12.5, MW203_14.5	29-Oct-2015	04-Nov-2015	26-Nov-2015	✓	06-Nov-2015	26-Nov-2015	✓
Pulp Bag (EK040T) MW205_12.2, MW205_14.5	30-Oct-2015	04-Nov-2015	27-Nov-2015	✓	06-Nov-2015	27-Nov-2015	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066) MW201_11.5	27-Oct-2015	06-Nov-2015	10-Nov-2015	✓	06-Nov-2015	16-Dec-2015	✓
Soil Glass Jar - Unpreserved (EP066) MW203_12.5, MW203_14.5	29-Oct-2015	06-Nov-2015	12-Nov-2015	✓	06-Nov-2015	16-Dec-2015	✓
Soil Glass Jar - Unpreserved (EP066) MW205_12.2, MW205_14.5	30-Oct-2015	06-Nov-2015	13-Nov-2015	✓	06-Nov-2015	16-Dec-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071) MW201_11.5	27-Oct-2015	04-Nov-2015	10-Nov-2015	✓	04-Nov-2015	14-Dec-2015	✓
Soil Glass Jar - Unpreserved (EP071) MW203_12.5, MW203_14.5	29-Oct-2015	04-Nov-2015	12-Nov-2015	✓	04-Nov-2015	14-Dec-2015	✓
Soil Glass Jar - Unpreserved (EP071) MW205_12.2, MW205_14.5	30-Oct-2015	04-Nov-2015	13-Nov-2015	✓	04-Nov-2015	14-Dec-2015	✓



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) MW201_11.5	27-Oct-2015	04-Nov-2015	10-Nov-2015	✓	04-Nov-2015	14-Dec-2015	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) MW203_12.5, MW203_14.5	29-Oct-2015	04-Nov-2015	12-Nov-2015	✓	04-Nov-2015	14-Dec-2015	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) MW205_12.2, MW205_14.5	30-Oct-2015	04-Nov-2015	13-Nov-2015	✓	04-Nov-2015	14-Dec-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) MW201_11.5	27-Oct-2015	03-Nov-2015	10-Nov-2015	✓	03-Nov-2015	10-Nov-2015	✓
Soil Glass Jar - Unpreserved (EP080) MW203_12.5, MW203_14.5	29-Oct-2015	03-Nov-2015	12-Nov-2015	✓	03-Nov-2015	12-Nov-2015	✓
Soil Glass Jar - Unpreserved (EP080) MW205_12.2, MW205_14.5	30-Oct-2015	03-Nov-2015	13-Nov-2015	✓	03-Nov-2015	13-Nov-2015	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification	
Analytical Methods	Method	QC	Regular	Actual	Expected		Evaluation
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	1	8	12.50	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	0	1	0.00	10.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	1	1	100.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	1	100.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	0	1	0.00	10.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	9	11.11	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	1	1	100.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	1	7	14.29	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	2	11	18.18	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	12	16.67	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	5	40.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	10	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	11	18.18	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	1	8	12.50	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	2	1	200.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	9	11.11	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	2	7	28.57	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	11	9.09	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	12	8.33	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	11	9.09	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	1	8	12.50	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	9	11.11	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement



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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	1	7	14.29	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	11	9.09	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	12	8.33	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	11	9.09	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride Soluble By Discrete Analyser	ED045G	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	9	11.11	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	1	7	14.29	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	11	9.09	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	12	8.33	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	0	5	0.00	5.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	11	9.09	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	In-house. A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Alkalinity in Soil	ED037	SOIL	In house: Referenced to APHA 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Chloride Soluble By Discrete Analyser	ED045G	SOIL	In house: Referenced to APHA 21st edition 4500-Cl- E. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm. Analysis is performed on a 1:5 soil / water leachate.
Cations - soluble by ICP-AES	ED093S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	In house: Referenced to APHA 4500-CN-O. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
Total Fluoride	EK040T	SOIL	(In-house) Total fluoride is determined by ion specific electrode (ISE) in a solution obtained after a Sodium Carbonate / Potassium Carbonate fusion dissolution.



Analytical Methods	Method	Matrix	Method Descriptions
Polychlorinated Biphenyls (PCB)	EP066	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
TRH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Preparation Methods	Method	Matrix	Method Descriptions
Total Fluoride	EK040T-PR	SOIL	(In-house) Samples are fused with Sodium Carbonate / Potassium Carbonate flux.
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

RAMBOLL ENVIRON

RAMBOLL ENVIRON

CERTIFICATE OF ANALYSIS

Work Order	: ES1535263	Page	: 1 of 5
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR NEIL WOODBRIDGE	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: nrwoodbridge@environcorp.com	E-mail	:
Telephone	: +61 02 99548114	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: AS130456	Date Samples Received	: 03-Nov-2015 16:40
C-O-C number	: ----	Date Analysis Commenced	: 04-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 11-Nov-2015 11:04
Site	: ----		
Quote number	: ----	No. of samples received	: 8
		No. of samples analysed	: 3

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Dian Dao		Sydney Inorganics
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics



General Comments

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- EP071: Results of sample MW206_12 have been confirmed by re-extraction and re-analysis.
- ED037 (Alkalinity): Analysed on 1:5 leachate; LOR in mg/kg adjusted accordingly.
- ED045G:LOR raised for Chloride analysis on sample ID(MW201_14) due to sample matrix.
- Poor precision was obtained for Mercury on sample ES1535156 #001. Results have been confirmed by re-extraction and reanalysis.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW201_14	MW206_12	MW206_15.0	----	----
Client sampling date / time					[28-Oct-2015]	[03-Nov-2015]	[03-Nov-2015]	----	----
Compound	CAS Number	LOR	Unit		ES1535263-001	ES1535263-002	ES1535263-008	-----	-----
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		10.1	9.9	10.5	----	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		3230	4840	4030	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		16.5	23.1	20.0	----	----
ED037: Alkalinity									
Total Alkalinity as CaCO3	----	1	mg/kg		2100	3280	1340	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg		1100	2230	499	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg		998	1050	840	----	----
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		950	2480	2400	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		<100	150	130	----	----
ED093S: Soluble Major Cations									
Sodium	7440-23-5	10	mg/kg		5630	6730	5170	----	----
Potassium	7440-09-7	10	mg/kg		1600	60	40	----	----
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		16100	103000	8890	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	0.1	<0.1	----	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	1	mg/kg		53	100	60	----	----
EK040T: Fluoride Total									
Fluoride	16984-48-8	40	mg/kg		1170	69000	1510	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	3.4	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	1.8	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	13.4	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	3.2	<0.5	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW201_14	MW206_12	MW206_15.0	----	----
Client sampling date / time					[28-Oct-2015]	[03-Nov-2015]	[03-Nov-2015]	----	----
Compound	CAS Number	LOR	Unit		ES1535263-001	ES1535263-002	ES1535263-008	-----	-----
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluoranthene	206-44-0	0.5	mg/kg		0.6	42.2	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg		0.6	45.3	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	48.2	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg		0.6	49.3	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		0.5	86.0	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	22.8	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	60.0	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	39.5	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	12.6	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	47.2	<0.5	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		2.3	475	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	93.2	<0.5	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	93.2	0.6	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	93.2	1.2	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	1020	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	1860	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	2880	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	2340	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	1120	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	3460	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW201_14	MW206_12	MW206_15.0	----	----
Client sampling date / time					[28-Oct-2015]	[03-Nov-2015]	[03-Nov-2015]	----	----
Compound	CAS Number	LOR	Unit		ES1535263-001	ES1535263-002	ES1535263-008	-----	-----
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		110	129	99.0	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		101	95.0	93.9	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		95.9	93.6	87.9	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%		74.6	82.5	82.0	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		98.6	97.8	90.2	----	----
Anthracene-d10	1719-06-8	0.5	%		107	102	99.5	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		94.2	97.5	87.2	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		99.3	90.6	90.4	----	----
Toluene-D8	2037-26-5	0.2	%		102	97.2	90.0	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		98.2	90.5	90.3	----	----

QUALITY CONTROL REPORT

Work Order	: ES1535263	Page	: 1 of 10
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR NEIL WOODBRIDGE	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: nrwoodbridge@environcorp.com	E-mail	:
Telephone	: +61 02 99548114	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: AS130456	Date Samples Received	: 03-Nov-2015
C-O-C number	: ----	Date Analysis Commenced	: 04-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 11-Nov-2015
Site	: ----	No. of samples received	: 8
Quote number	: ----	No. of samples analysed	: 3

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

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



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Dian Dao		Sydney Inorganics
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics



General Comments

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

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

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

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002 : pH (Soils) (QC Lot: 265614)									
ES1534970-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	5.8	5.8	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 270508)									
ES1535194-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	6.1	6.3	3.54	0% - 20%
ES1535327-009	Anonymous	EA002: pH Value	----	0.1	pH Unit	6.9	7.0	1.44	0% - 20%
EA010: Conductivity (QC Lot: 265615)									
ES1534970-001	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	75	74	2.55	0% - 20%
EA010: Conductivity (QC Lot: 270509)									
ES1535263-008	MW206_15.0	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	4030	3990	0.998	0% - 20%
ES1535327-009	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	180	186	3.72	0% - 20%
EA055: Moisture Content (QC Lot: 266147)									
ES1535218-016	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	21.5	20.9	2.68	0% - 20%
ES1535263-002	MW206_12	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	23.1	23.3	1.02	0% - 20%
ED037: Alkalinity (QC Lot: 269509)									
ES1535096-001	Anonymous	ED037: Total Alkalinity as CaCO3	----	1	mg/kg	1320	1310	1.05	0% - 20%
ED040S: Soluble Major Anions (QC Lot: 270506)									
ES1534806-004	Anonymous	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	10	10	0.00	No Limit
ES1535263-008	MW206_15.0	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	2400	2480	2.94	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 265616)									
ES1535263-001	MW201_14	ED045G: Chloride	16887-00-6	10	mg/kg	<100	<100	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 270507)									
ES1535194-001	Anonymous	ED045G: Chloride	16887-00-6	10	mg/kg	230	230	0.00	0% - 20%
ES1535263-008	MW206_15.0	ED045G: Chloride	16887-00-6	10	mg/kg	130	130	0.00	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 267081)									
ES1535156-001	Anonymous	EG005T: Aluminium	7429-90-5	50	mg/kg	7790	7690	1.27	0% - 20%
ES1535179-008	Anonymous	EG005T: Aluminium	7429-90-5	50	mg/kg	7140	7210	1.11	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 267082)									
ES1535156-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	4.9	# 7.1	36.0	0% - 20%
ES1535179-008	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 266476)									
ES1535262-001	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
ES1535218-013	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
EK040T: Fluoride Total (QC Lot: 268929)									
ES1535218-013	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	120	130	0.00	No Limit

Page : 4 of 10
 Work Order : ES1535263
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK040T: Fluoride Total (QC Lot: 268929) - continued									
ES1535096-005	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	90	90	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 266509)									
ES1535311-007	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1535311-001	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 266507)									
ES1535311-007	Anonymous	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenzo(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1535311-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenzo(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Page : 5 of 10
 Work Order : ES1535263
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 266507) - continued									
ES1535311-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 266085)									
EB1533240-003	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1535210-007	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 266506)									
ES1535311-007	Anonymous	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
ES1535311-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 266085)									
EB1533240-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1535210-007	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 266506)									
ES1535311-007	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1535311-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 266085)									
EB1533240-003	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	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
ES1535210-007	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 266085) - continued									
ES1535210-007	Anonymous	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

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

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EA010: Conductivity (QCLot: 265615)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	94.9	70	130
EA010: Conductivity (QCLot: 270509)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	106	70	130
ED037: Alkalinity (QCLot: 269509)								
ED037: Total Alkalinity as CaCO3	----	1	mg/kg	<1	200 mg/kg	# 248	87	112
ED040S: Soluble Major Anions (QCLot: 265617)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	150 mg/kg	104	80	120
ED040S: Soluble Major Anions (QCLot: 270506)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	150 mg/kg	97.2	80	120
ED045G: Chloride by Discrete Analyser (QCLot: 265616)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	103	75	125
				<10	5000 mg/kg	85.8	79	117
ED045G: Chloride by Discrete Analyser (QCLot: 270507)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	98.1	75	125
				<10	5000 mg/kg	86.3	79	117
ED093S: Soluble Major Cations (QCLot: 265618)								
ED093S: Potassium	7440-09-7	10	mg/kg	<10	50 mg/kg	110	80	120
ED093S: Sodium	7440-23-5	10	mg/kg	<10	50 mg/kg	110	80	112
ED093S: Soluble Major Cations (QCLot: 270510)								
ED093S: Potassium	7440-09-7	10	mg/kg	<10	50 mg/kg	101	83	125
ED093S: Sodium	7440-23-5	10	mg/kg	<10	50 mg/kg	105	81	123
EG005T: Total Metals by ICP-AES (QCLot: 267081)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	6134 mg/kg	115	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 267082)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	81.2	70	105
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 266476)								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	20 mg/kg	110	70	130
EK040T: Fluoride Total (QCLot: 268929)								
EK040T: Fluoride	16984-48-8	40	mg/kg	<40	950 mg/kg	82.7	69	107
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 266509)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	90.0	57	117
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 266507)								



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 266507) - continued								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	96.5	79	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	96.8	77	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	89.3	79	123
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	92.0	73	121
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	95.4	76	122
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	99.6	70	118
	205-82-3							
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	87.9	72	114
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	91.8	77	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	96.8	81	123
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	92.9	72	113
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	97.1	79	123
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	90.1	77	123
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	92.8	71	113
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	95.0	80	124
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	98.5	79	123
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	95.2	79	125
EP080/071: Total Petroleum Hydrocarbons (QCLot: 266085)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	82.1	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 266506)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	101	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	101	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	106	64	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 266085)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	82.0	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 266506)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	102	70	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	108	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	91.4	63	131
EP080: BTEXN (QCLot: 266085)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	87.1	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	80.1	58	118
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	80.5	60	120
	106-42-3							
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	80.3	62	138
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	82.1	60	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	81.7	62	128



Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 265616)							
ES1535263-001	MW201_14	ED045G: Chloride	16887-00-6	1250 mg/kg	106	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 270507)							
ES1535189-001	Anonymous	ED045G: Chloride	16887-00-6	1250 mg/kg	# Not Determined	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 267082)							
ES1535156-002	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	100	70	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 266476)							
ES1535218-013	Anonymous	EK026SF: Total Cyanide	57-12-5	20 mg/kg	99.9	70	130
EK040T: Fluoride Total (QCLot: 268929)							
ES1535218-013	Anonymous	EK040T: Fluoride	16984-48-8	400 mg/kg	85.5	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 266509)							
ES1535311-001	Anonymous	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	100.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 266507)							
ES1535311-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	99.6	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	96.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 266085)							
EB1533240-003	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	102	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 266506)							
ES1535311-001	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	100	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	103	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	120	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 266085)							
EB1533240-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	101	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 266506)							
ES1535311-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	93.5	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	116	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	109	52	132
EP080: BTEXN (QCLot: 266085)							
EB1533240-003	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	86.6	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	84.0	70	130



Sub-Matrix: SOIL

Laboratory sample IDClient sample IDMethod: CompoundCAS Number				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EP080: BTEXN (QCLot: 266085) - continued							
EB1533240-003	Anonymous	EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	84.3	70	130
			106-42-3				
		EP080: Naphthalene	91-20-3	2.5 mg/kg	85.5	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	86.3	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	82.4	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1535263	Page	: 1 of 8
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR NEIL WOODBRIDGE	Telephone	: +61-2-8784 8555
Project	: AS130456 CWS GW INSTALLATION	Date Samples Received	: 03-Nov-2015
Site	: ----	Issue Date	: 11-Nov-2015
Sampler	: MARK TIEDEMAN	No. of samples received	: 8
Order number	: AS130456	No. of samples analysed	: 3

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

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG035T: Total Recoverable Mercury by FIMS	ES1535156--001	Anonymous	Mercury	7439-97-6	36.0 %	0% - 20%	RPD exceeds LOR based limits
Laboratory Control Spike (LCS) Recoveries							
ED037: Alkalinity	QC-269509-002	----	Total Alkalinity as CaCO3	----	248 %	87-112%	Recovery greater than upper control limit
Matrix Spike (MS) Recoveries							
ED045G: Chloride by Discrete Analyser	ES1535189--001	Anonymous	Chloride	16887-00-6	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Cations - soluble by ICP-AES	0	1	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	0	1	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
Total Metals by ICP-AES	0	3	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved (EA002) MW206_12, MW206_15.0	03-Nov-2015	09-Nov-2015	10-Nov-2015	✓	09-Nov-2015	09-Nov-2015	✓	
Soil Glass Jar - Unpreserved (EA002) MW201_14	28-Oct-2015	04-Nov-2015	04-Nov-2015	✓	04-Nov-2015	04-Nov-2015	✓	
EA010: Conductivity								
Soil Glass Jar - Unpreserved (EA010) MW206_12, MW206_15.0	03-Nov-2015	09-Nov-2015	10-Nov-2015	✓	09-Nov-2015	07-Dec-2015	✓	
Soil Glass Jar - Unpreserved (EA010) MW201_14	28-Oct-2015	04-Nov-2015	04-Nov-2015	✓	04-Nov-2015	02-Dec-2015	✓	



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved (EA055-103) MW206_12, MW206_15.0	03-Nov-2015	----	----	----	04-Nov-2015	17-Nov-2015	✓	
Soil Glass Jar - Unpreserved (EA055-103) MW201_14	28-Oct-2015	----	----	----	04-Nov-2015	11-Nov-2015	✓	
ED037: Alkalinity								
Soil Glass Jar - Unpreserved (ED037) MW206_12, MW206_15.0	03-Nov-2015	07-Nov-2015	01-May-2016	✓	09-Nov-2015	01-May-2016	✓	
Soil Glass Jar - Unpreserved (ED037) MW201_14	28-Oct-2015	07-Nov-2015	25-Apr-2016	✓	09-Nov-2015	25-Apr-2016	✓	
ED040S : Soluble Sulfate by ICPAES								
Soil Glass Jar - Unpreserved (ED040S) MW206_12, MW206_15.0	03-Nov-2015	09-Nov-2015	01-Dec-2015	✓	09-Nov-2015	07-Dec-2015	✓	
Soil Glass Jar - Unpreserved (ED040S) MW201_14	28-Oct-2015	04-Nov-2015	25-Nov-2015	✓	04-Nov-2015	02-Dec-2015	✓	
ED045G: Chloride by Discrete Analyser								
Soil Glass Jar - Unpreserved (ED045G) MW206_12, MW206_15.0	03-Nov-2015	09-Nov-2015	01-Dec-2015	✓	09-Nov-2015	07-Dec-2015	✓	
Soil Glass Jar - Unpreserved (ED045G) MW201_14	28-Oct-2015	04-Nov-2015	25-Nov-2015	✓	04-Nov-2015	02-Dec-2015	✓	
ED093S: Soluble Major Cations								
Soil Glass Jar - Unpreserved (ED093S) MW206_12, MW206_15.0	03-Nov-2015	09-Nov-2015	01-May-2016	✓	09-Nov-2015	01-May-2016	✓	
Soil Glass Jar - Unpreserved (ED093S) MW201_14	28-Oct-2015	04-Nov-2015	25-Apr-2016	✓	04-Nov-2015	25-Apr-2016	✓	
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T) MW206_12, MW206_15.0	03-Nov-2015	05-Nov-2015	01-May-2016	✓	06-Nov-2015	01-May-2016	✓	
Soil Glass Jar - Unpreserved (EG005T) MW201_14	28-Oct-2015	05-Nov-2015	25-Apr-2016	✓	06-Nov-2015	25-Apr-2016	✓	
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T) MW206_12, MW206_15.0	03-Nov-2015	05-Nov-2015	01-Dec-2015	✓	08-Nov-2015	01-Dec-2015	✓	
Soil Glass Jar - Unpreserved (EG035T) MW201_14	28-Oct-2015	05-Nov-2015	25-Nov-2015	✓	08-Nov-2015	25-Nov-2015	✓	
EK026SF: Total CN by Segmented Flow Analyser								
Soil Glass Jar - Unpreserved (EK026SF) MW206_12, MW206_15.0	03-Nov-2015	04-Nov-2015	17-Nov-2015	✓	05-Nov-2015	18-Nov-2015	✓	
Soil Glass Jar - Unpreserved (EK026SF) MW201_14	28-Oct-2015	04-Nov-2015	11-Nov-2015	✓	05-Nov-2015	18-Nov-2015	✓	



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK040T: Fluoride Total								
Pulp Bag (EK040T) MW206_12, MW206_15.0	03-Nov-2015	04-Nov-2015	01-Dec-2015	✓	06-Nov-2015	01-Dec-2015	✓	
Pulp Bag (EK040T) MW201_14	28-Oct-2015	04-Nov-2015	25-Nov-2015	✓	06-Nov-2015	25-Nov-2015	✓	
EP066: Polychlorinated Biphenyls (PCB)								
Soil Glass Jar - Unpreserved (EP066) MW206_12, MW206_15.0	03-Nov-2015	04-Nov-2015	17-Nov-2015	✓	05-Nov-2015	14-Dec-2015	✓	
Soil Glass Jar - Unpreserved (EP066) MW201_14	28-Oct-2015	04-Nov-2015	11-Nov-2015	✓	05-Nov-2015	14-Dec-2015	✓	
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP071) MW206_12, MW206_15.0	03-Nov-2015	04-Nov-2015	17-Nov-2015	✓	05-Nov-2015	14-Dec-2015	✓	
Soil Glass Jar - Unpreserved (EP071) MW201_14	28-Oct-2015	04-Nov-2015	11-Nov-2015	✓	05-Nov-2015	14-Dec-2015	✓	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM)) MW206_12, MW206_15.0	03-Nov-2015	04-Nov-2015	17-Nov-2015	✓	05-Nov-2015	14-Dec-2015	✓	
Soil Glass Jar - Unpreserved (EP075(SIM)) MW201_14	28-Oct-2015	04-Nov-2015	11-Nov-2015	✓	05-Nov-2015	14-Dec-2015	✓	
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080) MW206_12, MW206_15.0	03-Nov-2015	04-Nov-2015	17-Nov-2015	✓	04-Nov-2015	17-Nov-2015	✓	
Soil Glass Jar - Unpreserved (EP080) MW201_14	28-Oct-2015	04-Nov-2015	11-Nov-2015	✓	04-Nov-2015	11-Nov-2015	✓	



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	1	8	12.50	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	0	1	0.00	10.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	1	1	100.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	2	50.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	0	1	0.00	10.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	2	17	11.76	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	1	2	50.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	2	12	16.67	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	2	13	15.38	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	2	11	18.18	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	3	66.67	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	2	18	11.11	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	14	14.29	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	1	8	12.50	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	2	1	200.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	2	50.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	17	5.88	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	12	8.33	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	2	13	15.38	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	11	9.09	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	3	33.33	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	14	7.14	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	1	8	12.50	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	2	50.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	17	5.88	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement



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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Polychlorinated Biphenyls (PCB)	EP066	1	12	8.33	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	1	13	7.69	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	11	9.09	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	3	33.33	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	14	7.14	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride Soluble By Discrete Analyser	ED045G	1	1	100.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	17	5.88	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	12	8.33	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	1	13	7.69	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	11	9.09	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	0	3	0.00	5.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	14	7.14	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	WATER	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	WATER	In house: Referenced to APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 104)
Moisture Content	EA055-103	WATER	In-house. A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Alkalinity in Soil	ED037	WATER	In house: Referenced to APHA 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	WATER	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Chloride Soluble By Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 21st edition 4500-Cl- E. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm. Analysis is performed on a 1:5 soil / water leachate.
Cations - soluble by ICP-AES	ED093S	WATER	In house: Referenced to APHA 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-AES	EG005T	WATER	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Cyanide by Segmented Flow Analyser	EK026SF	WATER	In house: Referenced to APHA 4500-CN-O. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
Total Fluoride	EK040T	WATER	(In-house) Total fluoride is determined by ion specific electrode (ISE) in a solution obtained after a Sodium Carbonate / Potassium Carbonate fusion dissolution.



Analytical Methods	Method	Matrix	Method Descriptions
Polychlorinated Biphenyls (PCB)	EP066	WATER	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
TRH - Semivolatile Fraction	EP071	WATER	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	WATER	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	WATER	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Preparation Methods	Method	Matrix	Method Descriptions
Total Fluoride	EK040T-PR	WATER	(In-house) Samples are fused with Sodium Carbonate / Potassium Carbonate flux.
Methanolic Extraction of Soils for Purge and Trap	* ORG16	WATER	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	WATER	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

RAMBOLL ENVIRON

Laboratory Details	
Lab. Name:	ALS
Lab. Address:	277-289 Woodpark Road, Smithfield NSW
Contact Name:	Final Report by:
Lab. Ref:	Lab Quote No:

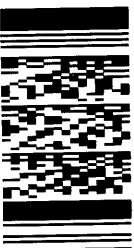
Purchase Order Number:

environcorp.com; frobinson@environcorp.com

Analysis Request

[illegible][illegible]

Work Order Reference
ES1535263



CERTIFICATE OF ANALYSIS

Work Order	: ES1535499	Page	: 1 of 6
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: mtiedeman@environcorp.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 05-Nov-2015 16:25
C-O-C number	: ----	Date Analysis Commenced	: 09-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 16-Nov-2015 15:37
Site	: ----		
Quote number	: ----	No. of samples received	: 11
		No. of samples analysed	: 3

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

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

Signatories

Position

Accreditation Category

Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Greg Vogel	Laboratory Manager	Brisbane Inorganics
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Raymond Commodore	Instrument Chemist	Sydney Inorganics



General Comments

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- ED037 (Alkalinity): Determined and reported on a 1:5 soil:water leach; as such results and LOR values have been adjusted accordingly.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW202-12	MW202-13.5	QA101	----	----
Client sampling date / time					[05-Nov-2015]	[05-Nov-2015]	[05-Nov-2015]	----	----
Compound	CAS Number	LOR	Unit		ES1535499-001	ES1535499-004	ES1535499-011	-----	-----
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		10.5	9.9	9.8	----	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		3400	3850	4630	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		20.3	12.0	13.3	----	----
ED037: Alkalinity									
Total Alkalinity as CaCO3	----	1	mg/kg		5580	5120	5840	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg		<5	2760	2950	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg		5510	2360	2890	----	----
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		2210	1920	2180	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		210	290	530	----	----
ED093S: Soluble Major Cations									
Sodium	7440-23-5	10	mg/kg		3750	3760	4650	----	----
Potassium	7440-09-7	10	mg/kg		40	60	40	----	----
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		7050	12300	16800	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	----	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	1	mg/kg		26	44	51	----	----
EK040T: Fluoride Total									
Fluoride	16984-48-8	40	mg/kg		2880	2140	3740	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg		0.6	<0.5	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg		4.3	<0.5	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg		0.9	<0.5	<0.5	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW202-12	MW202-13.5	QA101	----	----
Client sampling date / time					[05-Nov-2015]	[05-Nov-2015]	[05-Nov-2015]	----	----
Compound	CAS Number	LOR	Unit		ES1535499-001	ES1535499-004	ES1535499-011	-----	-----
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluoranthene	206-44-0	0.5	mg/kg		10.2	<0.5	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg		10.4	<0.5	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		4.9	<0.5	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg		4.8	<0.5	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		7.4	<0.5	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		2.7	<0.5	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		6.4	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		3.4	<0.5	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		0.7	<0.5	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		4.8	<0.5	<0.5	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		61.5	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		9.0	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		9.0	0.6	0.6	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		9.0	1.2	1.2	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		270	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		240	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		510	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg		470	<100	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		470	<50	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW202-12	MW202-13.5	QA101	----	----
Client sampling date / time					[05-Nov-2015]	[05-Nov-2015]	[05-Nov-2015]	----	----
Compound	CAS Number	LOR	Unit		ES1535499-001	ES1535499-004	ES1535499-011	-----	-----
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		79.0	71.0	68.0	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		119	116	117	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		102	100.0	100	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%		114	90.6	76.3	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		100	95.2	97.7	----	----
Anthracene-d10	1719-06-8	0.5	%		106	106	107	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		93.8	93.4	95.8	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		98.8	95.0	101	----	----
Toluene-D8	2037-26-5	0.2	%		121	117	119	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		114	116	121	----	----

QUALITY CONTROL REPORT

Work Order	: ES1535499	Page	: 1 of 8
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: mtiedeman@environcorp.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 05-Nov-2015
C-O-C number	: ----	Date Analysis Commenced	: 09-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 16-Nov-2015
Site	: ----	No. of samples received	: 11
Quote number	: ----	No. of samples analysed	: 3

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

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



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



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Greg Vogel	Laboratory Manager	Brisbane Inorganics
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Raymond Commodore	Instrument Chemist	Sydney Inorganics



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002 : pH (Soils) (QC Lot: 271675)									
ES1535611-007	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.4	8.0	4.52	0% - 20%
ES1535499-001	MW202-12	EA002: pH Value	----	0.1	pH Unit	10.5	10.4	0.00	0% - 20%
EA010: Conductivity (QC Lot: 271676)									
ES1535611-007	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	611	594	2.82	0% - 20%
ES1535499-001	MW202-12	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	3400	3460	1.75	0% - 20%
EA055: Moisture Content (QC Lot: 272559)									
ES1535499-001	MW202-12	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	20.3	19.9	2.06	0% - 20%
ES1535546-007	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	18.4	18.1	1.29	0% - 50%
ED037: Alkalinity (QC Lot: 272247)									
ES1535499-001	MW202-12	ED037: Total Alkalinity as CaCO3	----	1	mg/kg	5580	5610	0.586	0% - 20%
ED040S: Soluble Major Anions (QC Lot: 271679)									
ES1535499-001	MW202-12	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	2210	2270	2.60	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 271678)									
ES1535499-001	MW202-12	ED045G: Chloride	16887-00-6	10	mg/kg	210	210	0.00	0% - 20%
ED093S: Soluble Major Cations (QC Lot: 271677)									
ES1535624-004	Anonymous	ED093S: Potassium	7440-09-7	10	mg/kg	780	780	0.00	0% - 20%
		ED093S: Sodium	7440-23-5	10	mg/kg	970	970	0.00	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 274504)									
ES1535499-001	MW202-12	EG005T: Aluminium	7429-90-5	50	mg/kg	7050	6960	1.30	0% - 20%
ES1535552-008	Anonymous	EG005T: Aluminium	7429-90-5	50	mg/kg	13400	13800	2.68	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 274505)									
ES1535499-001	MW202-12	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1535552-008	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 271357)									
ES1535344-001	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
ES1535482-002	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
EK040T: Fluoride Total (QC Lot: 275969)									
ES1535499-001	MW202-12	EK040T: Fluoride	16984-48-8	40	mg/kg	2880	2760	4.08	0% - 20%
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 270806)									
ES1535499-001	MW202-12	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 270808)									
ES1535499-001	MW202-12	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	0.6	0.6	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 270808) - continued									
ES1535499-001	MW202-12	EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	0.9	1.1	24.5	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	4.9	6.2	24.3	0% - 50%
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	6.4	8.2	24.7	0% - 50%
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	9.0	# 11.7	25.6	0% - 20%
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	7.4	9.7	26.3	0% - 50%
			205-82-3						
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	4.8	6.0	22.0	0% - 50%
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	2.7	3.2	16.3	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	4.8	6.0	22.7	0% - 50%
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	0.7	1.0	36.4	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	10.2	12.4	19.5	0% - 20%
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	3.4	4.6	29.5	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	4.3	5.0	14.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	10.4	12.6	19.3	0% - 20%
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	61.5	# 76.6	21.9	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 270644)									
ES1535472-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1535578-005	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	16	46.8	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 270807)									
ES1535499-001	MW202-12	EP071: C15 - C28 Fraction	----	100	mg/kg	270	270	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	240	230	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 270644)									
ES1535472-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1535578-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	11	19	56.9	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 270807)									
ES1535499-001	MW202-12	EP071: >C16 - C34 Fraction	----	100	mg/kg	470	450	3.36	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: 270644)									
ES1535472-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	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: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Page : 5 of 8
 Work Order : ES1535499
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 270644) - continued									
ES1535472-001	Anonymous	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1535578-005	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	0.6	0.7	21.8	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	2.4	3.0	21.9	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	0.7	<0.5	28.3	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit



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

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low
EA010: Conductivity (QCLot: 271676)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	100	70	130
ED037: Alkalinity (QCLot: 272247)								
ED037: Total Alkalinity as CaCO3	----	1	mg/kg	<1	200 mg/kg	104	87	112
ED040S: Soluble Major Anions (QCLot: 271679)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	150 mg/kg	95.6	80	120
ED045G: Chloride by Discrete Analyser (QCLot: 271678)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	96.6	75	125
				<10	5000 mg/kg	97.0	79	117
ED093S: Soluble Major Cations (QCLot: 271677)								
ED093S: Potassium	7440-09-7	10	mg/kg	<10	50 mg/kg	92.7	83	125
ED093S: Sodium	7440-23-5	10	mg/kg	<10	50 mg/kg	86.6	81	123
EG005T: Total Metals by ICP-AES (QCLot: 274504)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	6134 mg/kg	116	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 274505)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	77.7	70	105
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 271357)								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	20 mg/kg	93.0	70	130
EK040T: Fluoride Total (QCLot: 275969)								
EK040T: Fluoride	16984-48-8	40	mg/kg	<40	950 mg/kg	86.1	69	107
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 270806)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	107	62	126
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 270808)								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	100	73	127
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	98.3	72	124
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	110	77	127
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	98.1	69	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	97.5	70	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	96.2	68	116
	205-82-3							
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	96.5	63	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	101	74	126
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	106	75	127
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	94.2	62	118

Matrix Spike (MS) Report

Sub-Matrix: SOIL

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 271678)							
ES1535499-001	MW202-12	ED045G: Chloride	16887-00-6	1250 mg/kg	123	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 274505)							



Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 274505) - continued							
ES1535499-001	MW202-12	EG035T: Mercury	7439-97-6	5 mg/kg	96.1	70	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 271357)							
ES1535344-001	Anonymous	EK026SF: Total Cyanide	57-12-5	20 mg/kg	82.5	70	130
EK040T: Fluoride Total (QCLot: 275969)							
ES1535499-001	MW202-12	EK040T: Fluoride	16984-48-8	400 mg/kg	# Not Determined	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 270806)							
ES1535499-001	MW202-12	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	105	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 270808)							
ES1535499-001	MW202-12	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	79.0	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	96.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 270644)							
ES1535472-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	98.8	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 270807)							
ES1535499-001	MW202-12	EP071: C10 - C14 Fraction	----	523 mg/kg	93.2	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	105	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	125	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 270644)							
ES1535472-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	96.2	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 270807)							
ES1535499-001	MW202-12	EP071: >C10 - C16 Fraction	----	860 mg/kg	92.1	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	116	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	110	52	132
EP080: BTEXN (QCLot: 270644)							
ES1535472-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	76.0	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	91.8	70	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	91.0	70	130
			106-42-3				
		EP080: Naphthalene	91-20-3	2.5 mg/kg	80.5	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	92.4	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	89.7	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1535499	Page	: 1 of 8
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Telephone	: +61-2-8784 8555
Project	: AS130456 CWS GW INSTALLATION	Date Samples Received	: 05-Nov-2015
Site	: ----	Issue Date	: 16-Nov-2015
Sampler	: MARK TIEDEMAN	No. of samples received	: 11
Order number	: ----	No. of samples analysed	: 3

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

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	ES1535499--001	MW202-12	Benzo(a)pyrene TEQ (zero)	----	25.6 %	0% - 20%	RPD exceeds LOR based limits
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	ES1535499--001	MW202-12	Sum of polycyclic aromatic hydrocarbons	----	21.9 %	0% - 20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EK040T: Fluoride Total	ES1535499--001	MW202-12	Fluoride	16984-48-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)					
Total Metals by ICP-AES	0	20	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved (EA002)								
MW202-12, QA101	MW202-13.5,	05-Nov-2015	11-Nov-2015	12-Nov-2015	✔	11-Nov-2015	11-Nov-2015	✔
EA010: Conductivity								
Soil Glass Jar - Unpreserved (EA010)								
MW202-12, QA101	MW202-13.5,	05-Nov-2015	11-Nov-2015	12-Nov-2015	✔	11-Nov-2015	09-Dec-2015	✔



Matrix: **SOIL**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
Soil Glass Jar - Unpreserved (EA055-103) MW202-12, QA101	MW202-13.5,	05-Nov-2015	----	----	----	10-Nov-2015	19-Nov-2015	✓
ED037: Alkalinity								
Soil Glass Jar - Unpreserved (ED037) MW202-12, QA101	MW202-13.5,	05-Nov-2015	16-Nov-2015	03-May-2016	✓	16-Nov-2015	03-May-2016	✓
ED040S : Soluble Sulfate by ICPAES								
Soil Glass Jar - Unpreserved (ED040S) MW202-12, QA101	MW202-13.5,	05-Nov-2015	11-Nov-2015	03-Dec-2015	✓	11-Nov-2015	09-Dec-2015	✓
ED045G: Chloride by Discrete Analyser								
Soil Glass Jar - Unpreserved (ED045G) MW202-12, QA101	MW202-13.5,	05-Nov-2015	11-Nov-2015	03-Dec-2015	✓	11-Nov-2015	09-Dec-2015	✓
ED093S: Soluble Major Cations								
Soil Glass Jar - Unpreserved (ED093S) MW202-12, QA101	MW202-13.5,	05-Nov-2015	11-Nov-2015	03-May-2016	✓	11-Nov-2015	03-May-2016	✓
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T) MW202-12, QA101	MW202-13.5,	05-Nov-2015	12-Nov-2015	03-May-2016	✓	12-Nov-2015	03-May-2016	✓
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T) MW202-12, QA101	MW202-13.5,	05-Nov-2015	12-Nov-2015	03-Dec-2015	✓	13-Nov-2015	03-Dec-2015	✓
EK026SF: Total CN by Segmented Flow Analyser								
Soil Glass Jar - Unpreserved (EK026SF) MW202-12, QA101	MW202-13.5,	05-Nov-2015	09-Nov-2015	19-Nov-2015	✓	10-Nov-2015	23-Nov-2015	✓
EK040T: Fluoride Total								
Pulp Bag (EK040T) MW202-12, QA101	MW202-13.5,	05-Nov-2015	09-Nov-2015	03-Dec-2015	✓	13-Nov-2015	03-Dec-2015	✓
EP066: Polychlorinated Biphenyls (PCB)								
Soil Glass Jar - Unpreserved (EP066) MW202-12, QA101	MW202-13.5,	05-Nov-2015	11-Nov-2015	19-Nov-2015	✓	12-Nov-2015	21-Dec-2015	✓

Page : 4 of 8
 Work Order : ES1535499
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Matrix: **SOIL**

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

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons									
Soil Glass Jar - Unpreserved (EP071) MW202-12, QA101		MW202-13.5,	05-Nov-2015	11-Nov-2015	19-Nov-2015	✔	12-Nov-2015	21-Dec-2015	✔
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Soil Glass Jar - Unpreserved (EP075(SIM)) MW202-12, QA101		MW202-13.5,	05-Nov-2015	11-Nov-2015	19-Nov-2015	✔	12-Nov-2015	21-Dec-2015	✔
EP080/071: Total Petroleum Hydrocarbons									
Soil Glass Jar - Unpreserved (EP080) MW202-12, QA101		MW202-13.5,	05-Nov-2015	09-Nov-2015	19-Nov-2015	✔	09-Nov-2015	19-Nov-2015	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	6	16.67	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	6	16.67	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	19	10.53	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	2	5	40.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	6	16.67	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	6	16.67	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	6	16.67	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement



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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	1	20	5.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	6	16.67	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride Soluble By Discrete Analyser	ED045G	1	5	20.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	1	20	5.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	6	16.67	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	0	20	0.00	5.00	✖	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	In-house. A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Alkalinity in Soil	ED037	SOIL	In house: Referenced to APHA 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Chloride Soluble By Discrete Analyser	ED045G	SOIL	In house: Referenced to APHA 21st edition 4500-Cl- E. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm. Analysis is performed on a 1:5 soil / water leachate.
Cations - soluble by ICP-AES	ED093S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	In house: Referenced to APHA 4500-CN-O. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
Total Fluoride	EK040T	SOIL	(In-house) Total fluoride is determined by ion specific electrode (ISE) in a solution obtained after a Sodium Carbonate / Potassium Carbonate fusion dissolution.



Analytical Methods	Method	Matrix	Method Descriptions
Polychlorinated Biphenyls (PCB)	EP066	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
TRH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Preparation Methods	Method	Matrix	Method Descriptions
Total Fluoride	EK040T-PR	SOIL	(In-house) Samples are fused with Sodium Carbonate / Potassium Carbonate flux.
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Chain of Custody & Analysis Request Form

Ramboll Environ
Level 2, Suite 19B, 50 Glebe Road
The Junction NSW 2291

Tel: 02 49625444
Email: mtiedeman@environcorp.com
Email: robinson@environcorp.com

Laboratory Details

Lab. Name: ALS
Lab. Address: 277-289 Woodpark Road, Smithfield NSW
Contact Name:
Lab. Ref:
Tel: 02 8784 8555
Fax: 02 8784 8500
Final Report by:
Lab Quote No:

Project Name: CWS GW Installation

Project Number: AS130456

Purchase Order Number:

Sample collected by: Mark Tiedeman

Sample Results to be returned to:

mtiedeman@environcorp.com; robinson@environcorp.com

Specifications:

1. Urgent TAT required? (please circle: 24hr 48hr ___ days) STANDARD ☐ Yes ☐ No ☐ N/A
2. Fast TAT Guarantee Required? ☒ Yes ☐ No ☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions? ☐ Yes ☐ No ☐ N/A
4. Special storage requirements? ☐ Yes ☒ No ☐ N/A
5. Preservation requirements? ☐ Yes ☐ No ☐ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☒ Email ☐ Yes ☐ No ☐ N/A
7. Report Format: esdat / excel / pdf 8. Project Manager: Neil Woodridge tel:

(Tick)

Analysis Request

Lab. ID	Sample ID	Sampling Date	Sampling Time	Matrix			Preservation			Container (No. & type)
				soil	water	other	filtered	acid	ice	

pH/EC	
Total Alkalinity	
Sodium / Potassium / Chloride	
Fluoride / Sulphate	
Cyanide	
Carbonate	
Aluminium	
PAH / TRH / BTEX / PCB	
Mercury	

HOLD

Telephone: + 61-2-8794 8555



Environmental Division
Sydney
Work Order Reference
ES1535499

1	MM202-12	5/11								
2	MM202-12.5									
3	MM202-13.0									
4	MM202-13.5									
5	MM202-14.0									
6	MM202-14.5									
7	MM202-15.0									
8	MM202-16									
9	MM202-17									
10	MM202-18									
11	QA101									

Received in good condition?	Yes/No/NA	Method of Shipment
Samples received chilled?	Yes/No/NA	Consignment Note No.
Received in good condition?	Yes/No/NA	Transport Co:
Samples received chilled?	Yes/No/NA	Method of Shipment
Received in good condition?	Yes/No/NA	Consignment Note No.
Samples received chilled?	Yes/No/NA	Transport Co:
Received in good condition?	Yes/No/NA	Method of Shipment
Samples received chilled?	Yes/No/NA	Consignment Note No.
Received in good condition?	Yes/No/NA	Transport Co:
Samples received chilled?	Yes/No/NA	Method of Shipment
Received in good condition?	Yes/No/NA	Consignment Note No.
Samples received chilled?	Yes/No/NA	Transport Co:

☐ Courier ☐ Postal ☐ By Hand
☐ Courier ☐ Postal ☐ By Hand
☐ Courier ☐ Postal ☐ By Hand
☐ Courier ☐ Postal ☐ By Hand
☐ Courier ☐ Postal ☐ By Hand
☐ Courier ☐ Postal ☐ By Hand
☐ Courier ☐ Postal ☐ By Hand
☐ Courier ☐ Postal ☐ By Hand
☐ Courier ☐ Postal ☐ By Hand
☐ Courier ☐ Postal ☐ By Hand
☐ Courier ☐ Postal ☐ By Hand
☐ Courier ☐ Postal ☐ By Hand

Relinquished By:

Date: 5/11

Name: Mark Spencer

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

Name: ACS

Time: 4:25pm

Received by:

Date: 5/11/13

CERTIFICATE OF ANALYSIS

Work Order	: ES1535624	Page	: 1 of 6
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR NEIL WOODBRIDGE	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: nrwoodbridge@environcorp.com	E-mail	:
Telephone	: +61 02 99548114	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 06-Nov-2015 16:38
C-O-C number	: ----	Date Analysis Commenced	: 09-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 16-Nov-2015 17:16
Site	: ----		
Quote number	: ----	No. of samples received	: 7
		No. of samples analysed	: 3

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Gerrad Morgan	Asbestos Identifier	Newcastle - Asbestos
Greg Vogel	Laboratory Manager	Brisbane Inorganics
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics



General Comments

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- **EP066 : Positive PCB result for sample #MW204_12.2 (ES1535624_2) is confirmed by re-extraction and re-analysis.**
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW204_4	MW204_12.2	MW204_14.0	----	----
Client sampling date / time					[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]	----	----
Compound	CAS Number	LOR	Unit		ES1535624-001	ES1535624-002	ES1535624-004	-----	-----
				Result	Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		----	10.2	9.6	----	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		----	5250	547	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		----	20.0	11.0	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		No	----	----	----	----
Asbestos Type	1332-21-4	-	--		-	----	----	----	----
Sample weight (dry)	----	0.01	g		21.7	----	----	----	----
APPROVED IDENTIFIER:	----	-	--		G.MORGAN	----	----	----	----
ED037: Alkalinity									
Total Alkalinity as CaCO3	----	1	mg/kg		----	853	7420	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/kg		----	591	5320	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/kg		----	262	2100	----	----
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		----	1250	200	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		----	1180	710	----	----
ED093S: Soluble Major Cations									
Sodium	7440-23-5	10	mg/kg		----	6940	970	----	----
Potassium	7440-09-7	10	mg/kg		----	1210	780	----	----
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		----	14800	5080	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		----	<0.1	<0.1	----	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	1	mg/kg		----	114	<1	----	----
EK040T: Fluoride Total									
Fluoride	16984-48-8	40	mg/kg		----	2290	110	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		----	0.1	<0.1	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	<0.5	<0.5	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW204_4	MW204_12.2	MW204_14.0	----	----
Client sampling date / time				[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]	----	----
Compound	CAS Number	LOR	Unit	ES1535624-001	ES1535624-002	ES1535624-004	-----	-----
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	0.8	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	4.2	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg	----	0.8	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	8.4	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg	----	8.5	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	3.9	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg	----	4.0	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	5.6	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	1.9	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	4.9	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	2.7	<0.5	----	----
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	----	0.5	<0.5	----	----
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	----	3.9	<0.5	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	50.1	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	6.9	<0.5	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	6.9	0.6	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	6.9	1.2	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg	----	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg	----	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg	----	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg	----	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg	----	<100	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg	----	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	<50	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	<50	<50	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW204_4	MW204_12.2	MW204_14.0	----	----
Client sampling date / time					[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]	----	----
Compound	CAS Number	LOR	Unit		ES1535624-001	ES1535624-002	ES1535624-004	-----	-----
					Result	Result	Result	Result	Result
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		----	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		----	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg		----	<0.2	<0.2	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg		----	<1	<1	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	61.0	61.0	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	116	117	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	98.6	99.1	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%		----	106	110	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	97.1	96.6	----	----
Anthracene-d10	1719-06-8	0.5	%		----	107	109	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	95.2	96.3	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		----	107	97.2	----	----
Toluene-D8	2037-26-5	0.2	%		----	104	97.6	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		----	90.4	85.7	----	----

Analytical Results

Descriptive Results

Sub-Matrix: SOIL		
Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	MW204_4 - [06-Nov-2015]	Mid grey soil with slag debris and several pieces of organic fibre matting..

QUALITY CONTROL REPORT

Work Order	: ES1535624	Page	: 1 of 8
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR NEIL WOODBRIDGE	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: nrwoodbridge@environcorp.com	E-mail	:
Telephone	: +61 02 99548114	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 06-Nov-2015
C-O-C number	: ----	Date Analysis Commenced	: 09-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 16-Nov-2015
Site	: ----	No. of samples received	: 7
Quote number	: ----	No. of samples analysed	: 3

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

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



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



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Gerrad Morgan	Asbestos Identifier	Newcastle - Asbestos
Greg Vogel	Laboratory Manager	Brisbane Inorganics
Merrin Avery	Supervisor - Inorganic	Newcastle - Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002 : pH (Soils) (QC Lot: 271681)									
ES1535611-027	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.4	8.4	0.00	0% - 20%
ES1535611-047	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.1	8.2	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 271682)									
ES1535624-004	MW204_14.0	EA002: pH Value	----	0.1	pH Unit	9.6	9.6	0.00	0% - 20%
EA010: Conductivity (QC Lot: 271680)									
ES1535611-027	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	678	647	4.68	0% - 20%
ES1535611-047	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	700	673	3.93	0% - 20%
EA010: Conductivity (QC Lot: 271683)									
ES1535624-004	MW204_14.0	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	547	625	13.3	0% - 20%
EA055: Moisture Content (QC Lot: 272564)									
ES1535622-029	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	37.4	34.0	9.57	0% - 20%
ES1535639-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	44.0	44.3	0.462	0% - 20%
ED037: Alkalinity (QC Lot: 272247)									
ES1535499-001	Anonymous	ED037: Total Alkalinity as CaCO3	----	1	mg/kg	5580	5610	0.586	0% - 20%
ED040S: Soluble Major Anions (QC Lot: 271679)									
ES1535499-001	Anonymous	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	2210	2270	2.60	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 271678)									
ES1535499-001	Anonymous	ED045G: Chloride	16887-00-6	10	mg/kg	210	210	0.00	0% - 20%
ED093S: Soluble Major Cations (QC Lot: 271677)									
ES1535624-004	MW204_14.0	ED093S: Potassium	7440-09-7	10	mg/kg	780	780	0.00	0% - 20%
		ED093S: Sodium	7440-23-5	10	mg/kg	970	970	0.00	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 273690)									
ES1535578-006	Anonymous	EG005T: Aluminium	7429-90-5	50	mg/kg	8540	8460	0.990	0% - 20%
ES1535867-001	Anonymous	EG005T: Aluminium	7429-90-5	50	mg/kg	4700	4710	0.242	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 273691)									
ES1535578-006	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.7	1.1	49.4	0% - 50%
ES1535867-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 271359)									
ES1535624-002	MW204_12.2	EK026SF: Total Cyanide	57-12-5	1	mg/kg	114	114	0.00	0% - 20%
ES1535707-002	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	35	33	4.66	0% - 20%
EK040T: Fluoride Total (QC Lot: 273654)									
ES1535466-001	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	70	80	13.8	No Limit
ES1535482-008	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	60	70	19.5	No Limit

Page : 4 of 8
 Work Order : ES1535624
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 270806)									
ES1535499-001	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 270808)									
ES1535499-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	0.6	0.6	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	0.9	1.1	24.5	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	4.9	6.2	24.3	0% - 50%
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	6.4	8.2	24.7	0% - 50%
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	9.0	# 11.7	25.6	0% - 20%
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	7.4	9.7	26.3	0% - 50%
			205-82-3						
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	4.8	6.0	22.0	0% - 50%
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	2.7	3.2	16.3	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	4.8	6.0	22.7	0% - 50%
		EP075(SIM): Dibenzo(a,h)anthracene	53-70-3	0.5	mg/kg	0.7	1.0	36.4	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	10.2	12.4	19.5	0% - 20%
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	3.4	4.6	29.5	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	4.3	5.0	14.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	10.4	12.6	19.3	0% - 20%
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	61.5	# 76.6	21.9	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 270807)									
ES1535499-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	270	270	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	240	230	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 270974)									
ES1535546-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1535546-009	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 270807)									
ES1535499-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	470	450	3.36	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: 270974)									
ES1535546-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1535546-009	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 270974)									
ES1535546-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Page : 5 of 8
 Work Order : ES1535624
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 270974) - continued									
ES1535546-001	Anonymous	EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1535546-009	Anonymous	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: 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: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit



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

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EA010: Conductivity (QCLot: 271680)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	101	70	130
EA010: Conductivity (QCLot: 271683)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	100	70	130
ED037: Alkalinity (QCLot: 272247)								
ED037: Total Alkalinity as CaCO3	----	1	mg/kg	<1	200 mg/kg	104	87	112
ED040S: Soluble Major Anions (QCLot: 271679)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	150 mg/kg	95.6	80	120
ED045G: Chloride by Discrete Analyser (QCLot: 271678)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	96.6	75	125
				<10	5000 mg/kg	97.0	79	117
ED093S: Soluble Major Cations (QCLot: 271677)								
ED093S: Potassium	7440-09-7	10	mg/kg	<10	50 mg/kg	92.7	83	125
ED093S: Sodium	7440-23-5	10	mg/kg	<10	50 mg/kg	86.6	81	123
EG005T: Total Metals by ICP-AES (QCLot: 273690)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	6134 mg/kg	123	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 273691)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	75.9	70	105
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 271359)								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	20 mg/kg	92.6	70	130
EK040T: Fluoride Total (QCLot: 273654)								
EK040T: Fluoride	16984-48-8	40	mg/kg	<40	950 mg/kg	84.9	69	107
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 270806)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	107	62	126
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 270808)								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	100	73	127
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	98.3	72	124
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	110	77	127
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	98.1	69	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	97.5	70	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	96.2	68	116
	205-82-3							
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	96.5	63	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	101	74	126



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 270808) - continued								
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	106	75	127
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	94.2	62	118
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	92.7	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	99.4	72	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	96.3	61	121
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	107	77	125
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	110	75	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	93.3	74	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 270807)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	104	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	113	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	103	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 270974)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	97.2	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 270807)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	104	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	116	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	93.8	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 270974)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	95.2	68	128
EP080: BTEXN (QCLot: 270974)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	88.3	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	80.7	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	84.8	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	89.8	62	138
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	82.8	60	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	90.8	62	128

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 271678)							
ES1535499-001	Anonymous	ED045G: Chloride	16887-00-6	1250 mg/kg	123	70	130



Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 273691)							
ES1535578-007	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	96.8	70	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 271359)							
ES1535624-002	MW204_12.2	EK026SF: Total Cyanide	57-12-5	20 mg/kg	# Not Determined	70	130
EK040T: Fluoride Total (QCLot: 273654)							
ES1535466-001	Anonymous	EK040T: Fluoride	16984-48-8	400 mg/kg	97.5	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 270806)							
ES1535499-001	Anonymous	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	105	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 270808)							
ES1535499-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	79.0	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	96.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 270807)							
ES1535499-001	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	93.2	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	105	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	125	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 270974)							
ES1535546-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	80.9	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 270807)							
ES1535499-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	92.1	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	116	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	110	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 270974)							
ES1535546-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	78.9	70	130
EP080: BTEXN (QCLot: 270974)							
ES1535546-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	77.4	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	86.9	70	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	79.5	70	130
			106-42-3				
		EP080: Naphthalene	91-20-3	2.5 mg/kg	83.4	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	85.6	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	79.2	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1535624	Page	: 1 of 7
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR NEIL WOODBRIDGE	Telephone	: +61-2-8784 8555
Project	: AS130456 CWS GW INSTALLATION	Date Samples Received	: 06-Nov-2015
Site	: ----	Issue Date	: 16-Nov-2015
Sampler	: MARK TIEDEMAN	No. of samples received	: 7
Order number	: ----	No. of samples analysed	: 3

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

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	ES1535499--001	Anonymous	Benzo(a)pyrene TEQ (zero)	----	25.6 %	0% - 20%	RPD exceeds LOR based limits
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	ES1535499--001	Anonymous	Sum of polycyclic aromatic hydrocarbons	----	21.9 %	0% - 20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EK026SF: Total CN by Segmented Flow Analyser	ES1535624--002	MW204_12.2	Total Cyanide	57-12-5	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)					
Total Metals by ICP-AES	0	2	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved (EA002) MW204_12.2, MW204_14.0		06-Nov-2015	11-Nov-2015	13-Nov-2015	✓	11-Nov-2015	11-Nov-2015	✓
EA010: Conductivity								
Soil Glass Jar - Unpreserved (EA010) MW204_12.2, MW204_14.0		06-Nov-2015	11-Nov-2015	13-Nov-2015	✓	11-Nov-2015	09-Dec-2015	✓
EA055: Moisture Content								
Soil Glass Jar - Unpreserved (EA055-103) MW204_12.2, MW204_14.0		06-Nov-2015	----	----	----	10-Nov-2015	20-Nov-2015	✓



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag - Separate bag received (EA200) MW204_4	06-Nov-2015	----	----	----	10-Nov-2015	04-May-2016	✓
ED037: Alkalinity							
Soil Glass Jar - Unpreserved (ED037) MW204_12.2, MW204_14.0	06-Nov-2015	16-Nov-2015	04-May-2016	✓	16-Nov-2015	04-May-2016	✓
ED040S : Soluble Sulfate by ICPAES							
Soil Glass Jar - Unpreserved (ED040S) MW204_12.2, MW204_14.0	06-Nov-2015	11-Nov-2015	04-Dec-2015	✓	11-Nov-2015	09-Dec-2015	✓
ED045G: Chloride by Discrete Analyser							
Soil Glass Jar - Unpreserved (ED045G) MW204_12.2, MW204_14.0	06-Nov-2015	11-Nov-2015	04-Dec-2015	✓	11-Nov-2015	09-Dec-2015	✓
ED093S: Soluble Major Cations							
Soil Glass Jar - Unpreserved (ED093S) MW204_12.2, MW204_14.0	06-Nov-2015	11-Nov-2015	04-May-2016	✓	11-Nov-2015	04-May-2016	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) MW204_12.2, MW204_14.0	06-Nov-2015	11-Nov-2015	04-May-2016	✓	12-Nov-2015	04-May-2016	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) MW204_12.2, MW204_14.0	06-Nov-2015	11-Nov-2015	04-Dec-2015	✓	12-Nov-2015	04-Dec-2015	✓
EK026SF: Total CN by Segmented Flow Analyser							
Soil Glass Jar - Unpreserved (EK026SF) MW204_12.2, MW204_14.0	06-Nov-2015	09-Nov-2015	20-Nov-2015	✓	10-Nov-2015	23-Nov-2015	✓
EK040T: Fluoride Total							
Pulp Bag (EK040T) MW204_12.2, MW204_14.0	06-Nov-2015	09-Nov-2015	04-Dec-2015	✓	11-Nov-2015	04-Dec-2015	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066) MW204_12.2, MW204_14.0	06-Nov-2015	11-Nov-2015	20-Nov-2015	✓	12-Nov-2015	21-Dec-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071) MW204_12.2, MW204_14.0	06-Nov-2015	11-Nov-2015	20-Nov-2015	✓	12-Nov-2015	21-Dec-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) MW204_12.2, MW204_14.0	06-Nov-2015	11-Nov-2015	20-Nov-2015	✓	12-Nov-2015	21-Dec-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) MW204_12.2, MW204_14.0	06-Nov-2015	10-Nov-2015	20-Nov-2015	✓	10-Nov-2015	20-Nov-2015	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity in Soil	ED037	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	6	16.67	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	2	12	16.67	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	2	14	14.29	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	2	100.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	16	12.50	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity in Soil	ED037	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	2	5	40.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	6	16.67	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	2	12	16.67	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	14	7.14	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	2	50.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Alkalinity in Soil	ED037	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Cations - soluble by ICP-AES	ED093S	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride Soluble By Discrete Analyser	ED045G	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	6	16.67	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement



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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	1	12	8.33	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	14	7.14	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	2	50.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride Soluble By Discrete Analyser	ED045G	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Cyanide by Segmented Flow Analyser	EK026SF	1	12	8.33	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	14	7.14	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	0	2	0.00	5.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	In-house. A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Alkalinity in Soil	ED037	SOIL	In house: Referenced to APHA 2320 B Alkalinity is determined and reported on a 1:5 soil/water leach.
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Chloride Soluble By Discrete Analyser	ED045G	SOIL	In house: Referenced to APHA 21st edition 4500-Cl- E. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm. Analysis is performed on a 1:5 soil / water leachate.
Cations - soluble by ICP-AES	ED093S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	In house: Referenced to APHA 4500-CN-O. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
Total Fluoride	EK040T	SOIL	(In-house) Total fluoride is determined by ion specific electrode (ISE) in a solution obtained after a Sodium Carbonate / Potassium Carbonate fusion dissolution.



Analytical Methods	Method	Matrix	Method Descriptions
Polychlorinated Biphenyls (PCB)	EP066	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
TRH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Preparation Methods	Method	Matrix	Method Descriptions
Total Fluoride	EK040T-PR	SOIL	(In-house) Samples are fused with Sodium Carbonate / Potassium Carbonate flux.
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

CERTIFICATE OF ANALYSIS

Work Order	: ES1535970	Page	: 1 of 8
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: mtiedeman@environcorp.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 12-Nov-2015 13:00
C-O-C number	: ----	Date Analysis Commenced	: 16-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 19-Nov-2015 17:57
Site	: ----		
Quote number	: ----	No. of samples received	: 6
		No. of samples analysed	: 6

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Dian Dao		Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics



General Comments

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- Positive results for sample ES1515970 #5 have been confirmed by reanalysis.
- EP075(SIM): Surrogate recovery bias low due to sample matrix interferences.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				MW202_20151111	MW204_20151111	MW206_20151111	QA101	QA201
Client sampling date / time				[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535970-001	ES1535970-002	ES1535970-003	ES1535970-004	ES1535970-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	26700	----	24700	26200	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	727	----	242	727	<1
Total Alkalinity as CaCO3	----	1	mg/L	27400	----	25000	26900	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1250	----	9000	9460	<1
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	568	----	522	553	<1
ED093F: Dissolved Major Cations								
Sodium	7440-23-5	1	mg/L	8300	----	16700	17400	<1
Potassium	7440-09-7	1	mg/L	13	----	68	73	<1
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.20	0.79	2.41	2.86	0.04
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	<0.0001	<0.0001	<0.0001
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	0.004	mg/L	7.81	227	223	207	<0.004
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	1880	1380	1640	1720	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	1	µg/L	<1	----	<1	<1	<1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	1.4	----	30.2	38.8	<1.0
Acenaphthylene	208-96-8	1	µg/L	<1.0	----	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	----	3.5	3.5	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	----	2.1	1.8	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	----	6.0	4.3	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	----	2.7	2.2	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	----	8.8	5.3	<1.0
Pyrene	129-00-0	1	µg/L	1.0	----	8.7	5.2	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	----	9.2	4.4	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	----	8.4	3.9	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	----	12.3	5.4	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	----	3.9	2.0	<1.0

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW202_20151111	MW204_20151111	MW206_20151111	QA101	QA201
Client sampling date / time				[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	
Compound	CAS Number	LOR	Unit	ES1535970-001	ES1535970-002	ES1535970-003	ES1535970-004	ES1535970-005	
				Result	Result	Result	Result	Result	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	9.6	4.1	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	----	7.0	2.8	<1.0	
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	----	1.7	<1.0	<1.0	
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	----	8.2	3.2	<1.0	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	2.4	----	122	86.9	<0.5	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	----	14.7	5.6	<0.5	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	110	----	330	310	<20	
C10 - C14 Fraction	----	50	µg/L	<50	----	200	200	<50	
C15 - C28 Fraction	----	100	µg/L	<100	----	540	530	<100	
C29 - C36 Fraction	----	50	µg/L	120	----	100	90	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	120	----	840	820	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	120	----	330	310	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	90	----	320	300	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	----	330	310	<100	
>C16 - C34 Fraction	----	100	µg/L	460	----	540	460	<100	
>C34 - C40 Fraction	----	100	µg/L	140	----	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	600	----	870	770	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	280	250	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	23	----	3	3	<1	
Toluene	108-88-3	2	µg/L	6	----	4	5	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	----	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	3	4	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	----	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	----	3	4	<2	
^ Sum of BTEX	----	1	µg/L	29	----	10	12	<1	
Naphthalene	91-20-3	5	µg/L	<5	----	48	58	<5	
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%	60.7	----	70.6	73.1	75.5	
EP075(SIM)S: Phenolic Compound Surrogates									



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				MW202_20151111	MW204_20151111	MW206_20151111	QA101	QA201
Client sampling date / time				[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535970-001	ES1535970-002	ES1535970-003	ES1535970-004	ES1535970-005
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued								
Phenol-d6	13127-88-3	1	%	23.8	----	15.0	15.7	25.6
2-Chlorophenol-D4	93951-73-6	1	%	33.5	----	20.1	19.0	46.6
2,4,6-Tribromophenol	118-79-6	1	%	35.9	----	13.9	14.1	31.5
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	53.9	----	69.6	69.4	67.1
Anthracene-d10	1719-06-8	1	%	57.9	----	75.2	78.8	76.2
4-Terphenyl-d14	1718-51-0	1	%	56.4	----	91.8	92.0	74.7
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	93.1	----	87.9	83.6	102
Toluene-D8	2037-26-5	2	%	112	----	114	117	103
4-Bromofluorobenzene	460-00-4	2	%	101	----	96.9	96.8	103



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				MW203_20151111	----	----	----	----
Client sampling date / time				[11-Nov-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1535970-006	-----	-----	-----	-----
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	----	----	----	----
ED093F: Dissolved Major Cations								
Sodium	7440-23-5	1	mg/L	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	0.004	mg/L	----	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.2	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	1	µg/L	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	----	----	----	----	----
Acenaphthylene	208-96-8	1	µg/L	----	----	----	----	----
Acenaphthene	83-32-9	1	µg/L	----	----	----	----	----
Fluorene	86-73-7	1	µg/L	----	----	----	----	----
Phenanthrene	85-01-8	1	µg/L	----	----	----	----	----
Anthracene	120-12-7	1	µg/L	----	----	----	----	----
Fluoranthene	206-44-0	1	µg/L	----	----	----	----	----
Pyrene	129-00-0	1	µg/L	----	----	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L	----	----	----	----	----
Chrysene	218-01-9	1	µg/L	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	----	----	----	----	----

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW203_20151111	----	----	----	----
Client sampling date / time				[11-Nov-2015]	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES1535970-006	-----	-----	-----	-----	
				Result	Result	Result	Result	Result	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(a)pyrene	50-32-8	0.5	µg/L	----	----	----	----	----	
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	----	----	----	----	----	
Dibenz(a.h)anthracene	53-70-3	1	µg/L	----	----	----	----	----	
Benzo(g.h.i)perylene	191-24-2	1	µg/L	----	----	----	----	----	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	----	----	----	----	----	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	----	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	----	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	----	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	----	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	----	----	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	----	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	----	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	----	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	----	----	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	----	----	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	----	----	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	----	----	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	----	----	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	----	----	----	----	----	
Toluene	108-88-3	2	µg/L	----	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	----	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	----	----	----	----	----	
^ Total Xylenes	1330-20-7	2	µg/L	----	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	----	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	----	----	----	----	----	
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%	----	----	----	----	----	
EP075(SIM)S: Phenolic Compound Surrogates									



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				MW203_20151111	----	----	----	----
Client sampling date / time				[11-Nov-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1535970-006	-----	-----	-----	-----
				Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued								
Phenol-d6	13127-88-3	1	%	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%	----	----	----	----	----
2,4,6-Tribromophenol	118-79-6	1	%	----	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	----	----	----	----	----
Anthracene-d10	1719-06-8	1	%	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	1	%	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	----	----	----	----	----
Toluene-D8	2037-26-5	2	%	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	----	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: ES1535970	Page	: 1 of 7
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: mtiedeman@environcorp.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 12-Nov-2015
C-O-C number	: ----	Date Analysis Commenced	: 16-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 19-Nov-2015
Site	: ----	No. of samples received	: 6
Quote number	: ----	No. of samples analysed	: 6

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

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



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Dian Dao		Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics



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: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 279144)									
ES1535970-001	MW202_20151111	ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	26700	26700	0.00	0% - 20%
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	27400	27200	0.887	0% - 20%
ES1536079-001	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	486	499	2.65	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	183	187	2.32	0% - 20%
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	669	686	2.56	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 279139)									
ES1535970-001	MW202_20151111	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1250	1530	19.6	0% - 20%
ES1536162-007	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 279140)									
ES1535970-001	MW202_20151111	ED045G: Chloride	16887-00-6	1	mg/L	568	559	1.56	0% - 20%
ES1536162-007	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	13	12	0.00	0% - 50%
ED093F: Dissolved Major Cations (QC Lot: 278422)									
ES1535970-005	QA201	ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 278424)									
ES1536006-006	Anonymous	EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1535970-005	QA201	EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.04	0.04	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 278423)									
ES1535970-005	QA201	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 278622)									
ES1536278-001	Anonymous	EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	<0.004	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 279143)									
ES1535970-001	MW202_20151111	EK040P: Fluoride	16984-48-8	0.1	mg/L	1880	1860	1.07	0% - 50%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 278546)									
EN1513881-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1535970-004	QA101	EP080: C6 - C9 Fraction	----	20	µg/L	310	300	0.00	0% - 50%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 278546)									
EN1513881-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1535970-004	QA101	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	310	300	0.00	0% - 50%
EP080: BTEXN (QC Lot: 278546)									
EN1513881-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

Page : 4 of 7
 Work Order : ES1535970
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 278546) - continued									
EN1513881-001	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: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
ES1535970-004	QA101	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	3	3	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	4	4	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	5	5	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	58	61	4.14	0% - 50%



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 Sample (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: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
ED037P: Alkalinity by PC Titrator (QCLot: 279144)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	90.7	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 279139)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	82	122
ED045G: Chloride by Discrete Analyser (QCLot: 279140)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	92.2	75	123
				<1	1000 mg/L	90.3	78	128
ED093F: Dissolved Major Cations (QCLot: 278422)								
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.0	85	113
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	96.2	82	120
EG020F: Dissolved Metals by ICP-MS (QCLot: 278424)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.8	80	116
EG035F: Dissolved Mercury by FIMS (QCLot: 278423)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	96.0	83	105
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 278622)								
EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	0.2 mg/L	111	73	133
EK040P: Fluoride by PC Titrator (QCLot: 279143)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	103	82	116
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 276881)								
EP066: Total Polychlorinated biphenyls	----	1	µg/L	<1	10 µg/L	84.0	62	107
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 276879)								
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	64.8	62	113
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	65.8	64	114
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	71.8	64	116
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	64.9	64	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	68.9	63	117
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	63.6	62	119
	205-82-3							
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	67.5	59	118
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	65.4	63	115
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	70.8	63	116
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	69.4	61	117
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	72.5	64	118
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	65.7	64	115



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 276879) - continued								
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	72.0	60	118
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	73.5	50	94
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	70.0	63	116
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	69.9	63	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 276880)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	102	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	91.7	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	87.0	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 278546)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	110	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 276880)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	98.2	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	96.5	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: 278546)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	114	75	127
EP080: BTEXN (QCLot: 278546)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	108	70	122
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	108	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	109	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	93.9	70	120
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	107	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	106	69	123

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report		
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%) Low High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 279139)						
ES1535970-001	MW202_20151111	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70 130
ED045G: Chloride by Discrete Analyser (QCLot: 279140)						
ES1535970-001	MW202_20151111	ED045G: Chloride	16887-00-6	250 mg/L	88.4	70 130

Page : 7 of 7
 Work Order : ES1535970
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035F: Dissolved Mercury by FIMS (QCLot: 278423)							
ME1510759-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	92.9	70	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 278622)							
ES1536278-001	Anonymous	EK026SF: Total Cyanide	57-12-5	0.2 mg/L	120	70	130
EK040P: Fluoride by PC Titrator (QCLot: 279143)							
ES1535970-001	MW202_20151111	EK040P: Fluoride	16984-48-8	5 mg/L	# Not Determined	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 278546)							
EN1513881-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	128	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 278546)							
EN1513881-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	127	70	130
EP080: BTEXN (QCLot: 278546)							
EN1513881-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	94.8	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	106	70	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	105	70	130
			106-42-3				
		EP080: Naphthalene	91-20-3	25 µg/L	88.7	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	104	70	130
		EP080: Toluene	108-88-3	25 µg/L	96.9	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1535970	Page	: 1 of 8
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Telephone	: +61-2-8784 8555
Project	: AS130456 CWS GW INSTALLATION	Date Samples Received	: 12-Nov-2015
Site	: ----	Issue Date	: 19-Nov-2015
Sampler	: MARK TIEDEMAN	No. of samples received	: 6
Order number	: ----	No. of samples analysed	: 6

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO ₄ 2- by DA	ES1535970--001	MW202_20151111	Sulfate as SO ₄ - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK040P: Fluoride by PC Titrator	ES1535970--001	MW202_20151111	Fluoride	16984-48-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Regular Sample Surrogates

Sub-Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075(SIM)S: Phenolic Compound Surrogates	ES1535970-003	MW206_20151111	2.4.6-Tribromophenol	118-79-6	13.9 %	17-125 %	Recovery less than lower data quality objective
EP075(SIM)S: Phenolic Compound Surrogates	ES1535970-004	QA101	2.4.6-Tribromophenol	118-79-6	14.1 %	17-125 %	Recovery less than lower data quality objective

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Dissolved Metals by ICP-MS - Suite A	0	10	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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: **WATER**

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



Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	16-Nov-2015	25-Nov-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	16-Nov-2015	09-Dec-2015	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	16-Nov-2015	09-Dec-2015	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	16-Nov-2015	09-Dec-2015	✓
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Natural (EG020A-F) MW204_20151111		11-Nov-2015	----	----	----	16-Nov-2015	09-May-2016	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	16-Nov-2015	09-May-2016	✓
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	17-Nov-2015	09-Dec-2015	✓
EK026SF: Total CN by Segmented Flow Analyser								
White Plastic Bottle-NaOH (EK026SF) MW202_20151111, MW206_20151111, QA201	MW204_20151111, QA101,	11-Nov-2015	----	----	----	16-Nov-2015	25-Nov-2015	✓
EK040P: Fluoride by PC Titrator								
Clear Plastic Bottle - Natural (EK040P) MW202_20151111, MW206_20151111, QA201,	MW204_20151111, QA101, MW203_20151111	11-Nov-2015	----	----	----	16-Nov-2015	09-Dec-2015	✓
EP066: Polychlorinated Biphenyls (PCB)								
Amber Glass Bottle - Unpreserved (EP066) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	17-Nov-2015	18-Nov-2015	✓	18-Nov-2015	27-Dec-2015	✓

Page : 4 of 8
 Work Order : ES1535970
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	17-Nov-2015	18-Nov-2015	✔	18-Nov-2015	27-Dec-2015	✔
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))								
MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	17-Nov-2015	18-Nov-2015	✔	18-Nov-2015	27-Dec-2015	✔
EP080/071: Total Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080)								
MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	16-Nov-2015	25-Nov-2015	✔	16-Nov-2015	25-Nov-2015	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	5	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	10	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	4	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	0	4	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	4	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	8	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Page : 6 of 8
 Work Order : ES1535970
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	0	10	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	4	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	0	4	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	4	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Cyanide by Segmented Flow Analyser	EK026SF	WATER	In house: Referenced to APHA 4500-CN O. Sodium hydroxide preserved samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)

Page : 8 of 8
 Work Order : ES1535970
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Analytical Methods	Method	Matrix	Method Descriptions
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES1535970

Client : RAMBOLL ENVIRON Contact : MR MARK TIEDEMAN Address : Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291 E-mail : mtiedeman@environcorp.com Telephone : 02 4962 5444 Facsimile : 02 4962 5888 Project : AS130456 CWS GW INSTALLATION Order number : ---- C-O-C number : ---- Site : ---- Sampler : MARK TIEDEMAN	Laboratory : Environmental Division Sydney Contact : Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 E-mail : Telephone : +61-2-8784 8555 Facsimile : +61-2-8784 8500 Page : 1 of 3 Quote number : ES2015ENVIAUS0373 (EN/072/15) QC Level : NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 12-Nov-2015 1:00 PM	Issue Date : 13-Nov-2015
Client Requested Due : 19-Nov-2015	Scheduled Reporting Date : 19-Nov-2015
Date	

Delivery Details

Mode of Delivery : Carrier	Security Seal : Intact.
No. of coolers/boxes : 1	Temperature : 4.3 - Ice present
Receipt Detail :	No. of samples received / analysed : 6 / 6

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

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

Method	Sample Container Received	Preferred Sample Container for Analysis
<i>Client sample ID</i>		
Dissolved Metals by ICP-MS - Suite A : EG020A-F		
MW204_20151111	- Clear Plastic Bottle - Natural	- Clear Plastic Bottle - Nitric Acid; Filtered

Summary of Sample(s) and Requested Analysis

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

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - ED093F + EA006 + EA065 Dissolved Major Cations + SAR + Hardness	WATER - EG020F Dissolved Metals by ICPMS	WATER - EG035F Dissolved Mercury by FIMS	WATER - EK026SF Total Cyanide by Segmented Flow Analyser	WATER - EP066-PCB-WA Polychlorinated Biphenyls (PCB)	WATER - NT-02A Major Anions (Chloride, Sulphate, Fluoride,	WATER - W-07 TRH/BTEXN/PAH
ES1535970-001	[11-Nov-2015]	MW202_20151111	✓	✓	✓	✓	✓	✓	✓
ES1535970-002	[11-Nov-2015]	MW204_20151111		✓		✓			
ES1535970-003	[11-Nov-2015]	MW206_20151111	✓	✓	✓	✓	✓	✓	✓
ES1535970-004	[11-Nov-2015]	QA101	✓	✓	✓	✓	✓	✓	✓
ES1535970-005	[11-Nov-2015]	QA201	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EK040-P Fluoride(PC)
ES1535970-002	[11-Nov-2015]	MW204_20151111	✓
ES1535970-006	[11-Nov-2015]	MW203_20151111	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Cindy Suen

- Email cindy.suen@alsglobal.com
Email cindy.suen@alsglobal.com

[illegible][illegible]

CERTIFICATE OF ANALYSIS

Work Order	: ES1535970	Page	: 1 of 8
Amendment	: 1		
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: mtiedeman@environcorp.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 12-Nov-2015 13:00
C-O-C number	: ----	Date Analysis Commenced	: 16-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 24-Nov-2015 09:40
Site	: ----		
Quote number	: ----	No. of samples received	: 6
		No. of samples analysed	: 6

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Dian Dao		Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics



General Comments

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- Positive results for sample ES1515970 #5 have been confirmed by reanalysis.
- EK025SF:LOR raised for Free Cyanide Analysis on various samples due to sample matrix.
- EP075(SIM): Surrogate recovery bias low due to sample matrix interferences.
- This report has been amended and re-released to allow the reporting of additional analytical data.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				MW202_20151111	MW204_20151111	MW206_20151111	QA101	QA201
Client sampling date / time				[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535970-001	ES1535970-002	ES1535970-003	ES1535970-004	ES1535970-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	26700	----	24700	26200	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	727	----	242	727	<1
Total Alkalinity as CaCO3	----	1	mg/L	27400	----	25000	26900	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1250	----	9000	9460	<1
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	568	----	522	553	<1
ED093F: Dissolved Major Cations								
Sodium	7440-23-5	1	mg/L	8300	----	16700	17400	<1
Potassium	7440-09-7	1	mg/L	13	----	68	73	<1
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.20	0.79	2.41	2.86	0.04
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	<0.0001	<0.0001	<0.0001
EK025SF: Free CN by Segmented Flow Analyser								
Free Cyanide	----	0.004	mg/L	<0.040	<0.400	<0.400	<0.400	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	0.004	mg/L	7.81	227	223	207	<0.004
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	1880	1380	1640	1720	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	1	µg/L	<1	----	<1	<1	<1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	1.4	----	30.2	38.8	<1.0
Acenaphthylene	208-96-8	1	µg/L	<1.0	----	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	----	3.5	3.5	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	----	2.1	1.8	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	----	6.0	4.3	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	----	2.7	2.2	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	----	8.8	5.3	<1.0
Pyrene	129-00-0	1	µg/L	1.0	----	8.7	5.2	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	----	9.2	4.4	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				MW202_20151111	MW204_20151111	MW206_20151111	QA101	QA201
Client sampling date / time				[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535970-001	ES1535970-002	ES1535970-003	ES1535970-004	ES1535970-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Chrysene	218-01-9	1	µg/L	<1.0	----	8.4	3.9	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	----	12.3	5.4	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	----	3.9	2.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	9.6	4.1	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	----	7.0	2.8	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	----	1.7	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	----	8.2	3.2	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	2.4	----	122	86.9	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	----	14.7	5.6	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	110	----	330	310	<20
C10 - C14 Fraction	----	50	µg/L	<50	----	200	200	<50
C15 - C28 Fraction	----	100	µg/L	<100	----	540	530	<100
C29 - C36 Fraction	----	50	µg/L	120	----	100	90	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	120	----	840	820	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	120	----	330	310	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	90	----	320	300	<20
>C10 - C16 Fraction	----	100	µg/L	<100	----	330	310	<100
>C16 - C34 Fraction	----	100	µg/L	460	----	540	460	<100
>C34 - C40 Fraction	----	100	µg/L	140	----	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	600	----	870	770	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	280	250	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	23	----	3	3	<1
Toluene	108-88-3	2	µg/L	6	----	4	5	<2
Ethylbenzene	100-41-4	2	µg/L	<2	----	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	3	4	<2
ortho-Xylene	95-47-6	2	µg/L	<2	----	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	----	3	4	<2
^ Sum of BTEX	----	1	µg/L	29	----	10	12	<1
Naphthalene	91-20-3	5	µg/L	<5	----	48	58	<5



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				MW202_20151111	MW204_20151111	MW206_20151111	QA101	QA201
Client sampling date / time				[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]	[11-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535970-001	ES1535970-002	ES1535970-003	ES1535970-004	ES1535970-005
				Result	Result	Result	Result	Result
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	1	%	60.7	----	70.6	73.1	75.5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	23.8	----	15.0	15.7	25.6
2-Chlorophenol-D4	93951-73-6	1	%	33.5	----	20.1	19.0	46.6
2,4,6-Tribromophenol	118-79-6	1	%	35.9	----	13.9	14.1	31.5
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	53.9	----	69.6	69.4	67.1
Anthracene-d10	1719-06-8	1	%	57.9	----	75.2	78.8	76.2
4-Terphenyl-d14	1718-51-0	1	%	56.4	----	91.8	92.0	74.7
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	93.1	----	87.9	83.6	102
Toluene-D8	2037-26-5	2	%	112	----	114	117	103
4-Bromofluorobenzene	460-00-4	2	%	101	----	96.9	96.8	103



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				MW203_20151111	----	----	----	----
Client sampling date / time				[11-Nov-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1535970-006	-----	-----	-----	-----
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	----	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	----	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	----	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	----	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	----	----	----	----
ED093F: Dissolved Major Cations								
Sodium	7440-23-5	1	mg/L	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	----
EK025SF: Free CN by Segmented Flow Analyser								
Free Cyanide	----	0.004	mg/L	<0.400	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	0.004	mg/L	----	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.2	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	1	µg/L	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	----	----	----	----	----
Acenaphthylene	208-96-8	1	µg/L	----	----	----	----	----
Acenaphthene	83-32-9	1	µg/L	----	----	----	----	----
Fluorene	86-73-7	1	µg/L	----	----	----	----	----
Phenanthrene	85-01-8	1	µg/L	----	----	----	----	----
Anthracene	120-12-7	1	µg/L	----	----	----	----	----
Fluoranthene	206-44-0	1	µg/L	----	----	----	----	----
Pyrene	129-00-0	1	µg/L	----	----	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW203_20151111	----	----	----	----
Client sampling date / time					[11-Nov-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1535970-006	-----	-----	-----	-----
				Result	Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	1	µg/L	----	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	----	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	1	µg/L	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	1	µg/L	----	----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	----	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	----	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	----	----	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	----	----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	----	----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	----	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	----	----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	----	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	----	----	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	----	----	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	----	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	----	----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	----	----	----	----	----	----
Toluene	108-88-3	2	µg/L	----	----	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	----	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	----	----	----	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L	----	----	----	----	----	----
^ Sum of BTEX	----	1	µg/L	----	----	----	----	----	----
Naphthalene	91-20-3	5	µg/L	----	----	----	----	----	----



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				MW203_20151111	----	----	----	----
Client sampling date / time				[11-Nov-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1535970-006	-----	-----	-----	-----
				Result	Result	Result	Result	Result
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	1	%	----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%	----	----	----	----	----
2,4,6-Tribromophenol	118-79-6	1	%	----	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	----	----	----	----	----
Anthracene-d10	1719-06-8	1	%	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	1	%	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	----	----	----	----	----
Toluene-D8	2037-26-5	2	%	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	----	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: ES1535970	Page	: 1 of 7
Amendment	: 1		
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: mtiedeman@environcorp.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 12-Nov-2015
C-O-C number	: ----	Date Analysis Commenced	: 16-Nov-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 24-Nov-2015
Site	: ----	No. of samples received	: 6
Quote number	: ----	No. of samples analysed	: 6

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

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



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Dian Dao		Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics



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: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 279144)									
ES1535970-001	MW202_20151111	ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	26700	26700	0.00	0% - 20%
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	27400	27200	0.887	0% - 20%
ES1536079-001	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	486	499	2.65	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	183	187	2.32	0% - 20%
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	669	686	2.56	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 279139)									
ES1535970-001	MW202_20151111	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1250	1530	19.6	0% - 20%
ES1536162-007	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 279140)									
ES1535970-001	MW202_20151111	ED045G: Chloride	16887-00-6	1	mg/L	568	559	1.56	0% - 20%
ES1536162-007	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	13	12	0.00	0% - 50%
ED093F: Dissolved Major Cations (QC Lot: 278422)									
ES1535970-005	QA201	ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 278424)									
ES1536006-006	Anonymous	EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1535970-005	QA201	EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.04	0.04	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 278423)									
ES1535970-005	QA201	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 278622)									
ES1536278-001	Anonymous	EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	<0.004	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 279143)									
ES1535970-001	MW202_20151111	EK040P: Fluoride	16984-48-8	0.1	mg/L	1880	1860	1.07	0% - 50%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 278546)									
EN1513881-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1535970-004	QA101	EP080: C6 - C9 Fraction	----	20	µg/L	310	300	0.00	0% - 50%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 278546)									
EN1513881-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1535970-004	QA101	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	310	300	0.00	0% - 50%
EP080: BTEXN (QC Lot: 278546)									
EN1513881-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

Page : 4 of 7
 Work Order : ES1535970 Amendment 1
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 278546) - continued									
EN1513881-001	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: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
ES1535970-004	QA101	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	3	3	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	4	4	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	5	5	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	58	61	4.14	0% - 50%



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 Sample (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: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 279144)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	90.7	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 279139)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	82	122
ED045G: Chloride by Discrete Analyser (QCLot: 279140)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	92.2	75	123
				<1	1000 mg/L	90.3	78	128
ED093F: Dissolved Major Cations (QCLot: 278422)								
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.0	85	113
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	96.2	82	120
EG020F: Dissolved Metals by ICP-MS (QCLot: 278424)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.8	80	116
EG035F: Dissolved Mercury by FIMS (QCLot: 278423)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	96.0	83	105
EK025SF: Free CN by Segmented Flow Analyser (QCLot: 285238)								
EK025SF: Free Cyanide	----	0.004	mg/L	<0.004	0.2 mg/L	101	88	128
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 278622)								
EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	0.2 mg/L	111	73	133
EK040P: Fluoride by PC Titrator (QCLot: 279143)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	103	82	116
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 276881)								
EP066: Total Polychlorinated biphenyls	----	1	µg/L	<1	10 µg/L	84.0	62	107
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 276879)								
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	64.8	62	113
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	65.8	64	114
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	71.8	64	116
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	64.9	64	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	68.9	63	117
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	63.6	62	119
	205-82-3							
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	67.5	59	118
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	65.4	63	115
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	70.8	63	116
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	69.4	61	117



Sub-Matrix: **WATER**

Method: Compound				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
CAS Number	LOR	Unit						
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 276879) - continued								
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	72.5	64	118
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	65.7	64	115
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	72.0	60	118
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	73.5	50	94
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	70.0	63	116
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	69.9	63	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 276880)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	102	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	91.7	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	87.0	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 278546)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	110	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 276880)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	98.2	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	96.5	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: 278546)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	114	75	127
EP080: BTEXN (QCLot: 278546)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	108	70	122
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	108	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	109	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	93.9	70	120
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	107	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	106	69	123

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%)	Recovery Limits (%)	
					MS	Low	High
Client sample ID	Method: Compound	CAS Number					
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 279139)							
ES1535970-001	MW202_20151111	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70	130

Page : 7 of 7
 Work Order : ES1535970 Amendment 1
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 279140)							
ES1535970-001	MW202_20151111	ED045G: Chloride	16887-00-6	250 mg/L	88.4	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 278423)							
ME1510759-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	92.9	70	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 278622)							
ES1536278-001	Anonymous	EK026SF: Total Cyanide	57-12-5	0.2 mg/L	120	70	130
EK040P: Fluoride by PC Titrator (QCLot: 279143)							
ES1535970-001	MW202_20151111	EK040P: Fluoride	16984-48-8	5 mg/L	# Not Determined	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 278546)							
EN1513881-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	128	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 278546)							
EN1513881-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	127	70	130
EP080: BTEXN (QCLot: 278546)							
EN1513881-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	94.8	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	106	70	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	105	70	130
			106-42-3				
		EP080: Naphthalene	91-20-3	25 µg/L	88.7	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	104	70	130
		EP080: Toluene	108-88-3	25 µg/L	96.9	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1535970	Page	: 1 of 8
Amendment	: 1		
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Telephone	: +61-2-8784 8555
Project	: AS130456 CWS GW INSTALLATION	Date Samples Received	: 12-Nov-2015
Site	: ----	Issue Date	: 24-Nov-2015
Sampler	: MARK TIEDEMAN	No. of samples received	: 6
Order number	: ----	No. of samples analysed	: 6

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO ₄ 2- by DA	ES1535970--001	MW202_20151111	Sulfate as SO ₄ - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK040P: Fluoride by PC Titrator	ES1535970--001	MW202_20151111	Fluoride	16984-48-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Regular Sample Surrogates

Sub-Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075(SIM)S: Phenolic Compound Surrogates	ES1535970-003	MW206_20151111	2.4.6-Tribromophenol	118-79-6	13.9 %	17-125 %	Recovery less than lower data quality objective
EP075(SIM)S: Phenolic Compound Surrogates	ES1535970-004	QA101	2.4.6-Tribromophenol	118-79-6	14.1 %	17-125 %	Recovery less than lower data quality objective

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK025SF: Free CN by Segmented Flow Analyser						
Clear Plastic Bottle - Natural MW203_20151111	----	----	----	20-Nov-2015	12-Nov-2015	8

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Free CN by Segmented Flow Analyser	0	5	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Dissolved Metals by ICP-MS - Suite A	0	10	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Free CN by Segmented Flow Analyser	0	5	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard



Analysis Holding Time Compliance

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: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	16-Nov-2015	25-Nov-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	16-Nov-2015	09-Dec-2015	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	16-Nov-2015	09-Dec-2015	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	16-Nov-2015	09-Dec-2015	✓
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Natural (EG020A-F) MW204_20151111		11-Nov-2015	----	----	----	16-Nov-2015	09-May-2016	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	16-Nov-2015	09-May-2016	✓
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	----	----	----	17-Nov-2015	09-Dec-2015	✓
EK025SF: Free CN by Segmented Flow Analyser								
Clear Plastic Bottle - Natural (EK025SF) MW203_20151111		11-Nov-2015	----	----	----	20-Nov-2015	12-Nov-2015	✗
White Plastic Bottle-NaOH (EK025SF) MW202_20151111, MW206_20151111,	MW204_20151111, QA101	11-Nov-2015	----	----	----	20-Nov-2015	25-Nov-2015	✓



Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK026SF: Total CN by Segmented Flow Analyser								
White Plastic Bottle-NaOH (EK026SF)								
MW202_20151111, MW206_20151111, QA201	MW204_20151111, QA101,	11-Nov-2015	----	----	----	16-Nov-2015	25-Nov-2015	✓
EK040P: Fluoride by PC Titrator								
Clear Plastic Bottle - Natural (EK040P)								
MW202_20151111, MW206_20151111, QA201,	MW204_20151111, QA101, MW203_20151111	11-Nov-2015	----	----	----	16-Nov-2015	09-Dec-2015	✓
EP066: Polychlorinated Biphenyls (PCB)								
Amber Glass Bottle - Unpreserved (EP066)								
MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	17-Nov-2015	18-Nov-2015	✓	18-Nov-2015	27-Dec-2015	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	17-Nov-2015	18-Nov-2015	✓	18-Nov-2015	27-Dec-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))								
MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	17-Nov-2015	18-Nov-2015	✓	18-Nov-2015	27-Dec-2015	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080)								
MW202_20151111, QA101,	MW206_20151111, QA201	11-Nov-2015	16-Nov-2015	25-Nov-2015	✓	16-Nov-2015	25-Nov-2015	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	5	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	10	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Free CN by Segmented Flow Analyser	EK025SF	0	5	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	4	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	0	4	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	4	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Free CN by Segmented Flow Analyser	EK025SF	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	8	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Free CN by Segmented Flow Analyser	EK025SF	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	0	10	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Free CN by Segmented Flow Analyser	EK025SF	0	5	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	4	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	0	4	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	4	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Free CN by Segmented Flow Analyser	EK025SF	WATER	In house: Referenced to ASTM D7237: Using an automated segmented flow analyser, a sample at high pH (sodium hydroxide preserved) is buffered to pH 6.0. The hydrogen cyanide present passes across a gas dialysis membrane into an acceptor stream consisting of 0.01 M sodium hydroxide. The acceptor stream mixes with a buffer at pH 5.2 and reacts with chloramine-T to form cyanogen chloride. Cyanogen chloride reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour, measured at 600nm. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Total Cyanide by Segmented Flow Analyser	EK026SF	WATER	In house: Referenced to APHA 4500-CN O. Sodium hydroxide preserved samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Chain of Custody & Analysis Request Form

Ramboll Environ
Level 2, Suite 19B, 50 Glebe Road
The Junction NSW 2291

Tel: 02 49625444
Email: mtiedeman@environcorp.com
Email: frobinson@environcorp.com

Laboratory Details
Lab. Name: ALS
Lab. Address: 277-289 Woodpark Road, Smithfield NSW
Contact Name:
Lab. Ref:
Tel: 02 8784 8555
Fax: 02 8784 8500
Final Report by:
Lab Quote No:

Project CWS GW Installation

Project Number: AS130456

Purchase Order Number:

Sample collected by: Mark Tiedeman

Sample Results to be returned to:

mtiedeman@environcorp.com; frobinson@environcorp.com

Specifications:

(Tick)

1. Urgent TAT required? (please circle: 24hr 48hr days)

STANDARD

☐ Yes☐ No☐ N/A

2. Fast TAT Guarantee Required?

☒ Yes☒ No☐ N/A

3. Is any sediment layer present in waters to be excluded from extractions?

☒ Yes☐ No☐ N/A

4. Special storage requirements?

☐ Yes☒ No☐ N/A

5. Preservation requirements?

☐ Yes☐ No☐ N/A

6. Other requirements?

☐ Fax☐ Hard copy☒ Email☐ Yes☐ No☐ N/A

7. Report Format: esdat / excel / pdf

8. Project Manager: Neil Woodridge

tel:

Lab. ID	Sample ID	Sampling Date	Sampling Time	Matrix			Preservation			Container (No. & type)
				soil	water	other	filled	acid	ice	other

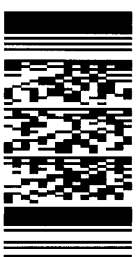
pH/EC
Total Alkalinity
Sodium / Potassium / Chloride
Fluoride / Sulphate
Cyanide
Carbonate
Aluminium
PAH / TRH / BTEX / PCB
Mercury
Fluoride

HOLD

Remarks & comments

Environmental Division
Sydney
Work Order Reference
ES1535970

Telephone : + 61-2-8784 8555



Relinquished By:

Received by:

Mark Tiedeman

Date:

Name: Mark Tiedeman

Date: 12/11/15

of: Ramboll Environ

Time:

of: AS

Time: 11:00

Relinquished By:

Received by:

Name:

Date:

Name:

Date:

of:

Time:

of:

Date:

Environment

Printed copies of this document are uncontrolled

Page 1 of 1

Revision: Oct 09
BMS-PM-DV-F046

Fadi Soro

From: Loren Schiavon
Sent: Thursday, 12 November 2015 12:30 PM
To: Fadi Soro
Subject: FW: COC
Attachments: GW COC_ALS CWS.xlsx

FWI – COC for sample received for analysis yesterday.

Kind regards

Loren Schiavon

CLIENT SERVICES CO-ORDINATOR
ALS | Environmental Division

277-289 Woodpark Road
Smithfield NSW 2164 Australia

T +61 2 8784 8503
F +61 2 8784 8500

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

EnviroMail™ 97 - Extractable Petroleum Hydrocarbons

EnviroMail™ 96 - Bench Trials for Remediation or Assessment of New Technologies

EnviroMail™ 95 - Subcontractor Safety & Positive Performance Indicator Reporting

www.alsglobal.com  Subscribe to EnviroMail™  Follow us on LinkedIn

From: Mark Tiedeman [mailto:mtiedeman@ramboll.com]
Sent: Thursday, 12 November 2015 11:26 AM
To: Loren Schiavon
Subject: COC

Hi Loren,

Please find attached CoC for water samples (ES1535970) submitted yesterday. I have only selected a few analytes for MW203 and MW204. If there is enough water for more of the listed analytes, please let me know.

Yours sincerely

Mark Tiedeman

Senior Environmental Consultant

D +61 2 4962 5444

mtiedeman@ramboll.com

Ramboll Environ

Level 2, Suite 19B

50 Glebe Road

PO Box 435

The Junction

NSW 2291

Australia

www.ramboll-environ.com

RAMBOLL ENVIRON

Ramboll Environ Australia Pty Ltd

ACN 095 437 442

ABN 49 095 437 442

This message contains information that may be confidential, privileged or otherwise protected by law from disclosure. It is intended for the exclusive use of the Addressee(s). Unless you are the addressee or authorized agent of the addressee, you may not review, copy, distribute or disclose to anyone the message or any information contained within. If you have received this message in error, please contact the sender by electronic reply to email@ramboll.com and immediately delete all copies of the message.

ALS Group: Click [here](#) to report this email as spam.

Wael Saleh

From: Loren Schiavon
Sent: Friday, 20 November 2015 12:44 PM
To: Wael Saleh
Subject: FW: ES1535970

Hi Wael,

Can you please amend batch ES1535970 to add in free cyanide as requested below?

Thanks.

Kind regards

Loren Schiavon

CLIENT SERVICES CO-ORDINATOR
ALS | Environmental Division

277-289 Woodpark Road
Smithfield NSW 2164 Australia

T +61 2 8784 8503
F +61 2 8784 8500

We are keen for your feedback! [Please click here for your 1 question survey](#)

[EnviroMail™ 95 – Subcontractor Safety & Positive Performance Indicator Reporting](#)

[EnviroMail™ 100 – Legionella Control in Health and Aged Care Facilities](#)

[EnviroMail™ 101 – Water Quality Analysis for compliance to AS/NZ 4187:2014 including Endotoxins](#)

www.alsglobal.com  [Subscribe to EnviroMail™](#)  [Follow us on LinkedIn](#)

ALS Sydney laboratory will be open during the Christmas/New Year period except for the mandated public holidays and weekends. Please click the link for details [Managing projects over the Christmas & New Year Period – Sydney](#)

From: Mark Tiedeman [mailto:mtiedeman@ramboll.com]
Sent: Friday, 20 November 2015 11:16 AM
To: Loren Schiavon
Subject: RE: ES1535970

Thanks Loren,

1. Can you please have the following water samples from w/o ES1535970 analysed for free cyanide:

- MW202
- MW204
- MW206
- QA101
- MW203

2. Can you please confirm if the fluoride analysed for these samples were “soluble fluoride?” Thanks

Yours sincerely
Mark Tiedeman

Senior Environmental Consultant

D +61 2 4962 5444
mtiedeman@ramboll.com

Ramboll Environ
Level 2, Suite 19B
50 Glebe Road
PO Box 435
The Junction
NSW 2291
Australia
www.ramboll-environ.com



Ramboll Environ Australia Pty Ltd
ACN 095 437 442
ABN 49 095 437 442

From: Loren Schiavon [<mailto:loren.schiavon@alsglobal.com>]
Sent: Thursday, 19 November 2015 6:30 PM
To: Mark Tiedeman <mtiedeman@ramboll.com>
Subject: RE: ES1535970

Hi Mark,

I'm so sorry for the late reply – the batch was released – just let me know if there are any issues.

Kind regards

Loren Schiavon

CLIENT SERVICES CO-ORDINATOR
ALS | Environmental Division

277-289 Woodpark Road
Smithfield NSW 2164 Australia

T +61 2 8784 8503
F +61 2 8784 8500

We are keen for your feedback! [Please click here for your 1 question survey](#)

[EnviroMail™ 95 – Subcontractor Safety & Positive Performance Indicator Reporting](#)

[EnviroMail™ 100 – Legionella Control in Health and Aged Care Facilities](#)

[EnviroMail™ 101 – Water Quality Analysis for compliance to AS/NZ 4187:2014 including Endotoxins](#)

www.alsglobal.com  [Subscribe to EnviroMail™](#)  [Follow us on LinkedIn](#)

ALS Sydney laboratory will be open during the Christmas/New Year period except for the mandated public holidays and weekends. Please click the link for details [Managing projects over the Christmas & New Year Period – Sydney](#)

From: Mark Tiedeman [<mailto:mtiedeman@ramboll.com>]
Sent: Thursday, 19 November 2015 3:12 PM
To: Loren Schiavon
Subject: ES1535970
Importance: High

Hi Loren,
Can you please let me know if ES1535970 is ready to report?

Thanks

Yours sincerely
Mark Tiedeman

Senior Environmental Consultant

D +61 2 4962 5444
mtiedeman@ramboll.com

Ramboll Environ
Level 2, Suite 19B
50 Glebe Road
PO Box 435
The Junction
NSW 2291
Australia
www.ramboll-environ.com



Ramboll Environ Australia Pty Ltd
ACN 095 437 442
ABN 49 095 437 442

This message contains information that may be confidential, privileged or otherwise protected by law from disclosure. It is intended for the exclusive use of the Addressee(s). Unless you are the addressee or authorized agent of the addressee, you may not review, copy, distribute or disclose to anyone the message or any information contained within. If you have received this message in error, please contact the sender by electronic reply to email@ramboll.com and immediately delete all copies of the message.

ALS Group: Click [here](#) to report this email as spam.

The information contained in this email is confidential. If the reader is not the intended recipient then you must notify the sender immediately by return email and then delete all copies of this email. You must not copy, distribute, print or otherwise use the information. Email may be stored by the Company to support operational activities. All information will be held in accordance with the Company's Privacy Policy which can be found on the Company's website - www.alsglobal.com.

This message contains information that may be confidential, privileged or otherwise protected by law from disclosure. It is intended for the exclusive use of the Addressee(s). Unless you are the addressee or authorized agent of the addressee, you may not review, copy, distribute or disclose to anyone the message or any information contained within. If you have received this message in error, please contact the sender by electronic reply to email@ramboll.com and immediately delete all copies of the message.

CERTIFICATE OF ANALYSIS

Work Order	: ES1536271	Page	: 1 of 10
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: mtiedeman@ramboll.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 13-Nov-2015 10:30
C-O-C number	: ----	Date Analysis Commenced	: 16-Nov-2015
Sampler	: ----	Issue Date	: 20-Nov-2015 17:20
Site	: ----		
Quote number	: ----	No. of samples received	: 4
		No. of samples analysed	: 4

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dian Dao		Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics



General Comments

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- EP075: Poor duplicate precision and matrix spike recovery due to sample heterogeneity.
- EP075: 'Sum of PAH' is the sum of the USEPA 16 priority PAHs
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW206_12	MW206_13	MW206_13.5	MW206_14	----
Client sampling date / time					[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	----
Compound	CAS Number	LOR	Unit		ES1536271-001	ES1536271-002	ES1536271-003	ES1536271-004	-----
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		18.5	15.0	17.5	16.4	----
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		2700	2360	1490	574	----
EP074A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3	0.5	mg/kg		<0.5	----	----	----	----
Styrene	100-42-5	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
Isopropylbenzene	98-82-8	0.5	mg/kg		<0.5	----	----	----	----
n-Propylbenzene	103-65-1	0.5	mg/kg		<0.5	----	----	----	----
1,3,5-Trimethylbenzene	108-67-8	0.5	mg/kg		<0.5	----	----	----	----
sec-Butylbenzene	135-98-8	0.5	mg/kg		<0.5	----	----	----	----
1,2,4-Trimethylbenzene	95-63-6	0.5	mg/kg		<0.5	----	----	----	----
tert-Butylbenzene	98-06-6	0.5	mg/kg		<0.5	----	----	----	----
p-Isopropyltoluene	99-87-6	0.5	mg/kg		<0.5	----	----	----	----
n-Butylbenzene	104-51-8	0.5	mg/kg		<0.5	----	----	----	----
EP074B: Oxygenated Compounds									
Vinyl Acetate	108-05-4	5	mg/kg		<5	----	----	----	----
2-Butanone (MEK)	78-93-3	5	mg/kg		<5	----	----	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg		<5	----	----	----	----
2-Hexanone (MBK)	591-78-6	5	mg/kg		<5	----	----	----	----
EP074C: Sulfonated Compounds									
Carbon disulfide	75-15-0	0.5	mg/kg		<0.5	----	----	----	----
EP074D: Fumigants									
2,2-Dichloropropane	594-20-7	0.5	mg/kg		<0.5	----	----	----	----
1,2-Dichloropropane	78-87-5	0.5	mg/kg		<0.5	----	----	----	----
cis-1,3-Dichloropropylene	10061-01-5	0.5	mg/kg		<0.5	----	----	----	----
trans-1,3-Dichloropropylene	10061-02-6	0.5	mg/kg		<0.5	----	----	----	----
1,2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg		<0.5	----	----	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	5	mg/kg		<5	----	----	----	----
Chloromethane	74-87-3	5	mg/kg		<5	----	----	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW206_12	MW206_13	MW206_13.5	MW206_14	----
Client sampling date / time				[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	----
Compound	CAS Number	LOR	Unit	ES1536271-001	ES1536271-002	ES1536271-003	ES1536271-004	-----
				Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued								
Vinyl chloride	75-01-4	5	mg/kg	<5	----	----	----	----
Bromomethane	74-83-9	5	mg/kg	<5	----	----	----	----
Chloroethane	75-00-3	5	mg/kg	<5	----	----	----	----
Trichlorofluoromethane	75-69-4	5	mg/kg	<5	----	----	----	----
1,1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	----	----	----	----
Iodomethane	74-88-4	0.5	mg/kg	<0.5	----	----	----	----
trans-1,2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	----	----	----	----
1,1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	----	----	----	----
cis-1,2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	----	----	----	----
1,1,1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	----	----	----	----
1,1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	----	----	----	----
Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	----	----	----	----
1,2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	----	----	----	----
Trichloroethene	79-01-6	0.5	mg/kg	<0.5	----	----	----	----
Dibromomethane	74-95-3	0.5	mg/kg	<0.5	----	----	----	----
1,1,2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	----	----	----	----
1,3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	----	----	----	----
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	----	----	----	----
1,1,1,2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	----	----	----	----
trans-1,4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	----	----	----	----
cis-1,4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	----	----	----	----
1,1,2,2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	----	----	----	----
1,2,3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	----	----	----	----
Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	----	----	----	----
1,2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	----	----	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	----	----	----	----
Bromobenzene	108-86-1	0.5	mg/kg	<0.5	----	----	----	----
2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	----	----	----	----
4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	----	----	----	----
1,2,3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	----	----	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg	<0.5	----	----	----	----
Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW206_12	MW206_13	MW206_13.5	MW206_14	----
Client sampling date / time					[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	----
Compound	CAS Number	LOR	Unit		ES1536271-001	ES1536271-002	ES1536271-003	ES1536271-004	-----
					Result	Result	Result	Result	Result
EP074G: Trihalomethanes - Continued									
Dibromochloromethane	124-48-1	0.5	mg/kg		<0.5	----	----	----	----
Bromoform	75-25-2	0.5	mg/kg		<0.5	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Fluorene	86-73-7	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Anthracene	120-12-7	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Pyrene	129-00-0	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Chrysene	218-01-9	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	0.6	0.6	0.6	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	1.2	1.2	1.2	----
EP075A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	----	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	----	----	----	----
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	----	----	----	----
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg		<0.6	----	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	----	----	----	----
2,4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	----	----	----	----
2,4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	----	----	----	----
2,6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	----	----	----	----
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW206_12	MW206_13	MW206_13.5	MW206_14	----
Client sampling date / time					[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	----
Compound	CAS Number	LOR	Unit		ES1536271-001	ES1536271-002	ES1536271-003	ES1536271-004	-----
					Result	Result	Result	Result	Result
EP075A: Phenolic Compounds - Continued									
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	----	----	----	----
Pentachlorophenol	87-86-5	1	mg/kg		<1	----	----	----	----
EP075B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		0.8	----	----	----	----
2-Methylnaphthalene	91-57-6	0.5	mg/kg		3.0	----	----	----	----
2-Chloronaphthalene	91-58-7	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		7.1	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		3.8	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		26.0	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		7.6	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		90.0	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		90.4	----	----	----	----
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)anthracene	56-55-3	0.5	mg/kg		110	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		96.3	----	----	----	----
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg		230	----	----	----	----
7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		128	----	----	----	----
3-Methylcholanthrene	56-49-5	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg		66.4	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg		17.6	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg		64.5	----	----	----	----
^ Sum of PAHs	----	0.5	mg/kg		938	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		188	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		188	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		188	----	----	----	----
EP075C: Phthalate Esters									
Dimethyl phthalate	131-11-3	0.5	mg/kg		<0.5	----	----	----	----
Diethyl phthalate	84-66-2	0.5	mg/kg		<0.5	----	----	----	----
Di-n-butyl phthalate	84-74-2	0.5	mg/kg		<0.5	----	----	----	----
Butyl benzyl phthalate	85-68-7	0.5	mg/kg		<0.5	----	----	----	----
bis(2-ethylhexyl) phthalate	117-81-7	5	mg/kg		<5.0	----	----	----	----
Di-n-octylphthalate	117-84-0	0.5	mg/kg		<0.5	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW206_12	MW206_13	MW206_13.5	MW206_14	----
Client sampling date / time					[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	----
Compound	CAS Number	LOR	Unit		ES1536271-001	ES1536271-002	ES1536271-003	ES1536271-004	-----
					Result	Result	Result	Result	Result
EP075C: Phthalate Esters - Continued									
EP075D: Nitrosamines									
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg		<0.5	----	----	----	----
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg		<0.5	----	----	----	----
N-Nitrosopyrrolidine	930-55-2	1	mg/kg		<1.0	----	----	----	----
N-Nitrosomorpholine	59-89-2	0.5	mg/kg		<0.5	----	----	----	----
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg		<0.5	----	----	----	----
N-Nitrosopiperidine	100-75-4	0.5	mg/kg		<0.5	----	----	----	----
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg		<0.5	----	----	----	----
N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	1	mg/kg		<1.0	----	----	----	----
Methapyrilene	91-80-5	0.5	mg/kg		<0.5	----	----	----	----
EP075E: Nitroaromatics and Ketones									
2-Picoline	109-06-8	0.5	mg/kg		<0.5	----	----	----	----
Acetophenone	98-86-2	0.5	mg/kg		<0.5	----	----	----	----
Nitrobenzene	98-95-3	0.5	mg/kg		<0.5	----	----	----	----
Isophorone	78-59-1	0.5	mg/kg		<0.5	----	----	----	----
2,6-Dinitrotoluene	606-20-2	1	mg/kg		<1.0	----	----	----	----
2,4-Dinitrotoluene	121-14-2	1	mg/kg		<1.0	----	----	----	----
1-Naphthylamine	134-32-7	0.5	mg/kg		<0.5	----	----	----	----
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg		<0.5	----	----	----	----
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg		<0.5	----	----	----	----
Azobenzene	103-33-3	1	mg/kg		<1	----	----	----	----
1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg		<0.5	----	----	----	----
Phenacetin	62-44-2	0.5	mg/kg		<0.5	----	----	----	----
4-Aminobiphenyl	92-67-1	0.5	mg/kg		<0.5	----	----	----	----
Pentachloronitrobenzene	82-68-8	0.5	mg/kg		<0.5	----	----	----	----
Pronamide	23950-58-5	0.5	mg/kg		<0.5	----	----	----	----
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg		<0.5	----	----	----	----
Chlorobenzilate	510-15-6	0.5	mg/kg		<0.5	----	----	----	----
EP075F: Haloethers									
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg		<0.5	----	----	----	----
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg		<0.5	----	----	----	----
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg		<0.5	----	----	----	----
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg		<0.5	----	----	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW206_12	MW206_13	MW206_13.5	MW206_14	----
Client sampling date / time				[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	----
Compound	CAS Number	LOR	Unit	ES1536271-001	ES1536271-002	ES1536271-003	ES1536271-004	-----
				Result	Result	Result	Result	Result
EP075G: Chlorinated Hydrocarbons								
1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	----	----	----	----
1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	----	----	----	----
1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	----	----	----	----
Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	----	----	----	----
1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	----	----	----	----
Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	----	----	----	----
Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	----	----	----	----
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	<2.5	----	----	----	----
Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	1	mg/kg	<1.0	----	----	----	----
EP075H: Anilines and Benzidines								
Aniline	62-53-3	0.5	mg/kg	<0.5	----	----	----	----
4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	----	----	----	----
2-Nitroaniline	88-74-4	1	mg/kg	<1.0	----	----	----	----
3-Nitroaniline	99-09-2	1	mg/kg	<1.0	----	----	----	----
Dibenzofuran	132-64-9	0.5	mg/kg	3.5	----	----	----	----
4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	----	----	----	----
Carbazole	86-74-8	0.5	mg/kg	6.6	----	----	----	----
3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	----	----	----	----
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	mg/kg	<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	mg/kg	<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	mg/kg	<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	mg/kg	<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	mg/kg	<0.5	----	----	----	----
Aldrin	309-00-2	0.5	mg/kg	<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	----	----	----	----
4,4'-DDE	72-55-9	0.5	mg/kg	<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	mg/kg	<0.5	----	----	----	----
Endrin	72-20-8	0.5	mg/kg	<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	----	----	----	----
4,4'-DDD	72-54-8	0.5	mg/kg	<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW206_12	MW206_13	MW206_13.5	MW206_14	----
Client sampling date / time					[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	----
Compound	CAS Number	LOR	Unit		ES1536271-001	ES1536271-002	ES1536271-003	ES1536271-004	-----
					Result	Result	Result	Result	Result
EP075I: Organochlorine Pesticides - Continued									
4,4'-DDT	50-29-3	1	mg/kg		<1.0	----	----	----	----
EP075J: Organophosphorus Pesticides									
Dichlorvos	62-73-7	0.5	mg/kg		<0.5	----	----	----	----
Dimethoate	60-51-5	0.5	mg/kg		<0.5	----	----	----	----
Diazinon	333-41-5	0.5	mg/kg		<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg		<0.5	----	----	----	----
Malathion	121-75-5	0.5	mg/kg		<0.5	----	----	----	----
Fenthion	55-38-9	0.5	mg/kg		<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	mg/kg		<0.5	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	mg/kg		<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	mg/kg		<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	mg/kg		<0.5	----	----	----	----
Ethion	563-12-2	0.5	mg/kg		<0.5	----	----	----	----
EP074S: VOC Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.5	%		79.9	----	----	----	----
Toluene-D8	2037-26-5	0.5	%		104	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.5	%		97.5	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	82.4	99.0	106	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	101	102	98.6	----
2,4,6-Tribromophenol	118-79-6	0.5	%		----	91.7	78.4	103	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	106	94.1	91.3	----
Anthracene-d10	1719-06-8	0.5	%		----	99.1	97.4	101	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	93.4	93.3	93.0	----
EP075S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.5	%		59.2	----	----	----	----
Phenol-d6	13127-88-3	0.5	%		98.5	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		92.5	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%		57.2	----	----	----	----
EP075T: Base/Neutral Extractable Surrogates									
Nitrobenzene-D5	4165-60-0	0.5	%		81.9	----	----	----	----
1,2-Dichlorobenzene-D4	2199-69-1	0.5	%		80.8	----	----	----	----
2-Fluorobiphenyl	321-60-8	0.5	%		95.5	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW206_12	MW206_13	MW206_13.5	MW206_14	----
				Client sampling date / time	[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	[03-Nov-2015]	----
Compound	CAS Number	LOR	Unit		ES1536271-001	ES1536271-002	ES1536271-003	ES1536271-004	-----
					Result	Result	Result	Result	Result
EP075T: Base/Neutral Extractable Surrogates - Continued									
Anthracene-d10	1719-06-8	0.5	%		104	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		103	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: ES1536271	Page	: 1 of 15
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: mtiedeman@ramboll.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130456 CWS GW INSTALLATION	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 13-Nov-2015
C-O-C number	: ----	Date Analysis Commenced	: 16-Nov-2015
Sampler	: ----	Issue Date	: 20-Nov-2015
Site	: ----	No. of samples received	: 4
Quote number	: ----	No. of samples analysed	: 4

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

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



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Dian Dao		Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics



General Comments

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

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

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

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 278716)									
ES1536269-003	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	9.0	9.7	7.94	No Limit
EK040S: Fluoride Soluble (QC Lot: 281378)									
ES1536271-001	MW206_12	EK040S: Fluoride	16984-48-8	1	mg/kg	2700	2450	10.0	0% - 20%
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 277519)									
ES1536040-001	Anonymous	EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP074: 1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP074: n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074B: Oxygenated Compounds (QC Lot: 277519)									
ES1536040-001	Anonymous	EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.00	No Limit
		EP074: 2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	<5	0.00	No Limit
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Vinyl Acetate	108-05-4	5	mg/kg	<5	<5	0.00	No Limit
EP074C: Sulfonated Compounds (QC Lot: 277519)									
ES1536040-001	Anonymous	EP074: Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074D: Fumigants (QC Lot: 277519)									
ES1536040-001	Anonymous	EP074: 1.2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 2.2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074E: Halogenated Aliphatic Compounds (QC Lot: 277519)									
ES1536040-001	Anonymous	EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074E: Halogenated Aliphatic Compounds (QC Lot: 277519) - continued									
ES1536040-001	Anonymous	EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Iodomethane	74-88-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromomethane	74-83-9	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Chloroethane	75-00-3	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Chloromethane	74-87-3	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Trichlorofluoromethane	75-69-4	5	mg/kg	<5	<5	0.00	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	<5	0.00	No Limit
EP074F: Halogenated Aromatic Compounds (QC Lot: 277519)									
ES1536040-001	Anonymous	EP074: 1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP074G: Trihalomethanes (QC Lot: 277519)									
ES1536040-001	Anonymous	EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 277528)									
ES1536271-004	MW206_14	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 277528) - continued									
ES1536271-004	MW206_14	EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1536030-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075A: Phenolic Compounds (QC Lot: 278113)							
ES1536271-001	MW206_12	EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075A: Phenolic Compounds (QC Lot: 278113) - continued									
ES1536271-001	MW206_12	EP075: 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.6	<0.6	0.00	No Limit
		EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	<1	0.00	No Limit
EP075B: Polynuclear Aromatic Hydrocarbons (QC Lot: 278113)									
ES1536271-001	MW206_12	EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Methylnaphthalene	91-57-6	0.5	mg/kg	3.0	2.0	39.8	No Limit
		EP075: 3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Acenaphthene	83-32-9	0.5	mg/kg	7.1	4.7	40.3	0% - 50%
		EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Anthracene	120-12-7	0.5	mg/kg	7.6	5.1	40.5	0% - 50%
		EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	110	# 84.7	26.2	0% - 20%
		EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	128	# 102	22.2	0% - 20%
		EP075: Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	64.5	56.1	14.0	0% - 20%
		EP075: Chrysene	218-01-9	0.5	mg/kg	96.3	80.4	18.0	0% - 20%
		EP075: Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	17.6	15.8	10.8	0% - 20%
		EP075: Fluoranthene	206-44-0	0.5	mg/kg	90.0	# 67.3	28.8	0% - 20%
		EP075: Fluorene	86-73-7	0.5	mg/kg	3.8	2.3	48.8	No Limit
		EP075: Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	66.4	55.4	18.2	0% - 20%
		EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Naphthalene	91-20-3	0.5	mg/kg	0.8	0.6	24.3	No Limit
		EP075: Phenanthrene	85-01-8	0.5	mg/kg	26.0	23.2	11.0	0% - 20%
		EP075: Pyrene	129-00-0	0.5	mg/kg	90.4	# 68.9	27.1	0% - 20%
				EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	230	# 186
EP075C: Phthalate Esters (QC Lot: 278113)									
ES1536271-001	MW206_12	EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075D: Nitrosamines (QC Lot: 278113)									
ES1536271-001	MW206_12	EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075D: Nitrosamines (QC Lot: 278113) - continued									
ES1536271-001	MW206_12	EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
EP075E: Nitroaromatics and Ketones (QC Lot: 278113)									
ES1536271-001	MW206_12	EP075: 1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2,4-Dinitrotoluene	121-14-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 2,6-Dinitrotoluene	606-20-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Azobenzene	103-33-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075F: Haloethers (QC Lot: 278113)							
ES1536271-001	MW206_12	EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075G: Chlorinated Hydrocarbons (QC Lot: 278113)									
ES1536271-001	MW206_12	EP075: 1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachlorocyclopentadiene	77-47-4	0.5	mg/kg	<2.5	<2.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075G: Chlorinated Hydrocarbons (QC Lot: 278113) - continued									
ES1536271-001	MW206_12	EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075H: Anilines and Benzidines (QC Lot: 278113)									
ES1536271-001	MW206_12	EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 3,3`-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Carbazole	86-74-8	0.5	mg/kg	6.6	4.5	37.3	0% - 50%
		EP075: Dibenzofuran	132-64-9	0.5	mg/kg	3.5	2.4	35.0	No Limit
EP075I: Organochlorine Pesticides (QC Lot: 278113)									
ES1536271-001	MW206_12	EP075: 4,4`-DDD	72-54-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4,4`-DDE	72-55-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4,4`-DDT	50-29-3	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Endrin	72-20-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: gamma-BHC	58-89-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Heptachlor	76-44-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075J: Organophosphorus Pesticides (QC Lot: 278113)									
ES1536271-001	MW206_12	EP075: Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Diazinon	333-41-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dichlorvos	62-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dimethoate	60-51-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Ethion	563-12-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Fenthion	55-38-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Malathion	121-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Prothiofos	34643-46-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



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

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EK040S: Fluoride Soluble (QCLot: 281378)								
EK040S: Fluoride	16984-48-8	1	mg/kg	<1	25 mg/kg	95.0	69	117
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 277519)								
EP074: 1,2,4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	1 mg/kg	93.5	69	117
EP074: 1,3,5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	1 mg/kg	80.4	68	118
EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	73.7	71	121
EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	77.9	72	114
EP074: Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	1 mg/kg	78.3	65	117
EP074: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	85.2	70	116
	106-42-3							
EP074: n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	1 mg/kg	75.5	59	125
EP074: n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	1 mg/kg	78.6	66	122
EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	84.6	75	115
EP074: p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	1 mg/kg	76.4	66	118
EP074: sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	1 mg/kg	76.9	69	119
EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	1 mg/kg	76.9	67	113
EP074: tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	1 mg/kg	77.7	69	115
EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	88.6	65	131
EP074B: Oxygenated Compounds (QCLot: 277519)								
EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	10 mg/kg	62.3	58	136
EP074: 2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	10 mg/kg	81.4	54	136
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	10 mg/kg	87.2	62	132
EP074: Vinyl Acetate	108-05-4	5	mg/kg	<5	10 mg/kg	43.6	30	156
EP074C: Sulfonated Compounds (QCLot: 277519)								
EP074: Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	1 mg/kg	73.5	54	126
EP074D: Fumigants (QCLot: 277519)								
EP074: 1,2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	1 mg/kg	78.2	63	115
EP074: 1,2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	1 mg/kg	72.8	68	124
EP074: 2,2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	1 mg/kg	74.2	60	126
EP074: cis-1,3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	1 mg/kg	66.9	51	119
EP074: trans-1,3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	1 mg/kg	68.1	52	114
EP074E: Halogenated Aliphatic Compounds (QCLot: 277519)								
EP074: 1,1,1,2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	1 mg/kg	71.8	62	122
EP074: 1,1,1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	1 mg/kg	72.5	65	117
EP074: 1,1,2,2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	1 mg/kg	81.0	65	121



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP074E: Halogenated Aliphatic Compounds (QCLot: 277519) - continued								
EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	1 mg/kg	81.1	64	126
EP074: 1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	1 mg/kg	76.7	67	125
EP074: 1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	1 mg/kg	73.5	54	126
EP074: 1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	1 mg/kg	74.4	65	123
EP074: 1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	1 mg/kg	77.8	61	125
EP074: 1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	1 mg/kg	81.7	53	129
EP074: 1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	1 mg/kg	75.8	65	125
EP074: 1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	1 mg/kg	76.9	68	122
EP074: Bromomethane	74-83-9	5	mg/kg	<5	10 mg/kg	77.6	47	141
EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	1 mg/kg	68.8	59	125
EP074: Chloroethane	75-00-3	5	mg/kg	<5	10 mg/kg	86.6	49	143
EP074: Chloromethane	74-87-3	5	mg/kg	<5	10 mg/kg	77.5	41	141
EP074: cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	1 mg/kg	73.1	69	121
EP074: cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	1 mg/kg	78.9	55	129
EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	1 mg/kg	73.7	68	118
EP074: Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	10 mg/kg	61.0	30	148
EP074: Iodomethane	74-88-4	0.5	mg/kg	<0.5	1 mg/kg	76.8	43	129
EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	1 mg/kg	59.0	20	134
EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	1 mg/kg	90.2	67	143
EP074: trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	1 mg/kg	72.4	64	120
EP074: trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	1 mg/kg	73.4	54	128
EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	1 mg/kg	75.7	70	118
EP074: Trichlorofluoromethane	75-69-4	5	mg/kg	<5	10 mg/kg	85.4	49	135
EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	10 mg/kg	80.5	43	147
EP074F: Halogenated Aromatic Compounds (QCLot: 277519)								
EP074: 1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	1 mg/kg	77.7	52	122
EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	1 mg/kg	78.8	68	122
EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	1 mg/kg	77.2	67	123
EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	1 mg/kg	77.2	70	1147
EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	1 mg/kg	76.8	68	116
EP074G: Trihalomethanes (QCLot: 277519)								
EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	1 mg/kg	63.3	61	121
EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	1 mg/kg	79.8	60	126
EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	1 mg/kg	77.2	66	124
EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	1 mg/kg	81.8	63	121
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 277528)								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	100	73	127
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	97.4	72	124



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 277528) - continued								
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	95.3	77	127
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	89.8	69	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	93.7	70	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	97.9	68	116
	205-82-3							
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	89.2	63	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	96.0	74	126
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	97.7	75	127
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	88.4	62	118
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	100	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	97.6	72	126
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	90.9	61	121
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	97.0	77	125
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	97.5	75	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	94.0	74	128
EP075A: Phenolic Compounds (QCLot: 278113)								
EP075: 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	1.5 mg/kg	66.1	49	107
EP075: 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	1.5 mg/kg	77.6	49	109
EP075: 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	1.5 mg/kg	# 129	47	105
EP075: 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	1.5 mg/kg	74.4	14	108
EP075: 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	1.5 mg/kg	76.4	48	110
EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	1.5 mg/kg	76.0	57	115
EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	1.5 mg/kg	76.1	55	117
EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	1.5 mg/kg	68.7	47	117
EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.6	3 mg/kg	69.5	46	122
EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	1.5 mg/kg	78.8	57	113
EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	3 mg/kg	19.3	12	76
EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	1.5 mg/kg	72.4	64	114
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 278113)								
EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	1.5 mg/kg	94.0	54	112
EP075: 2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	1.5 mg/kg	81.7	58	116
EP075: 3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	1.5 mg/kg	76.3	50	116
EP075: 7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	1.5 mg/kg	83.6	48	106
EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	81.9	62	112
EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	81.4	56	114
EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	83.8	57	111
EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	79.8	59	115
EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	80.0	56	116



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 278113) - continued								
EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	3 mg/kg	83.8	57	119
EP075: Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	76.5	56	120
EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	83.9	61	117
EP075: Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	71.1	53	119
EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	82.5	58	114
EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	80.6	59	115
EP075: Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	77.0	55	117
EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	1.5 mg/kg	83.8	58	114
EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	83.4	62	118
EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	85.2	63	113
EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	82.2	57	117
EP075C: Phthalate Esters (QCLot: 278113)								
EP075: bis(2-ethylhexyl) phthalate	117-81-7	----	mg/kg	----	1.5 mg/kg	88.5	69	133
EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	1.5 mg/kg	85.1	62	116
EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	1.5 mg/kg	82.4	65	115
EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	1.5 mg/kg	85.9	60	118
EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	1.5 mg/kg	83.9	65	121
EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	1.5 mg/kg	83.0	62	124
EP075D: Nitrosamines (QCLot: 278113)								
EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	1.5 mg/kg	57.6	16	123
EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	1.5 mg/kg	77.5	57	119
EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	1.5 mg/kg	67.6	59	117
EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	1.5 mg/kg	73.4	59	123
EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<0.6	3 mg/kg	80.2	42	112
EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	1.5 mg/kg	88.0	39	124
EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	1.5 mg/kg	73.6	65	121
EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	1.5 mg/kg	74.3	57	115
EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<0.5	1.5 mg/kg	72.9	53	125
EP075E: Nitroaromatics and Ketones (QCLot: 278113)								
EP075: 1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	1.5 mg/kg	58.4	36	114
EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	1.5 mg/kg	38.8	18	112
EP075: 2,4-Dinitrotoluene	121-14-2	0.5	mg/kg	<0.5	1.5 mg/kg	78.2	59	115
EP075: 2,6-Dinitrotoluene	606-20-2	0.5	mg/kg	<0.5	1.5 mg/kg	79.1	58	118
EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	1.5 mg/kg	56.3	27	129
EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	1.5 mg/kg	44.7	36	102
EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	1.5 mg/kg	50.4	10	87



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075E: Nitroaromatics and Ketones (QCLot: 278113) - continued								
EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	1.5 mg/kg	63.9	48	99
EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	1.5 mg/kg	69.1	60	116
EP075: Azobenzene	103-33-3	1	mg/kg	<1	1.5 mg/kg	82.8	62	118
EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	1.5 mg/kg	89.5	57	112
EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	1.5 mg/kg	80.0	48	108
EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	1.5 mg/kg	69.4	62	116
EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	1.5 mg/kg	72.4	65	119
EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	1.5 mg/kg	77.6	56	110
EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	1.5 mg/kg	94.0	62	114
EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	1.5 mg/kg	79.4	54	110
EP075F: Haloethers (QCLot: 278113)								
EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	83.8	58	110
EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	1.5 mg/kg	81.0	58	112
EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	1.5 mg/kg	72.8	59	115
EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	1.5 mg/kg	# 49.1	63	121
EP075G: Chlorinated Hydrocarbons (QCLot: 278113)								
EP075: 1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1.5 mg/kg	79.9	63	108
EP075: 1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1.5 mg/kg	72.4	57	115
EP075: 1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	1.5 mg/kg	73.7	58	112
EP075: 1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1.5 mg/kg	76.6	58	116
EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<0.5	1.5 mg/kg	84.7	59	111
EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	1.5 mg/kg	88.3	59	117
EP075: Hexachlorocyclopentadiene	77-47-4	0.5	mg/kg	<0.5	1.5 mg/kg	# 19.3	24	108
EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	1.5 mg/kg	76.9	54	116
EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	1.5 mg/kg	75.6	39	110
EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	1.5 mg/kg	80.9	57	109
EP075H: Anilines and Benzidines (QCLot: 278113)								
EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	<0.5	1.5 mg/kg	79.3	52	112
EP075: 3,3`-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	1.5 mg/kg	108	23	113
EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	<0.5	1.5 mg/kg	73.0	32	94
EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	1.5 mg/kg	41.4	21	99
EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	1.5 mg/kg	95.0	42	112
EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	1.5 mg/kg	49.4	13	108
EP075: Carbazole	86-74-8	0.5	mg/kg	<0.5	1.5 mg/kg	81.3	59	111
EP075: Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	1.5 mg/kg	79.8	60	110
EP075I: Organochlorine Pesticides (QCLot: 278113)								
EP075: 4,4`-DDD	72-54-8	0.5	mg/kg	<0.5	1.5 mg/kg	86.5	62	118
EP075: 4,4`-DDE	72-55-9	0.5	mg/kg	<0.5	1.5 mg/kg	77.8	60	116



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075I: Organochlorine Pesticides (QCLot: 278113) - continued								
EP075: 4,4'-DDT	50-29-3	0.5	mg/kg	<0.5	1.5 mg/kg	84.2	46	122
EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	1.5 mg/kg	93.6	61	115
EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	1.5 mg/kg	84.1	63	113
EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	1.5 mg/kg	84.1	65	125
EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	1.5 mg/kg	71.6	57	113
EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	1.5 mg/kg	81.2	65	115
EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	1.5 mg/kg	85.7	64	118
EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	1.5 mg/kg	84.6	64	118
EP075: Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	1.5 mg/kg	86.7	63	129
EP075: Endrin	72-20-8	0.5	mg/kg	<0.5	1.5 mg/kg	86.4	53	117
EP075: gamma-BHC	58-89-9	0.5	mg/kg	<0.5	1.5 mg/kg	82.0	61	117
EP075: Heptachlor	76-44-8	0.5	mg/kg	<0.5	1.5 mg/kg	83.9	55	115
EP075: Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	1.5 mg/kg	83.8	56	118
EP075J: Organophosphorus Pesticides (QCLot: 278113)								
EP075: Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	1.5 mg/kg	82.9	59	103
EP075: Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	1.5 mg/kg	84.9	63	113
EP075: Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	1.5 mg/kg	81.2	60	130
EP075: Diazinon	333-41-5	0.5	mg/kg	<0.5	1.5 mg/kg	# 35.5	68	134
EP075: Dichlorvos	62-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	54.3	46	112
EP075: Dimethoate	60-51-5	0.5	mg/kg	<0.5	1.5 mg/kg	80.1	63	119
EP075: Ethion	563-12-2	0.5	mg/kg	<0.5	1.5 mg/kg	87.1	62	118
EP075: Fenthion	55-38-9	0.5	mg/kg	<0.5	1.5 mg/kg	82.4	60	116
EP075: Malathion	121-75-5	0.5	mg/kg	<0.5	1.5 mg/kg	92.1	65	127
EP075: Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	1.5 mg/kg	82.7	65	115
EP075: Prothiofos	34643-46-4	0.5	mg/kg	<0.5	1.5 mg/kg	84.4	59	119

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK040S: Fluoride Soluble (QCLot: 281378)							
ES1536271-001	MW206_12	EK040S: Fluoride	16984-48-8	25 mg/kg	# Not Determined	70	130
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 277519)							
ES1536040-001	Anonymous	EP074: Benzene	71-43-2	2.5 mg/kg	74.9	70	130

Page : 15 of 15
 Work Order : ES1536271
 Client : RAMBOLL ENVIRON
 Project : AS130456 CWS GW INSTALLATION



Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 277519) - continued							
ES1536040-001	Anonymous	EP074: Toluene	108-88-3	2.5 mg/kg	71.8	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 277519)							
ES1536040-001	Anonymous	EP074: 1,1-Dichloroethene	75-35-4	2.5 mg/kg	80.8	70	130
		EP074: Trichloroethene	79-01-6	2.5 mg/kg	71.0	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 277519)							
ES1536040-001	Anonymous	EP074: Chlorobenzene	108-90-7	2.5 mg/kg	76.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 277528)							
ES1536030-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	80.2	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	97.6	70	130
EP075A: Phenolic Compounds (QCLot: 278113)							
ES1536271-001	MW206_12	EP075: 2-Chlorophenol	95-57-8	10 mg/kg	89.2	60	130
		EP075: 2-Nitrophenol	88-75-5	10 mg/kg	76.6	50	130
		EP075: 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	88.9	50	130
		EP075: Pentachlorophenol	87-86-5	20 mg/kg	21.6	10	130
		EP075: Phenol	108-95-2	10 mg/kg	88.7	60	130
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 278113)							
ES1536271-001	MW206_12	EP075: Acenaphthene	83-32-9	10 mg/kg	103	50	130
		EP075: Pyrene	129-00-0	10 mg/kg	# Not Determined	50	130
EP075D: Nitrosamines (QCLot: 278113)							
ES1536271-001	MW206_12	EP075: N-Nitrosodi-n-propylamine	621-64-7	10 mg/kg	88.6	50	130
EP075E: Nitroaromatics and Ketones (QCLot: 278113)							
ES1536271-001	MW206_12	EP075: 2,4-Dinitrotoluene	121-14-2	10 mg/kg	93.9	40	130
EP075G: Chlorinated Hydrocarbons (QCLot: 278113)							
ES1536271-001	MW206_12	EP075: 1,2,4-Trichlorobenzene	120-82-1	10 mg/kg	92.0	50	130
		EP075: 1,4-Dichlorobenzene	106-46-7	10 mg/kg	90.2	60	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1536271	Page	: 1 of 5
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Telephone	: +61-2-8784 8555
Project	: AS130456 CWS GW INSTALLATION	Date Samples Received	: 13-Nov-2015
Site	: ----	Issue Date	: 20-Nov-2015
Sampler	: ----	No. of samples received	: 4
Order number	: ----	No. of samples analysed	: 4

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.
- Duplicate outliers exist - please see following pages for full details.
- Laboratory Control outliers exist - please see following pages for full details.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EP075B: Polynuclear Aromatic Hydrocarbons	ES1536271--001	MW206_12	Benz(a)anthracene	56-55-3	26.2 %	0% - 20%	RPD exceeds LOR based limits
EP075B: Polynuclear Aromatic Hydrocarbons	ES1536271--001	MW206_12	Benzo(a)pyrene	50-32-8	22.2 %	0% - 20%	RPD exceeds LOR based limits
EP075B: Polynuclear Aromatic Hydrocarbons	ES1536271--001	MW206_12	Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	21.1 %	0% - 20%	RPD exceeds LOR based limits
EP075B: Polynuclear Aromatic Hydrocarbons	ES1536271--001	MW206_12	Fluoranthene	206-44-0	28.8 %	0% - 20%	RPD exceeds LOR based limits
EP075B: Polynuclear Aromatic Hydrocarbons	ES1536271--001	MW206_12	Pyrene	129-00-0	27.1 %	0% - 20%	RPD exceeds LOR based limits
Laboratory Control Spike (LCS) Recoveries							
EP075A: Phenolic Compounds	QC-278113-002	----	2,4-Dichlorophenol	120-83-2	129 %	47-105%	Recovery greater than upper control limit
EP075F: Haloethers	QC-278113-002	----	Bis(2-chloroethyl) ether	111-44-4	49.1 %	63-121%	Recovery less than lower control limit
EP075G: Chlorinated Hydrocarbons	QC-278113-002	----	Hexachlorocyclopentadiene	77-47-4	19.3 %	24-108%	Recovery less than lower control limit
EP075J: Organophosphorus Pesticides	QC-278113-002	----	Diazinon	333-41-5	35.5 %	68-134%	Recovery less than lower control limit
Matrix Spike (MS) Recoveries							
EK040S: Fluoride Soluble	ES1536271--001	MW206_12	Fluoride	16984-48-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP075B: Polynuclear Aromatic Hydrocarbons	ES1536271--001	MW206_12	Pyrene	129-00-0	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK040S: Fluoride Soluble							
Soil Glass Jar - Unpreserved							
MW206_12,	MW206_13,	18-Nov-2015	10-Nov-2015	8	----	----	----
MW206_13.5,	MW206_14						
EP074A: Monocyclic Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved							
MW206_12		16-Nov-2015	10-Nov-2015	5	16-Nov-2015	10-Nov-2015	6

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					



Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP) - Continued					
Moisture Content	1	13	7.69	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Lab Split: Managed Moisture for Dry Weight Det. (EA055-103) MW206_12	03-Nov-2015	----	----	----	16-Nov-2015	01-May-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) MW206_13, MW206_14	03-Nov-2015	----	----	----	16-Nov-2015	17-Nov-2015	✓
EK040S: Fluoride Soluble							
Soil Glass Jar - Unpreserved (EK040S) MW206_12, MW206_13.5,	03-Nov-2015	18-Nov-2015	10-Nov-2015	✗	20-Nov-2015	16-Dec-2015	✓
EP074A: Monocyclic Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP074) MW206_12	03-Nov-2015	16-Nov-2015	10-Nov-2015	✗	16-Nov-2015	10-Nov-2015	✗
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) MW206_13, MW206_14	03-Nov-2015	16-Nov-2015	17-Nov-2015	✓	17-Nov-2015	26-Dec-2015	✓
EP075A: Phenolic Compounds							
Soil Glass Jar - Unpreserved (EP075) MW206_12	03-Nov-2015	16-Nov-2015	17-Nov-2015	✓	17-Nov-2015	26-Dec-2015	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Fluoride - Soluble	EK040S	1	4	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055-103	1	13	7.69	10.00	✗	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	7	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Fluoride - Soluble	EK040S	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Fluoride - Soluble	EK040S	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Fluoride - Soluble	EK040S	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Organic Compounds	EP074	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	In-house. A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Fluoride - Soluble	EK040S	SOIL	In house: Referenced to APHA 4500 F--C Soluble Fluoride is determined after a 1:5 soil/water extract using an ion selective electrode.
Volatile Organic Compounds	EP074	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)
Semivolatile Organic Compounds	EP075	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 502)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES1536271

Client : RAMBOLL ENVIRON Contact : MR MARK TIEDEMAN Address : Eastpoint Complex Suite 19B, Level 2 50 Glebe Road PO Box 435 THE JUNCTION NSW 2291 E-mail : mtiedeman@ramboll.com Telephone : 02 4962 5444 Facsimile : 02 4962 5888 Project : AS130456 CWS GW INSTALLATION Order number : ---- C-O-C number : ---- Site : ---- Sampler :	Laboratory : Environmental Division Sydney Contact : Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 E-mail : Telephone : +61-2-8784 8555 Facsimile : +61-2-8784 8500 Page : 1 of 2 Quote number : ES2015ENVIAUS0373 (EN/072/15) QC Level : NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 13-Nov-2015 10:30 AM	Issue Date : 13-Nov-2015
Client Requested Due Date : 20-Nov-2015	Scheduled Reporting Date : 20-Nov-2015

Delivery Details

Mode of Delivery : Undefined	Security Seal : Not Available
No. of coolers/boxes : ----	Temperature : 4.1' C
Receipt Detail :	No. of samples received / analysed : 4 / 4

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **This is a rebatch of ES1535263.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

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

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

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

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.				SOIL - EA055-103 Moisture Content	SOIL - EK040S Fluoride Soluble	SOIL - EP075 SIM PAH only SIM - PAH only	SOIL - S-23 SVOC/VOC
Matrix: SOIL							
<i>Laboratory sample ID</i>	<i>Client sampling date / time</i>	<i>Client sample ID</i>					
ES1536271-001	[03-Nov-2015]	MW206_12	✓	✓		✓	
ES1536271-002	[03-Nov-2015]	MW206_13	✓	✓	✓		
ES1536271-003	[03-Nov-2015]	MW206_13.5	✓	✓	✓		
ES1536271-004	[03-Nov-2015]	MW204_14	✓	✓	✓		

Proactive Holding Time Report

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

Matrix: SOIL

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

Method	Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received		Instructions Received	
					Date	Evaluation	Date	Evaluation
EK040S: Fluoride - Soluble								
MW204_14	Soil Glass Jar - Unpreserved	10-Nov-2015	08-Dec-2015	13-Nov-2015	✗	----	----	
MW206_12	Soil Glass Jar - Unpreserved	10-Nov-2015	08-Dec-2015	13-Nov-2015	✗	----	----	
MW206_13.5	Soil Glass Jar - Unpreserved	10-Nov-2015	08-Dec-2015	13-Nov-2015	✗	----	----	
MW206_13	Soil Glass Jar - Unpreserved	10-Nov-2015	08-Dec-2015	13-Nov-2015	✗	----	----	
EP074: Volatile Organic Compounds								
MW206_12	Soil Glass Jar - Unpreserved	10-Nov-2015	10-Nov-2015	13-Nov-2015	✗	----	----	

Requested Deliverables

Cindy Suen

- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- Chain of Custody (CoC) (COC)

Email cindy.suen@alsglobal.com

Email cindy.suen@alsglobal.com

MARK TIEDEMAN

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- A4 - AU Tax Invoice (INV)
- Chain of Custody (CoC) (COC)
- EDI Format - ENMRG (ENMRG)
- EDI Format - ESDAT (ESDAT)

Email mtiedeman@ramboll.com

Email mtiedeman@ramboll.com

Email mtiedeman@ramboll.com

Email mtiedeman@ramboll.com

Email mtiedeman@ramboll.com

Email mtiedeman@ramboll.com

Email mtiedeman@ramboll.com

Email mtiedeman@ramboll.com

Fadi Soro

From: Loren Schiavon
Sent: Thursday, 12 November 2015 5:18 PM
To: Fadi Soro
Subject: FW: ES1535263 - Additional analysis

Hi Fadi,

Can you please arrange this re-batch for me?

Thanks.

Kind regards

Loren Schiavon

CLIENT SERVICES CO-ORDINATOR
ALS | Environmental Division

277-289 Woodpark Road
Smithfield NSW 2164 Australia

T +61 2 8784 8503
F +61 2 8784 8500

We are keen for your feedback! Please click [here](#) for your 1 question survey

[EnviroMail™ 97 - Extractable Petroleum Hydrocarbons](#)

[EnviroMail™ 96 - Bench Trials for Remediation or Assessment of New Technologies](#)

[EnviroMail™ 95 - Subcontractor Safety & Positive Performance Indicator Reporting](#)

www.alsglobal.com  [Subscribe to EnviroMail™](#)  [Follow us on LinkedIn](#)

From: Mark Tiedeman [mailto:mtiedeman@ramboll.com]

Sent: Thursday, 12 November 2015 4:46 PM

To: Loren Schiavon

2,4,5,6

SYW


13/11/15
10:30~



Cc: Fiona Robinson

Subject: ES1535263 - Additional analysis

Hi Loren,

I would like some additional analysis on sample "MW206_12" from ES1535263. Can you please get this sample analysed for:

- Soluble fluoride;
- SVOC scan; and
- VOC scan.

(1)

(2)

(3)

Additionally, can you please have samples MW206_13, MW206_13.5 and MW206_14 analysed for:

- Soluble Fluoride;
- PAHs

Thanks

Yours sincerely

Mark Tiedeman

Senior Environmental Consultant

D +61 2 4962 5444

mtiedeman@ramboll.com

Ramboll Environ

Level 2, Suite 19B

50 Glebe Road

PO Box 435

The Junction

NSW 2291

Australia

w www.ramboll-environ.com

RAMBOLL ENVIRON

Ramboll Environ Australia Pty Ltd

ACN 095 437 442

ABN 49 095 437 442

This message contains information that may be confidential, privileged or otherwise protected by law from disclosure. It is intended for the exclusive use of the Addressee(s). Unless you are the addressee or authorized agent of the addressee, you may not review, copy, distribute or disclose to anyone the message or any information contained within. If you have received this message in error, please contact the sender by electronic reply to email@ramboll.com and immediately delete all copies of the message.

ALS Group: Click [here](#) to report this email as spam.

CERTIFICATE OF ANALYSIS

Work Order	: ES1536568	Page	: 1 of 10
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: PO BOX 560	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	: NORTH SYDNEY NSW, AUSTRALIA 2060		
E-mail	: mtiedeman@ramboll.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130456 ADDITIONAL SAMPLING	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 18-Nov-2015 14:42
C-O-C number	: ----	Date Analysis Commenced	: 07-Dec-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 15-Dec-2015 11:22
Site	: ----		
Quote number	: ----	No. of samples received	: 12
		No. of samples analysed	: 12

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Pabi Subba	Senior Organic Chemist	Sydney Inorganics, Smithfield, NSW
Shobhna Chandra	Metals Coordinator	Sydney Organics, Smithfield, NSW
		Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- Unable to determine Matrix Spike recovery for ES1536568-001 as the level in the sample greatly exceeds the spike concentration.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				LEDGE BATH 26/7/12	ANODE COVER MATERIAL 11/9/15	ALUMINIUM FLUORIDE	REACTED ALUMINA	REFRACTORY - A
Client sampling date / time				[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1536568-001	ES1536568-002	ES1536568-003	ES1536568-004	ES1536568-005
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	<1.0	<1.0	<1.0	3.9	<1.0
ED093S: Soluble Major Cations								
Calcium	7440-70-2	0.001	%	----	----	----	----	----
Calcium	7440-70-2	10	mg/kg	130	70	<10	<10	----
Sodium	7440-23-5	0.001	%	----	----	----	----	----
Sodium	7440-23-5	10	mg/kg	1400	1770	270	2540	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	0.005	%	----	----	----	----	----
Aluminium	7429-90-5	50	mg/kg	84500	136000	18100	122000	----
Arsenic	7440-38-2	5	mg/kg	----	----	----	----	<5
Cadmium	7440-43-9	1	mg/kg	----	----	----	----	<1
Chromium	7440-47-3	2	mg/kg	----	----	----	----	23
Copper	7440-50-8	5	mg/kg	----	----	----	----	40
Lead	7439-92-1	5	mg/kg	----	----	----	----	<5
Nickel	7440-02-0	2	mg/kg	----	----	----	----	6
Zinc	7440-66-6	5	mg/kg	----	----	----	----	63
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	<0.1
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	----	----	----	----	<1
EK040T: Fluoride Total								
Fluoride	16984-48-8	0.004	%	----	----	----	----	----
Fluoride	16984-48-8	40	mg/kg	206000	184000	312000	9390	3210
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	6.9	6.9	6.2	6.2	----
After HCl pH	----	0.1	pH Unit	1.8	1.7	1.4	1.6	----
Extraction Fluid Number	----	1	-	1	1	1	1	----
Final pH	----	0.1	pH Unit	4.9	5.0	4.9	5.0	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	<0.5



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				LEDGE BATH 26/7/12	ANODE COVER MATERIAL 11/9/15	ALUMINIUM FLUORIDE	REACTED ALUMINA	REFRACTORY - A
Client sampling date / time				[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1536568-001	ES1536568-002	ES1536568-003	ES1536568-004	ES1536568-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	1.2
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	----	----	78.2
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	----	----	75.4
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	----	----	81.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	----	----	74.2
Anthracene-d10	1719-06-8	0.5	%	----	----	----	----	75.2
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	----	----	73.7



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				REFRACTORY - B	REFRACTORY - C	REFRACTORY - D	LEDGE BATH 26/7/12 REPORTED %	ANODE COVER MATERIAL 11/9/15 REPORTED %
Client sampling date / time				[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1536568-006	ES1536568-007	ES1536568-008	ES1536568-009	ES1536568-010
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	<1.0	<1.0	<1.0	<1.0	<1.0
ED093S: Soluble Major Cations								
Calcium	7440-70-2	0.001	%	----	----	----	0.013	0.007
Calcium	7440-70-2	10	mg/kg	----	----	----	----	----
Sodium	7440-23-5	0.001	%	----	----	----	0.141	0.174
Sodium	7440-23-5	10	mg/kg	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	0.005	%	----	----	----	7.68	14.0
Aluminium	7429-90-5	50	mg/kg	----	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	22	36	32	----	----
Copper	7440-50-8	5	mg/kg	45	10	24	----	----
Lead	7439-92-1	5	mg/kg	<5	<5	<5	----	----
Nickel	7440-02-0	2	mg/kg	6	8	11	----	----
Zinc	7440-66-6	5	mg/kg	48	43	200	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	<1	<1	<1	----	----
EK040T: Fluoride Total								
Fluoride	16984-48-8	0.004	%	----	----	----	20.6	18.4
Fluoride	16984-48-8	40	mg/kg	1540	2110	3360	----	----
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	----	----	----	----	----
After HCl pH	----	0.1	pH Unit	----	----	----	----	----
Extraction Fluid Number	----	1	-	----	----	----	----	----
Final pH	----	0.1	pH Unit	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				REFRACTORY - B	REFRACTORY - C	REFRACTORY - D	LEDGE BATH 26/7/12 REPORTED %	ANODE COVER MATERIAL 11/9/15 REPORTED %
Client sampling date / time				[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1536568-006	ES1536568-007	ES1536568-008	ES1536568-009	ES1536568-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	100	81.8	80.5	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	91.0	81.6	81.4	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%	94.1	88.0	70.1	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	93.6	81.9	83.4	----	----
Anthracene-d10	1719-06-8	0.5	%	87.9	84.4	86.5	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	95.8	82.6	86.2	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				ALUMINIUM FLUORIDE REPORTED %	REACTED ALUMINA REPORTED %	----	----	----
Client sampling date / time				[18-Nov-2015]	[18-Nov-2015]	----	----	----
Compound	CAS Number	LOR	Unit	ES1536568-011	ES1536568-012	-----	-----	-----
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	<1.0	3.7	----	----	----
ED093S: Soluble Major Cations								
Calcium	7440-70-2	0.001	%	<0.001	<0.001	----	----	----
Calcium	7440-70-2	10	mg/kg	----	----	----	----	----
Sodium	7440-23-5	0.001	%	0.027	0.257	----	----	----
Sodium	7440-23-5	10	mg/kg	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	0.005	%	2.06	12.4	----	----	----
Aluminium	7429-90-5	50	mg/kg	----	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	----	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	----	----	----	----	----
Chromium	7440-47-3	2	mg/kg	----	----	----	----	----
Copper	7440-50-8	5	mg/kg	----	----	----	----	----
Lead	7439-92-1	5	mg/kg	----	----	----	----	----
Nickel	7440-02-0	2	mg/kg	----	----	----	----	----
Zinc	7440-66-6	5	mg/kg	----	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	----	----	----	----	----
EK040T: Fluoride Total								
Fluoride	16984-48-8	0.004	%	31.2	0.939	----	----	----
Fluoride	16984-48-8	40	mg/kg	----	----	----	----	----
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	----	----	----	----	----
After HCl pH	----	0.1	pH Unit	----	----	----	----	----
Extraction Fluid Number	----	1	-	----	----	----	----	----
Final pH	----	0.1	pH Unit	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				ALUMINIUM FLUORIDE REPORTED %	REACTED ALUMINA REPORTED %	----	----	----
Client sampling date / time				[18-Nov-2015]	[18-Nov-2015]	----	----	----
Compound	CAS Number	LOR	Unit	ES1536568-011	ES1536568-012	-----	-----	-----
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	----
Benzo(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	----	----	----

Page : 10 of 10
 Work Order : ES1536568
 Client : RAMBOLL ENVIRON
 Project : AS130456 ADDITIONAL SAMPLING



Analytical Results

Sub-Matrix: **TCLP LEACHATE**
 (Matrix: **WATER**)

Client sample ID

				LEDGE BATH 26/7/12	ANODE COVER MATERIAL 11/9/15	ALUMINIUM FLUORIDE	REACTED ALUMINA	----
Client sampling date / time				[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]	[18-Nov-2015]	----
Compound	CAS Number	LOR	Unit	ES1536568-001	ES1536568-002	ES1536568-003	ES1536568-004	-----
				Result	Result	Result	Result	Result
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	151	240	44.8	260	----

QUALITY CONTROL REPORT

Work Order	: ES1536568	Page	: 1 of 9
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: PO BOX 560 NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: mtiedeman@ramboll.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130456 ADDITIONAL SAMPLING	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 18-Nov-2015
C-O-C number	: ----	Date Analysis Commenced	: 07-Dec-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 15-Dec-2015
Site	: ----	No. of samples received	: 12
Quote number	: ----	No. of samples analysed	: 12

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

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



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



NATA Accredited
 Laboratory 825

Accredited for
 compliance with
 ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Pabi Subba	Senior Organic Chemist	Sydney Inorganics, Smithfield, NSW
		Sydney Organics, Smithfield, NSW
Shobhna Chandra	Metals Coordinator	Sydney Inorganics, Smithfield, NSW



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 304031)									
ES1536568-003	ALUMINIUM FLUORIDE	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	<1.0	<1.0	0.00	No Limit
ES1537696-005	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	11.7	12.2	3.71	0% - 50%
ED093S: Soluble Major Cations (QC Lot: 304790)									
ES1536568-004	REACTED ALUMINA	ED093S: Calcium	7440-70-2	10	mg/kg	<10	<10	0.00	No Limit
		ED093S: Sodium	7440-23-5	10	mg/kg	2540	2600	2.24	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 303194)									
ES1536568-001	LEDGE BATH 26/7/12	EG005T: Cadmium	7440-43-9	1	mg/kg	1	1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	347	328	5.68	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	29	27	6.74	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	7	6	17.3	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	11	9	19.6	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	12	9	35.1	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	84500	76800	9.50	0% - 20%
EW1512849-003	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	16	16	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	5	6	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	5	5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	20	16	22.3	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	26	19	31.6	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	30	35	12.7	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	11300	11200	1.18	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 305474)									
ES1538059-026	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	19	18	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	15	14	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	7	7	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	58	57	3.24	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	48	47	3.24	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	384	404	5.12	0% - 20%
		EG005T: Aluminium	7429-90-5	50	mg/kg	12100	12100	0.337	0% - 20%
ES1538059-036	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	25	26	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	17	18	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	9	15.4	No Limit

Page : 4 of 9
 Work Order : ES1536568
 Client : RAMBOLL ENVIRON
 Project : AS130456 ADDITIONAL SAMPLING



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005T: Total Metals by ICP-AES (QC Lot: 305474) - continued									
ES1538059-036	Anonymous	EG005T: Copper	7440-50-8	5	mg/kg	64	67	4.53	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	55	57	3.61	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	459	473	3.03	0% - 20%
		EG005T: Aluminium	7429-90-5	50	mg/kg	18100	18900	4.60	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 306688)									
ES1536568-005	REFRACTORY - A	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	23	23	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	6	6	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	40	42	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	63	56	12.3	0% - 50%
		EG005T: Aluminium	7429-90-5	50	mg/kg	7300	6410	12.9	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 306687)									
ES1536568-005	REFRACTORY - A	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 304337)									
ES1536568-005	REFRACTORY - A	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
ES1537731-006	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	49	48	0.00	0% - 20%
EK040T: Fluoride Total (QC Lot: 309015)									
ES1536568-001	LEDGE BATH 26/7/12	EK040T: Fluoride	16984-48-8	40	mg/kg	206000	200000	2.77	0% - 20%
ES1536568-005	REFRACTORY - A	EK040T: Fluoride	16984-48-8	40	mg/kg	3210	2870	11.2	0% - 20%
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 302791)									
ES1536568-005	REFRACTORY - A	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Page : 5 of 9
 Work Order : ES1536568
 Client : RAMBOLL ENVIRON
 Project : AS130456 ADDITIONAL SAMPLING



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 302791) - continued									
ES1536568-005	REFRACTORY - A	EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK040P: Fluoride by PC Titrator (QC Lot: 305710)									
ES1536568-001	LEDGE BATH 26/7/12	EK040P: Fluoride	16984-48-8	0.1	mg/L	151	151	0.398	0% - 20%
ES1538320-006	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.8	0.8	0.00	No Limit

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
	Spike	Spike Recovery (%)	Recovery Limits (%)		
	Concentration	LCS	Low	High	
Result					
<10	50 mg/kg	100	85	119	
<10	50 mg/kg	93.1	81	123	
<50	6134 mg/kg	119	70	130	
<5	21.7 mg/kg	122	86	126	
<1	4.64 mg/kg	102	83	113	
<2	43.9 mg/kg	105	76	128	
<5	32 mg/kg	115	86	120	
<5	40 mg/kg	106	80	114	
<2	55 mg/kg	112	87	123	
<5	60.8 mg/kg	115	80	122	
<50	6134 mg/kg	129	70	130	
<5	21.7 mg/kg	116	86	126	
<1	4.64 mg/kg	107	83	113	
<2	43.9 mg/kg	106	76	128	
<5	32 mg/kg	115	86	120	
<5	40 mg/kg	109	80	114	
<2	55 mg/kg	111	87	123	
<5	60.8 mg/kg	113	80	122	
<50	6134 mg/kg	121	70	130	
<5	21.7 mg/kg	107	86	126	
<1	4.64 mg/kg	99.3	83	113	
<2	43.9 mg/kg	100	76	128	
<5	32 mg/kg	110	86	120	
<5	40 mg/kg	101	80	114	
<2	55 mg/kg	103	87	123	
<5	60.8 mg/kg	106	80	122	
<0.1	2.57 mg/kg	74.5	70	105	
<1	20 mg/kg	106	81	129	



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EK040T: Fluoride Total (QCLot: 309015) - continued								
EK040T: Fluoride	16984-48-8	40	mg/kg	<40	950 mg/kg	87.6	69	107
EN33: TCLP Leach (QCLot: 303736)								
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 302791)								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	80.3	73	127
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	80.2	72	124
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	80.0	77	127
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	81.0	69	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	81.6	70	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	84.5	68	116
	205-82-3							
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	81.7	63	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	84.8	74	126
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	80.6	75	127
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	79.0	62	118
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	80.1	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	80.3	72	126
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	77.3	61	121
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	83.4	77	125
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	81.1	75	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	79.9	74	128

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit		Result		LCS	Low
EK040P: Fluoride by PC Titrator (QCLot: 305710)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	90.4	82	116

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
EG005T: Total Metals by ICP-AES (QCLot: 303194)							
ES1536568-002	ANODE COVER MATERIAL 11/9/15	EG005T: Arsenic	7440-38-2	50 mg/kg	124	70	130

Page : 8 of 9
 Work Order : ES1536568
 Client : RAMBOLL ENVIRON
 Project : AS130456 ADDITIONAL SAMPLING



Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 303194) - continued							
ES1536568-002	ANODE COVER MATERIAL 11/9/15	EG005T: Cadmium	7440-43-9	50 mg/kg	101	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	100	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	123	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	103	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	# Not Determined	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	108	70	130
EG005T: Total Metals by ICP-AES (QCLot: 305474)							
ES1538059-026	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	97.7	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	95.5	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	92.8	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	98.4	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	95.5	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	95.4	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	91.8	70	130
EG005T: Total Metals by ICP-AES (QCLot: 306688)							
ES1536568-005	REFRACTORY - A	EG005T: Arsenic	7440-38-2	50 mg/kg	108	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	102	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	99.4	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	110	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	103	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	105	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	94.5	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 306687)							
ES1536568-005	REFRACTORY - A	EG035T: Mercury	7439-97-6	5 mg/kg	98.2	70	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 304337)							
ES1536568-005	REFRACTORY - A	EK026SF: Total Cyanide	57-12-5	20 mg/kg	99.0	70	130
EK040T: Fluoride Total (QCLot: 309015)							
ES1536568-001	LEDGE BATH 26/7/12	EK040T: Fluoride	16984-48-8	400 mg/kg	# Not Determined	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 302791)							
ES1536568-005	REFRACTORY - A	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	80.6	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	84.8	70	130

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
Laboratory sample ID		Client sample ID		Spike	SpikeRecovery(%)	Recovery Limits (%)	
		Method: Compound	CAS Number	Concentration	MS	Low	High
EK040P: Fluoride by PC Titrator (QCLot: 305710)							
ES1536568-002	ANODE COVER MATERIAL 11/9/15	EK040P: Fluoride	16984-48-8	5 mg/L	# Not Determined	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order : **ES1536568**

Page : 1 of 7

Client : **RAMBOLL ENVIRON**
Contact : **MR MARK TIEDEMAN**
Project : **AS130456 ADDITIONAL SAMPLING**
Site : **----**
Sampler : **MARK TIEDEMAN**
Order number : **----**

Laboratory : **Environmental Division Sydney**
Telephone : **+61-2-8784 8555**
Date Samples Received : **18-Nov-2015**
Issue Date : **15-Dec-2015**
No. of samples received : **12**
No. of samples analysed : **12**

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG005T: Total Metals by ICP-AES	ES1536568--002	ANODE COVER MATERIAL 1	Nickel	7440-02-0	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK040T: Fluoride Total	ES1536568--001	LEDGE BATH 26/7/12	Fluoride	16984-48-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK040P: Fluoride by PC Titrator	ES1536568--002	ANODE COVER MATERIAL 1	Fluoride	16984-48-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method			Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content								
Miscellaneous Plastic bottle -unpreserved LEDGE BATH 26/7/12, ALUMINIUM FLUORIDE, LEDGE BATH 26/7/12 - REPORTED %, ALUMINIUM FLUORIDE - REPORTED %,	ANODE COVER MATERIAL 11/9/15, REACTED ALUMINA, ANODE COVER MATERIAL 11/9/15 - REPORTED %, REACTED ALUMINA - REPORTED %		----	----	----	09-Dec-2015	02-Dec-2015	7
Snap Lock Bag REFRACTORY - A, REFRACTORY - C,	REFRACTORY - B, REFRACTORY - D		----	----	----	09-Dec-2015	02-Dec-2015	7
EK026SF: Total CN by Segmented Flow Analyser								
Snap Lock Bag REFRACTORY - A, REFRACTORY - C,	REFRACTORY - B, REFRACTORY - D		12-Dec-2015	02-Dec-2015	10	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Snap Lock Bag REFRACTORY - A, REFRACTORY - C,	REFRACTORY - B, REFRACTORY - D		10-Dec-2015	02-Dec-2015	7	----	----	----



Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content									
Miscellaneous Plastic bottle -unpreserved (EA055-103) LEDGE BATH 26/7/12, ALUMINIUM FLUORIDE, LEDGE BATH 26/7/12 - REPORTED %, ALUMINIUM FLUORIDE - REPORTED %, ANODE COVER MATERIAL 11/9/15, REACTED ALUMINA, ANODE COVER MATERIAL 11/9/15 - REPORTED %, REACTED ALUMINA - REPORTED %		18-Nov-2015	----	----	----	09-Dec-2015	02-Dec-2015	✖	
Snap Lock Bag (EA055-103) REFRACTORY - A, REFRACTORY - C, REFRACTORY - B, REFRACTORY - D		18-Nov-2015	----	----	----	09-Dec-2015	02-Dec-2015	✖	
ED093S: Soluble Major Cations									
Miscellaneous Plastic bottle -unpreserved (ED093S) LEDGE BATH 26/7/12, ALUMINIUM FLUORIDE, LEDGE BATH 26/7/12 - REPORTED %, ANODE COVER MATERIAL 11/9/15, ALUMINIUM FLUORIDE - REPORTED %, REACTED ALUMINA, ANODE COVER MATERIAL 11/9/15 - REPORTED %, REACTED ALUMINA - REPORTED %		18-Nov-2015	10-Dec-2015	16-May-2016	✔	10-Dec-2015	16-May-2016	✔	
EG005T: Total Metals by ICP-AES									
Miscellaneous Plastic bottle -unpreserved (EG005T) LEDGE BATH 26/7/12, ALUMINIUM FLUORIDE, ANODE COVER MATERIAL 11/9/15, REACTED ALUMINA		18-Nov-2015	08-Dec-2015	16-May-2016	✔	09-Dec-2015	16-May-2016	✔	
Miscellaneous Plastic bottle -unpreserved (EG005T) LEDGE BATH 26/7/12 - REPORTED %, ANODE COVER MATERIAL 11/9/15 - REPORTED %, ALUMINIUM FLUORIDE - REPORTED %, REACTED ALUMINA - REPORTED %		18-Nov-2015	10-Dec-2015	16-May-2016	✔	11-Dec-2015	16-May-2016	✔	
Snap Lock Bag (EG005T) REFRACTORY - A, REFRACTORY - C, REFRACTORY - B, REFRACTORY - D		18-Nov-2015	11-Dec-2015	16-May-2016	✔	11-Dec-2015	16-May-2016	✔	
EG035T: Total Recoverable Mercury by FIMS									
Snap Lock Bag (EG035T) REFRACTORY - A, REFRACTORY - C, REFRACTORY - B, REFRACTORY - D		18-Nov-2015	11-Dec-2015	16-Dec-2015	✔	11-Dec-2015	16-Dec-2015	✔	
EK026SF: Total CN by Segmented Flow Analyser									
Snap Lock Bag (EK026SF) REFRACTORY - A, REFRACTORY - C, REFRACTORY - B, REFRACTORY - D		18-Nov-2015	12-Dec-2015	02-Dec-2015	✖	12-Dec-2015	26-Dec-2015	✔	

Page : 4 of 7
 Work Order : ES1536568
 Client : RAMBOLL ENVIRON
 Project : AS130456 ADDITIONAL SAMPLING



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK040T: Fluoride Total								
Pulp Bag (EK040T) LEDGE BATH 26/7/12, ALUMINIUM FLUORIDE, LEDGE BATH 26/7/12 - REPORTED %, ALUMINIUM FLUORIDE - REPORTED %,ANODE COVER MATERIAL 11/9/15, REACTED ALUMINA, ANODE COVER MATERIAL 11/9/15 - REPORTED %, REACTED ALUMINA - REPORTED %	18-Nov-2015	07-Dec-2015	16-Dec-2015	✔	14-Dec-2015	16-Dec-2015	✔	
Pulp Bag (EK040T) REFRACTORY - A, REFRACTORY - C,REFRACTORY - B, REFRACTORY - D	18-Nov-2015	10-Dec-2015	16-Dec-2015	✔	14-Dec-2015	16-Dec-2015	✔	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Snap Lock Bag (EP075(SIM)) REFRACTORY - A, REFRACTORY - C,REFRACTORY - B, REFRACTORY - D	18-Nov-2015	10-Dec-2015	02-Dec-2015	✖	10-Dec-2015	19-Jan-2016	✔	

Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK040P: Fluoride by PC Titrator									
Clear Plastic Bottle - Natural (EK040P)		ANODE COVER MATERIAL 11/9/15, REACTED ALUMINA	09-Dec-2015	----	----	----	10-Dec-2015	06-Jan-2016	✔
LEDGE BATH 26/7/12, ALUMINIUM FLUORIDE.									



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
PAH/Phenols (SIM)	EP075(SIM)	15	83	18.07	9.48	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	9	83	10.84	4.74	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	8	83	9.64	4.74	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	8	83	9.64	3.79	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	In-house. A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Cations - soluble by ICP-AES	ED093S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	In house: Referenced to APHA 4500-CN-O. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
Fluoride by PC Titrator	EK040P	SOIL	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Total Fluoride	EK040T	SOIL	(In-house) Total fluoride is determined by ion specific electrode (ISE) in a solution obtained after a Sodium Carbonate / Potassium Carbonate fusion dissolution.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)

Preparation Methods	Method	Matrix	Method Descriptions
Total Fluoride	EK040T-PR	SOIL	(In-house) Samples are fused with Sodium Carbonate / Potassium Carbonate flux.
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.



Preparation Methods	Method	Matrix	Method Descriptions
Tumbler Extraction of Solids	ORG17	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Chain of Custody & Analysis Request Form

Ramboll Environ

Level 2, Suite 19B, 60 Glebe Road

The Junction NSW 2291

Tel: 02 49625444

Email: mtiedeman@environcorp.com

Email: frobinson@environcorp.com

Laboratory Details

Tel: 02 8784 8555

Lab. Name: ALS

Fax: 02 8784 8500

Lab. Address: 277-289 Woodpark Road, Smithfield NSW

Contact Name: Final Report by:

Lab. Ref: ES1536568

Lab Quote No:

Project Additional sampling

Project Number: AS130456

Purchase Order Number:

Sample collected by: Mark Tiedeman

Sample Results to be returned to:

mtiedeman@environcorp.com; frobinson@environcorp.com

Specifications:

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

Yes No

N/A

Is any sediment layer present in waters to be excluded from extractions?

Yes No

N/A

Special storage requirements?

Yes No

N/A

Preservation requirements?

Yes No

N/A

Other requirements?

Yes No

N/A

Fax Hard copy Email

esdat / excel / pdf

24hr 48hr days

8. Project Manager: Neil Woodridge

tel:

(Tick)

STANDARD

Yes No

N/A

Fast TAT Guarantee Required?

CERTIFICATE OF ANALYSIS

Work Order	: ES1537731	Page	: 1 of 27
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: PO BOX 560	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	NORTH SYDNEY NSW, AUSTRALIA 2060		
E-mail	: mtiedeman@ramboll.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: A5130456 CWS	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 04-Dec-2015 11:00
C-O-C number	: ----	Date Analysis Commenced	: 07-Dec-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 15-Dec-2015 18:06
Site	: ----		
Quote number	: ----	No. of samples received	: 21
		No. of samples analysed	: 21

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW
Shobhna Chandra	Metals Coordinator	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- EP075: Particular samples required dilution prior to extraction due to matrix interferences. LOR values have been adjusted accordingly.
- EP075: 'Sum of PAH' is the sum of the USEPA 16 priority PAHs
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H⁺ + Al³⁺).



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW201_3.0	MW201_6.0	MW201_9.0	MW202_2.0	MW202_6.5
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1537731-001	ES1537731-002	ES1537731-003	ES1537731-004	ES1537731-005
				Result	Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		9.1	9.6	9.9	11.4	10.2
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		14.3	10.3	17.1	9.0	20.0
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		<0.2	<0.2	<0.2	<0.2	<0.2
Exchangeable Magnesium	----	0.2	meq/100g		<0.2	<0.2	<0.2	<0.2	<0.2
Exchangeable Potassium	----	0.2	meq/100g		0.6	0.3	0.6	<0.2	0.4
Exchangeable Sodium	----	0.2	meq/100g		30.1	25.5	39.3	53.4	49.8
Cation Exchange Capacity	----	0.2	meq/100g		30.8	26.0	40.0	----	50.2
Exchangeable Calcium Percent	----	0.2	%		<0.2	<0.2	<0.2	0.5	<0.2
Exchangeable Magnesium Percent	----	0.2	%		<0.2	<0.2	<0.2	<0.2	<0.2
Exchangeable Potassium Percent	----	0.2	%		2.1	1.5	1.6	0.2	0.8
Exchangeable Sodium Percent	----	0.2	%		97.9	98.5	98.4	99.3	99.2
Magnesium/Potassium Ratio	----	0.2	-		----	----	----	<0.2	----
Magnesium/Potassium Ratio	----	0.2	-		<0.2	<0.2	<0.2	----	<0.2
ED008: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g		----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g		----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g		----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g		----	----	----	----	----
ED093S: Soluble Major Cations									
Sodium	7440-23-5	10	mg/kg		3300	3810	7240	14500	14800
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	1	mg/kg		14	86	78	33	50
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		2440	2220	3030	21100	3220
EP075A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<3.0	----	----	----	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<3.0	----	----	----	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<3.0	----	----	----	<0.5
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg		<6.0	----	----	----	<0.6
2-Nitrophenol	88-75-5	0.5	mg/kg		<3.0	----	----	----	<0.5
2,4-Dimethylphenol	105-67-9	0.5	mg/kg		<3.0	----	----	----	<0.5



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW201_3.0	MW201_6.0	MW201_9.0	MW202_2.0	MW202_6.5
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1537731-001	ES1537731-002	ES1537731-003	ES1537731-004	ES1537731-005
					Result	Result	Result	Result	Result
EP075A: Phenolic Compounds - Continued									
2,4-Dichlorophenol	120-83-2	0.5	mg/kg		<3.0	----	----	----	<0.5
2,6-Dichlorophenol	87-65-0	0.5	mg/kg		<3.0	----	----	----	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<3.0	----	----	----	<0.5
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg		<3.0	----	----	----	<0.5
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg		<3.0	----	----	----	<0.5
Pentachlorophenol	87-86-5	1	mg/kg		<6	----	----	----	<1
EP075B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<3.0	----	----	----	1.0
2-Methylnaphthalene	91-57-6	0.5	mg/kg		5.3	----	----	----	0.9
2-Chloronaphthalene	91-58-7	0.5	mg/kg		<3.0	----	----	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<3.0	----	----	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		15.3	----	----	----	2.2
Fluorene	86-73-7	0.5	mg/kg		7.1	----	----	----	1.0
Phenanthrene	85-01-8	0.5	mg/kg		57.9	----	----	----	9.9
Anthracene	120-12-7	0.5	mg/kg		12.3	----	----	----	2.2
Fluoranthene	206-44-0	0.5	mg/kg		148	----	----	----	27.3
Pyrene	129-00-0	0.5	mg/kg		126	----	----	----	24.1
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg		<3.0	----	----	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		132	----	----	----	21.7
Chrysene	218-01-9	0.5	mg/kg		116	----	----	----	19.9
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg		238	----	----	----	42
7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg		<3.0	----	----	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		124	----	----	----	22.9
3-Methylcholanthrene	56-49-5	0.5	mg/kg		<3.0	----	----	----	<0.5
Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg		56.3	----	----	----	9.0
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg		17.0	----	----	----	3.4
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg		59.5	----	----	----	9.4
^ Sum of PAHs	----	0.5	mg/kg		1110	----	----	----	196
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		185	----	----	----	33.9
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		185	----	----	----	33.9
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		185	----	----	----	33.9
EP075C: Phthalate Esters									
Dimethyl phthalate	131-11-3	0.5	mg/kg		<3.0	----	----	----	<0.5
Diethyl phthalate	84-66-2	0.5	mg/kg		<3.0	----	----	----	<0.5

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW201_3.0	MW201_6.0	MW201_9.0	MW202_2.0	MW202_6.5
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	
Compound	CAS Number	LOR	Unit	ES1537731-001	ES1537731-002	ES1537731-003	ES1537731-004	ES1537731-005	
				Result	Result	Result	Result	Result	
EP075C: Phthalate Esters - Continued									
Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<3.0	----	----	----	<0.5	
Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<3.0	----	----	----	<0.5	
bis(2-ethylhexyl) phthalate	117-81-7	5	mg/kg	<5.0	----	----	----	<5.0	
Di-n-octylphthalate	117-84-0	0.5	mg/kg	<3.0	----	----	----	<0.5	
EP075D: Nitrosamines									
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<3.0	----	----	----	<0.5	
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<3.0	----	----	----	<0.5	
N-Nitrosopyrrolidine	930-55-2	1	mg/kg	<3.0	----	----	----	<1.0	
N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<3.0	----	----	----	<0.5	
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<3.0	----	----	----	<0.5	
N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<3.0	----	----	----	<0.5	
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<3.0	----	----	----	<0.5	
N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	1	mg/kg	<6.0	----	----	----	<1.0	
Methapyrilene	91-80-5	0.5	mg/kg	<3.0	----	----	----	<0.5	
EP075E: Nitroaromatics and Ketones									
2-Picoline	109-06-8	0.5	mg/kg	<3.0	----	----	----	<0.5	
Acetophenone	98-86-2	0.5	mg/kg	<3.0	----	----	----	<0.5	
Nitrobenzene	98-95-3	0.5	mg/kg	<3.0	----	----	----	<0.5	
Isophorone	78-59-1	0.5	mg/kg	<3.0	----	----	----	<0.5	
2,6-Dinitrotoluene	606-20-2	1	mg/kg	<3.0	----	----	----	<1.0	
2,4-Dinitrotoluene	121-14-2	1	mg/kg	<3.0	----	----	----	<1.0	
1-Naphthylamine	134-32-7	0.5	mg/kg	<3.0	----	----	----	<0.5	
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<3.0	----	----	----	<0.5	
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<3.0	----	----	----	<0.5	
Azobenzene	103-33-3	1	mg/kg	<3	----	----	----	<1	
1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	<3.0	----	----	----	<0.5	
Phenacetin	62-44-2	0.5	mg/kg	<3.0	----	----	----	<0.5	
4-Aminobiphenyl	92-67-1	0.5	mg/kg	<3.0	----	----	----	<0.5	
Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<3.0	----	----	----	<0.5	
Pronamide	23950-58-5	0.5	mg/kg	<3.0	----	----	----	<0.5	
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<3.0	----	----	----	<0.5	
Chlorobenzilate	510-15-6	0.5	mg/kg	<3.0	----	----	----	<0.5	
EP075F: Haloethers									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW201_3.0	MW201_6.0	MW201_9.0	MW202_2.0	MW202_6.5
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1537731-001	ES1537731-002	ES1537731-003	ES1537731-004	ES1537731-005
					Result	Result	Result	Result	Result
EP075F: Haloethers - Continued									
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg		<3.0	----	----	----	<0.5
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg		<3.0	----	----	----	<0.5
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg		<3.0	----	----	----	<0.5
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg		<3.0	----	----	----	<0.5
EP075G: Chlorinated Hydrocarbons									
1,3-Dichlorobenzene	541-73-1	0.5	mg/kg		<3.0	----	----	----	<0.5
1,4-Dichlorobenzene	106-46-7	0.5	mg/kg		<3.0	----	----	----	<0.5
1,2-Dichlorobenzene	95-50-1	0.5	mg/kg		<3.0	----	----	----	<0.5
Hexachloroethane	67-72-1	0.5	mg/kg		<3.0	----	----	----	<0.5
1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg		<3.0	----	----	----	<0.5
Hexachloropropylene	1888-71-7	0.5	mg/kg		<3.0	----	----	----	<0.5
Hexachlorobutadiene	87-68-3	0.5	mg/kg		<3.0	----	----	----	<0.5
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg		<3.0	----	----	----	<2.5
Pentachlorobenzene	608-93-5	0.5	mg/kg		<3.0	----	----	----	<0.5
Hexachlorobenzene (HCB)	118-74-1	1	mg/kg		<3.0	----	----	----	<1.0
EP075H: Anilines and Benzidines									
Aniline	62-53-3	0.5	mg/kg		<3.0	----	----	----	<0.5
4-Chloroaniline	106-47-8	0.5	mg/kg		<3.0	----	----	----	<0.5
2-Nitroaniline	88-74-4	1	mg/kg		<3.0	----	----	----	<1.0
3-Nitroaniline	99-09-2	1	mg/kg		<3.0	----	----	----	<1.0
Dibenzofuran	132-64-9	0.5	mg/kg		7.3	----	----	----	1.1
4-Nitroaniline	100-01-6	0.5	mg/kg		<3.0	----	----	----	<0.5
Carbazole	86-74-8	0.5	mg/kg		10.6	----	----	----	1.7
3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg		<3.0	----	----	----	<0.5
EP075I: Organochlorine Pesticides									
alpha-BHC	319-84-6	0.5	mg/kg		<3.0	----	----	----	<0.5
beta-BHC	319-85-7	0.5	mg/kg		<3.0	----	----	----	<0.5
gamma-BHC	58-89-9	0.5	mg/kg		<3.0	----	----	----	<0.5
delta-BHC	319-86-8	0.5	mg/kg		<3.0	----	----	----	<0.5
Heptachlor	76-44-8	0.5	mg/kg		<3.0	----	----	----	<0.5
Aldrin	309-00-2	0.5	mg/kg		<3.0	----	----	----	<0.5
Heptachlor epoxide	1024-57-3	0.5	mg/kg		<3.0	----	----	----	<0.5
alpha-Endosulfan	959-98-8	0.5	mg/kg		<3.0	----	----	----	<0.5
4,4'-DDE	72-55-9	0.5	mg/kg		<3.0	----	----	----	<0.5



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW201_3.0	MW201_6.0	MW201_9.0	MW202_2.0	MW202_6.5
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1537731-001	ES1537731-002	ES1537731-003	ES1537731-004	ES1537731-005
				Result	Result	Result	Result	Result
EP075I: Organochlorine Pesticides - Continued								
Dieldrin	60-57-1	0.5	mg/kg	<3.0	----	----	----	<0.5
Endrin	72-20-8	0.5	mg/kg	<3.0	----	----	----	<0.5
beta-Endosulfan	33213-65-9	0.5	mg/kg	<3.0	----	----	----	<0.5
4,4'-DDD	72-54-8	0.5	mg/kg	<3.0	----	----	----	<0.5
Endosulfan sulfate	1031-07-8	0.5	mg/kg	<3.0	----	----	----	<0.5
4,4'-DDT	50-29-3	1	mg/kg	<3.0	----	----	----	<1.0
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	mg/kg	<2.4	----	----	----	<0.5
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	mg/kg	<2.4	----	----	----	<0.5
EP075J: Organophosphorus Pesticides								
Dichlorvos	62-73-7	0.5	mg/kg	<3.0	----	----	----	<0.5
Dimethoate	60-51-5	0.5	mg/kg	<3.0	----	----	----	<0.5
Diazinon	333-41-5	0.5	mg/kg	<3.0	----	----	----	<0.5
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<3.0	----	----	----	<0.5
Malathion	121-75-5	0.5	mg/kg	<3.0	----	----	----	<0.5
Fenthion	55-38-9	0.5	mg/kg	<3.0	----	----	----	<0.5
Chlorpyrifos	2921-88-2	0.5	mg/kg	<3.0	----	----	----	<0.5
Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<3.0	----	----	----	<0.5
Chlorfenvinphos	470-90-6	0.5	mg/kg	<3.0	----	----	----	<0.5
Prothiofos	34643-46-4	0.5	mg/kg	<3.0	----	----	----	<0.5
Ethion	563-12-2	0.5	mg/kg	<3.0	----	----	----	<0.5
EP075S: Acid Extractable Surrogates								
2-Fluorophenol	367-12-4	0.5	%	90.6	----	----	----	92.0
Phenol-d6	13127-88-3	0.5	%	82.4	----	----	----	94.7
2-Chlorophenol-D4	93951-73-6	0.5	%	82.5	----	----	----	95.6
2,4,6-Tribromophenol	118-79-6	0.5	%	56.2	----	----	----	76.0
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	0.5	%	73.4	----	----	----	82.8
1,2-Dichlorobenzene-D4	2199-69-1	0.5	%	80.6	----	----	----	88.2
2-Fluorobiphenyl	321-60-8	0.5	%	86.0	----	----	----	99.4
Anthracene-d10	1719-06-8	0.5	%	89.9	----	----	----	94.9
4-Terphenyl-d14	1718-51-0	0.5	%	88.0	----	----	----	98.5



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW202_9.8	MW203_2.5	MW203_7.0	MW203_9.0	MW204_2.5
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1537731-006	ES1537731-007	ES1537731-008	ES1537731-009	ES1537731-010
					Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		10.1	9.7	9.8	11.4	6.3
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		31.0	29.2	13.8	13.6	16.8
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		<0.2	<0.2	<0.2	0.4	<0.2
Exchangeable Magnesium	----	0.2	meq/100g		<0.2	<0.2	<0.2	<0.2	<0.2
Exchangeable Potassium	----	0.2	meq/100g		1.0	1.0	0.6	0.9	<0.2
Exchangeable Sodium	----	0.2	meq/100g		29.2	32.2	54.3	78.3	16.5
Cation Exchange Capacity	----	0.2	meq/100g		30.4	33.3	55.2	79.7	18.6
Exchangeable Calcium Percent	----	0.2	%		0.8	<0.2	0.4	0.6	10.7
Exchangeable Magnesium Percent	----	0.2	%		<0.2	<0.2	<0.2	<0.2	<0.2
Exchangeable Potassium Percent	----	0.2	%		3.3	3.1	1.2	1.1	0.7
Exchangeable Sodium Percent	----	0.2	%		95.8	96.9	98.4	98.2	88.6
Magnesium/Potassium Ratio	----	0.2	-		----	----	----	----	<0.2
Magnesium/Potassium Ratio	----	0.2	-		<0.2	<0.2	<0.2	<0.2	----
ED008: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g		----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g		----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g		----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g		----	----	----	----	----
ED093S: Soluble Major Cations									
Sodium	7440-23-5	10	mg/kg		2990	5960	4660	16400	8040
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	1	mg/kg		49	158	35	70	20
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		1500	3560	3120	21000	184
EP075A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		----	----	----	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		----	----	----	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		----	----	----	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg		----	----	----	<0.6	<0.6
2-Nitrophenol	88-75-5	0.5	mg/kg		----	----	----	<0.5	<0.5
2,4-Dimethylphenol	105-67-9	0.5	mg/kg		----	----	----	<0.5	<0.5



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW202_9.8	MW203_2.5	MW203_7.0	MW203_9.0	MW204_2.5
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1537731-006	ES1537731-007	ES1537731-008	ES1537731-009	ES1537731-010
					Result	Result	Result	Result	Result
EP075A: Phenolic Compounds - Continued									
2,4-Dichlorophenol	120-83-2	0.5	mg/kg		----	----	----	<0.5	<0.5
2,6-Dichlorophenol	87-65-0	0.5	mg/kg		----	----	----	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		----	----	----	<0.5	<0.5
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg		----	----	----	<0.5	<0.5
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg		----	----	----	<0.5	<0.5
Pentachlorophenol	87-86-5	1	mg/kg		----	----	----	<1	<1
EP075B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	----	----	<0.5	<0.5
2-Methylnaphthalene	91-57-6	0.5	mg/kg		----	----	----	<0.5	<0.5
2-Chloronaphthalene	91-58-7	0.5	mg/kg		----	----	----	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		----	----	----	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		----	----	----	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		----	----	----	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		----	----	----	<0.5	8.3
Anthracene	120-12-7	0.5	mg/kg		----	----	----	<0.5	1.0
Fluoranthene	206-44-0	0.5	mg/kg		----	----	----	0.5	47.0
Pyrene	129-00-0	0.5	mg/kg		----	----	----	<0.5	22.9
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	----	<0.5	19.5
Chrysene	218-01-9	0.5	mg/kg		----	----	----	<0.5	52.5
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg		----	----	----	<1	55
7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg		----	----	----	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	----	----	<0.5	5.1
3-Methylcholanthrene	56-49-5	0.5	mg/kg		----	----	----	<0.5	<0.5
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg		----	----	----	<0.5	5.6
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg		----	----	----	<0.5	2.6
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg		----	----	----	<0.5	5.4
^ Sum of PAHs	----	0.5	mg/kg		----	----	----	0.5	225
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	----	<0.5	16.3
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	----	0.6	16.3
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	----	1.2	16.3
EP075C: Phthalate Esters									
Dimethyl phthalate	131-11-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Diethyl phthalate	84-66-2	0.5	mg/kg		----	----	----	<0.5	<0.5

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW202_9.8	MW203_2.5	MW203_7.0	MW203_9.0	MW204_2.5
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1537731-006	ES1537731-007	ES1537731-008	ES1537731-009	ES1537731-010	
				Result	Result	Result	Result	Result	Result
EP075C: Phthalate Esters - Continued									
Di-n-butyl phthalate	84-74-2	0.5	mg/kg	----	----	----	<0.5	<0.5	
Butyl benzyl phthalate	85-68-7	0.5	mg/kg	----	----	----	<0.5	<0.5	
bis(2-ethylhexyl) phthalate	117-81-7	5	mg/kg	----	----	----	<5.0	<5.0	
Di-n-octylphthalate	117-84-0	0.5	mg/kg	----	----	----	<0.5	<0.5	
EP075D: Nitrosamines									
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	----	----	----	<0.5	<0.5	
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	----	----	----	<0.5	<0.5	
N-Nitrosopyrrolidine	930-55-2	1	mg/kg	----	----	----	<1.0	<1.0	
N-Nitrosomorpholine	59-89-2	0.5	mg/kg	----	----	----	<0.5	<0.5	
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	----	----	----	<0.5	<0.5	
N-Nitrosopiperidine	100-75-4	0.5	mg/kg	----	----	----	<0.5	<0.5	
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	----	----	----	<0.5	<0.5	
N-Nitrosodiphenyl & Diphenylamine	86-30-6	122-39-4	1	mg/kg	----	----	----	<1.0	<1.0
Methapyrilene	91-80-5	0.5	mg/kg	----	----	----	<0.5	<0.5	
EP075E: Nitroaromatics and Ketones									
2-Picoline	109-06-8	0.5	mg/kg	----	----	----	<0.5	<0.5	
Acetophenone	98-86-2	0.5	mg/kg	----	----	----	<0.5	<0.5	
Nitrobenzene	98-95-3	0.5	mg/kg	----	----	----	<0.5	<0.5	
Isophorone	78-59-1	0.5	mg/kg	----	----	----	<0.5	<0.5	
2,6-Dinitrotoluene	606-20-2	1	mg/kg	----	----	----	<1.0	<1.0	
2,4-Dinitrotoluene	121-14-2	1	mg/kg	----	----	----	<1.0	<1.0	
1-Naphthylamine	134-32-7	0.5	mg/kg	----	----	----	<0.5	<0.5	
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	----	----	----	<0.5	<0.5	
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	----	----	----	<0.5	<0.5	
Azobenzene	103-33-3	1	mg/kg	----	----	----	<1	<1	
1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	----	----	----	<0.5	<0.5	
Phenacetin	62-44-2	0.5	mg/kg	----	----	----	<0.5	<0.5	
4-Aminobiphenyl	92-67-1	0.5	mg/kg	----	----	----	<0.5	<0.5	
Pentachloronitrobenzene	82-68-8	0.5	mg/kg	----	----	----	<0.5	<0.5	
Pronamide	23950-58-5	0.5	mg/kg	----	----	----	<0.5	<0.5	
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	----	----	----	<0.5	<0.5	
Chlorobenzilate	510-15-6	0.5	mg/kg	----	----	----	<0.5	<0.5	
EP075F: Haloethers									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW202_9.8	MW203_2.5	MW203_7.0	MW203_9.0	MW204_2.5
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1537731-006	ES1537731-007	ES1537731-008	ES1537731-009	ES1537731-010
					Result	Result	Result	Result	Result
EP075F: Haloethers - Continued									
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg		----	----	----	<0.5	<0.5
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg		----	----	----	<0.5	<0.5
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg		----	----	----	<0.5	<0.5
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg		----	----	----	<0.5	<0.5
EP075G: Chlorinated Hydrocarbons									
1,3-Dichlorobenzene	541-73-1	0.5	mg/kg		----	----	----	<0.5	<0.5
1,4-Dichlorobenzene	106-46-7	0.5	mg/kg		----	----	----	<0.5	<0.5
1,2-Dichlorobenzene	95-50-1	0.5	mg/kg		----	----	----	<0.5	<0.5
Hexachloroethane	67-72-1	0.5	mg/kg		----	----	----	<0.5	<0.5
1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg		----	----	----	<0.5	<0.5
Hexachloropropylene	1888-71-7	0.5	mg/kg		----	----	----	<0.5	<0.5
Hexachlorobutadiene	87-68-3	0.5	mg/kg		----	----	----	<0.5	<0.5
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg		----	----	----	<2.5	<2.5
Pentachlorobenzene	608-93-5	0.5	mg/kg		----	----	----	<0.5	<0.5
Hexachlorobenzene (HCB)	118-74-1	1	mg/kg		----	----	----	<1.0	<1.0
EP075H: Anilines and Benzidines									
Aniline	62-53-3	0.5	mg/kg		----	----	----	<0.5	<0.5
4-Chloroaniline	106-47-8	0.5	mg/kg		----	----	----	<0.5	<0.5
2-Nitroaniline	88-74-4	1	mg/kg		----	----	----	<1.0	<1.0
3-Nitroaniline	99-09-2	1	mg/kg		----	----	----	<1.0	<1.0
Dibenzofuran	132-64-9	0.5	mg/kg		----	----	----	<0.5	<0.5
4-Nitroaniline	100-01-6	0.5	mg/kg		----	----	----	<0.5	<0.5
Carbazole	86-74-8	0.5	mg/kg		----	----	----	<0.5	1.1
3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg		----	----	----	<0.5	<0.5
EP075I: Organochlorine Pesticides									
alpha-BHC	319-84-6	0.5	mg/kg		----	----	----	<0.5	<0.5
beta-BHC	319-85-7	0.5	mg/kg		----	----	----	<0.5	<0.5
gamma-BHC	58-89-9	0.5	mg/kg		----	----	----	<0.5	<0.5
delta-BHC	319-86-8	0.5	mg/kg		----	----	----	<0.5	<0.5
Heptachlor	76-44-8	0.5	mg/kg		----	----	----	<0.5	<0.5
Aldrin	309-00-2	0.5	mg/kg		----	----	----	<0.5	<0.5
Heptachlor epoxide	1024-57-3	0.5	mg/kg		----	----	----	<0.5	<0.5
alpha-Endosulfan	959-98-8	0.5	mg/kg		----	----	----	<0.5	<0.5
4,4'-DDE	72-55-9	0.5	mg/kg		----	----	----	<0.5	<0.5



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW202_9.8	MW203_2.5	MW203_7.0	MW203_9.0	MW204_2.5
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1537731-006	ES1537731-007	ES1537731-008	ES1537731-009	ES1537731-010
					Result	Result	Result	Result	Result
EP075I: Organochlorine Pesticides - Continued									
Dieldrin	60-57-1	0.5	mg/kg		----	----	----	<0.5	<0.5
Endrin	72-20-8	0.5	mg/kg		----	----	----	<0.5	<0.5
beta-Endosulfan	33213-65-9	0.5	mg/kg		----	----	----	<0.5	<0.5
4.4`-DDD	72-54-8	0.5	mg/kg		----	----	----	<0.5	<0.5
Endosulfan sulfate	1031-07-8	0.5	mg/kg		----	----	----	<0.5	<0.5
4.4`-DDT	50-29-3	1	mg/kg		----	----	----	<1.0	<1.0
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	mg/kg		----	----	----	<0.5	<0.5
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	mg/kg		----	----	----	<0.5	<0.5
EP075J: Organophosphorus Pesticides									
Dichlorvos	62-73-7	0.5	mg/kg		----	----	----	<0.5	<0.5
Dimethoate	60-51-5	0.5	mg/kg		----	----	----	<0.5	<0.5
Diazinon	333-41-5	0.5	mg/kg		----	----	----	<0.5	<0.5
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg		----	----	----	<0.5	<0.5
Malathion	121-75-5	0.5	mg/kg		----	----	----	<0.5	<0.5
Fenthion	55-38-9	0.5	mg/kg		----	----	----	<0.5	<0.5
Chlorpyrifos	2921-88-2	0.5	mg/kg		----	----	----	<0.5	<0.5
Pirimphos-ethyl	23505-41-1	0.5	mg/kg		----	----	----	<0.5	<0.5
Chlorfenvinphos	470-90-6	0.5	mg/kg		----	----	----	<0.5	<0.5
Prothiofos	34643-46-4	0.5	mg/kg		----	----	----	<0.5	<0.5
Ethion	563-12-2	0.5	mg/kg		----	----	----	<0.5	<0.5
EP075S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.5	%		----	----	----	99.0	106
Phenol-d6	13127-88-3	0.5	%		----	----	----	97.9	99.5
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	88.3	98.3
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	----	57.0	100
EP075T: Base/Neutral Extractable Surrogates									
Nitrobenzene-D5	4165-60-0	0.5	%		----	----	----	84.2	84.8
1.2-Dichlorobenzene-D4	2199-69-1	0.5	%		----	----	----	89.0	90.8
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	99.2	94.2
Anthracene-d10	1719-06-8	0.5	%		----	----	----	60.2	98.7
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	59.7	108



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW204_6.0 MW204_	MW204_9.0 MW204_11.0	MW205_5.5	MW205_9.0	MW205_11.3
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1537731-011	ES1537731-012	ES1537731-013	ES1537731-014	ES1537731-015
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	10.7	11.3	8.3	10.7	9.4
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	15.6	13.8	11.1	8.6	11.4
ED006: Exchangeable Cations on Alkaline Soils								
Exchangeable Calcium	----	0.2	meq/100g	<0.2	<0.2	<0.2	<0.2	<0.2
Exchangeable Magnesium	----	0.2	meq/100g	<0.2	<0.2	<0.2	<0.2	<0.2
Exchangeable Potassium	----	0.2	meq/100g	0.6	0.6	<0.2	<0.2	0.5
Exchangeable Sodium	----	0.2	meq/100g	63.2	76.4	4.6	17.5	23.0
Cation Exchange Capacity	----	0.2	meq/100g	63.9	77.5	5.0	17.9	23.5
Exchangeable Calcium Percent	----	0.2	%	<0.2	0.3	5.0	1.4	<0.2
Exchangeable Magnesium Percent	----	0.2	%	<0.2	<0.2	<0.2	<0.2	<0.2
Exchangeable Potassium Percent	----	0.2	%	1.0	0.8	2.6	0.7	2.2
Exchangeable Sodium Percent	----	0.2	%	99.0	98.8	92.3	97.9	97.8
Magnesium/Potassium Ratio	----	0.2	-	----	----	<0.2	<0.2	----
Magnesium/Potassium Ratio	----	0.2	-	<0.2	<0.2	----	----	<0.2
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	----
ED093S: Soluble Major Cations								
Sodium	7440-23-5	10	mg/kg	16400	18000	1510	7250	3870
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	1	mg/kg	72	45	77	56	71
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	10500	18400	1240	12700	1740
EP075A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	----	----	----	----	<3.0
2-Chlorophenol	95-57-8	0.5	mg/kg	----	----	----	----	<3.0
2-Methylphenol	95-48-7	0.5	mg/kg	----	----	----	----	<3.0
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	----	----	----	----	<6.0
2-Nitrophenol	88-75-5	0.5	mg/kg	----	----	----	----	<3.0
2,4-Dimethylphenol	105-67-9	0.5	mg/kg	----	----	----	----	<3.0



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW204_6.0 MW204_	MW204_9.0 MW204_11.0	MW205_5.5	MW205_9.0	MW205_11.3
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1537731-011	ES1537731-012	ES1537731-013	ES1537731-014	ES1537731-015
				Result	Result	Result	Result	Result
EP075A: Phenolic Compounds - Continued								
2,4-Dichlorophenol	120-83-2	0.5	mg/kg	----	----	----	----	<3.0
2,6-Dichlorophenol	87-65-0	0.5	mg/kg	----	----	----	----	<3.0
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	----	----	----	<3.0
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	----	----	----	----	<3.0
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	----	----	----	----	<3.0
Pentachlorophenol	87-86-5	1	mg/kg	----	----	----	----	<6
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	3.8
2-Methylnaphthalene	91-57-6	0.5	mg/kg	----	----	----	----	7.4
2-Chloronaphthalene	91-58-7	0.5	mg/kg	----	----	----	----	<3.0
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	<3.0
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	27.0
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	9.9
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	186
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	44.8
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	739
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	706
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	----	----	----	----	<3.0
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	731
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	626
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	----	----	----	----	1330
7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	----	----	----	----	<3.0
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	832
3-Methylcholanthrene	56-49-5	0.5	mg/kg	----	----	----	----	15.5
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	442
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	116
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	528
^ Sum of PAHs	----	0.5	mg/kg	----	----	----	----	6320
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	1210
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	1210
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	1210
EP075C: Phthalate Esters								
Dimethyl phthalate	131-11-3	0.5	mg/kg	----	----	----	----	<3.0



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW204_6.0 MW204_	MW204_9.0 MW204_11.0	MW205_5.5	MW205_9.0	MW205_11.3
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1537731-011	ES1537731-012	ES1537731-013	ES1537731-014	ES1537731-015
				Result	Result	Result	Result	Result
EP075C: Phthalate Esters - Continued								
Diethyl phthalate	84-66-2	0.5	mg/kg	----	----	----	----	<3.0
Di-n-butyl phthalate	84-74-2	0.5	mg/kg	----	----	----	----	<3.0
Butyl benzyl phthalate	85-68-7	0.5	mg/kg	----	----	----	----	<3.0
bis(2-ethylhexyl) phthalate	117-81-7	5	mg/kg	----	----	----	----	<5.0
Di-n-octylphthalate	117-84-0	0.5	mg/kg	----	----	----	----	<3.0
EP075D: Nitrosamines								
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	----	----	----	----	<3.0
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	----	----	----	----	<3.0
N-Nitrosopyrrolidine	930-55-2	1	mg/kg	----	----	----	----	<3.0
N-Nitrosomorpholine	59-89-2	0.5	mg/kg	----	----	----	----	<3.0
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	----	----	----	----	<3.0
N-Nitrosopiperidine	100-75-4	0.5	mg/kg	----	----	----	----	<3.0
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	----	----	----	----	<3.0
N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	1	mg/kg	----	----	----	----	<6.0
Methapyrilene	91-80-5	0.5	mg/kg	----	----	----	----	<3.0
EP075E: Nitroaromatics and Ketones								
2-Picoline	109-06-8	0.5	mg/kg	----	----	----	----	<3.0
Acetophenone	98-86-2	0.5	mg/kg	----	----	----	----	<3.0
Nitrobenzene	98-95-3	0.5	mg/kg	----	----	----	----	<3.0
Isophorone	78-59-1	0.5	mg/kg	----	----	----	----	<3.0
2,6-Dinitrotoluene	606-20-2	1	mg/kg	----	----	----	----	<3.0
2,4-Dinitrotoluene	121-14-2	1	mg/kg	----	----	----	----	<3.0
1-Naphthylamine	134-32-7	0.5	mg/kg	----	----	----	----	<3.0
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	----	----	----	----	<3.0
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	----	----	----	----	<3.0
Azobenzene	103-33-3	1	mg/kg	----	----	----	----	<3
1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	----	----	----	----	<3.0
Phenacetin	62-44-2	0.5	mg/kg	----	----	----	----	<3.0
4-Aminobiphenyl	92-67-1	0.5	mg/kg	----	----	----	----	<3.0
Pentachloronitrobenzene	82-68-8	0.5	mg/kg	----	----	----	----	<3.0
Pronamide	23950-58-5	0.5	mg/kg	----	----	----	----	<3.0
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	----	----	----	----	<3.0
Chlorobenzilate	510-15-6	0.5	mg/kg	----	----	----	----	<3.0



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW204_6.0 MW204_	MW204_9.0 MW204_11.0	MW205_5.5	MW205_9.0	MW205_11.3
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1537731-011	ES1537731-012	ES1537731-013	ES1537731-014	ES1537731-015
				Result	Result	Result	Result	Result
EP075F: Haloethers								
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	----	----	----	----	<3.0
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	----	----	----	----	<3.0
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	----	----	----	----	<3.0
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	----	----	----	----	<3.0
EP075G: Chlorinated Hydrocarbons								
1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	----	----	----	----	<3.0
1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	----	----	----	----	<3.0
1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	----	----	----	----	<3.0
Hexachloroethane	67-72-1	0.5	mg/kg	----	----	----	----	<3.0
1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	----	----	----	----	<3.0
Hexachloropropylene	1888-71-7	0.5	mg/kg	----	----	----	----	<3.0
Hexachlorobutadiene	87-68-3	0.5	mg/kg	----	----	----	----	<3.0
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	----	----	----	----	<3.0
Pentachlorobenzene	608-93-5	0.5	mg/kg	----	----	----	----	<3.0
Hexachlorobenzene (HCB)	118-74-1	1	mg/kg	----	----	----	----	<3.0
EP075H: Anilines and Benzidines								
Aniline	62-53-3	0.5	mg/kg	----	----	----	----	<3.0
4-Chloroaniline	106-47-8	0.5	mg/kg	----	----	----	----	<3.0
2-Nitroaniline	88-74-4	1	mg/kg	----	----	----	----	<3.0
3-Nitroaniline	99-09-2	1	mg/kg	----	----	----	----	<3.0
Dibenzofuran	132-64-9	0.5	mg/kg	----	----	----	----	7.5
4-Nitroaniline	100-01-6	0.5	mg/kg	----	----	----	----	<3.0
Carbazole	86-74-8	0.5	mg/kg	----	----	----	----	46.7
3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg	----	----	----	----	<3.0
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	mg/kg	----	----	----	----	<3.0
beta-BHC	319-85-7	0.5	mg/kg	----	----	----	----	<3.0
gamma-BHC	58-89-9	0.5	mg/kg	----	----	----	----	<3.0
delta-BHC	319-86-8	0.5	mg/kg	----	----	----	----	<3.0
Heptachlor	76-44-8	0.5	mg/kg	----	----	----	----	<3.0
Aldrin	309-00-2	0.5	mg/kg	----	----	----	----	<3.0
Heptachlor epoxide	1024-57-3	0.5	mg/kg	----	----	----	----	<3.0
alpha-Endosulfan	959-98-8	0.5	mg/kg	----	----	----	----	<3.0
4,4'-DDE	72-55-9	0.5	mg/kg	----	----	----	----	<3.0



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW204_6.0 MW204_	MW204_9.0 MW204_11.0	MW205_5.5	MW205_9.0	MW205_11.3
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1537731-011	ES1537731-012	ES1537731-013	ES1537731-014	ES1537731-015
				Result	Result	Result	Result	Result
EP075I: Organochlorine Pesticides - Continued								
Dieldrin	60-57-1	0.5	mg/kg	----	----	----	----	<3.0
Endrin	72-20-8	0.5	mg/kg	----	----	----	----	<3.0
beta-Endosulfan	33213-65-9	0.5	mg/kg	----	----	----	----	<3.0
4,4'-DDD	72-54-8	0.5	mg/kg	----	----	----	----	<3.0
Endosulfan sulfate	1031-07-8	0.5	mg/kg	----	----	----	----	<3.0
4,4'-DDT	50-29-3	1	mg/kg	----	----	----	----	<3.0
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.5	mg/kg	----	----	----	----	<2.4
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	mg/kg	----	----	----	----	<2.4
EP075J: Organophosphorus Pesticides								
Dichlorvos	62-73-7	0.5	mg/kg	----	----	----	----	<3.0
Dimethoate	60-51-5	0.5	mg/kg	----	----	----	----	<3.0
Diazinon	333-41-5	0.5	mg/kg	----	----	----	----	<3.0
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	----	----	----	----	<3.0
Malathion	121-75-5	0.5	mg/kg	----	----	----	----	<3.0
Fenthion	55-38-9	0.5	mg/kg	----	----	----	----	<3.0
Chlorpyrifos	2921-88-2	0.5	mg/kg	----	----	----	----	<3.0
Pirimphos-ethyl	23505-41-1	0.5	mg/kg	----	----	----	----	<3.0
Chlorfenvinphos	470-90-6	0.5	mg/kg	----	----	----	----	<3.0
Prothiofos	34643-46-4	0.5	mg/kg	----	----	----	----	<3.0
Ethion	563-12-2	0.5	mg/kg	----	----	----	----	<3.0
EP075S: Acid Extractable Surrogates								
2-Fluorophenol	367-12-4	0.5	%	----	----	----	----	90.0
Phenol-d6	13127-88-3	0.5	%	----	----	----	----	83.7
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	----	----	78.2
2,4,6-Tribromophenol	118-79-6	0.5	%	----	----	----	----	49.7
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	0.5	%	----	----	----	----	74.4
1,2-Dichlorobenzene-D4	2199-69-1	0.5	%	----	----	----	----	81.4
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	----	----	86.8
Anthracene-d10	1719-06-8	0.5	%	----	----	----	----	89.9
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	----	----	97.5



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW206_3.0	MW206_7.0	MW206_11.0	QA100	QA101
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1537731-016	ES1537731-017	ES1537731-018	ES1537731-019	ES1537731-020
				Result	Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		10.4	9.6	9.8	9.4	6.4
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		21.5	16.6	20.9	21.6	21.8
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		<0.2	<0.2	<0.2	<0.2	----
Exchangeable Magnesium	----	0.2	meq/100g		<0.2	<0.2	<0.2	<0.2	----
Exchangeable Potassium	----	0.2	meq/100g		1.6	1.0	1.9	1.2	----
Exchangeable Sodium	----	0.2	meq/100g		68.8	38.5	53.4	34.4	----
Cation Exchange Capacity	----	0.2	meq/100g		70.7	39.6	55.8	36.1	----
Exchangeable Calcium Percent	----	0.2	%		0.4	<0.2	0.4	1.4	----
Exchangeable Magnesium Percent	----	0.2	%		<0.2	<0.2	<0.2	<0.2	----
Exchangeable Potassium Percent	----	0.2	%		2.4	2.6	3.4	3.2	----
Exchangeable Sodium Percent	----	0.2	%		97.3	97.4	96.1	95.4	----
Magnesium/Potassium Ratio	----	0.2	-		----	----	----	----	----
Magnesium/Potassium Ratio	----	0.2	-		<0.2	<0.2	<0.2	<0.2	----
ED008: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	----	----	----	22.8
Exchangeable Magnesium	----	0.1	meq/100g		----	----	----	----	0.2
Exchangeable Potassium	----	0.1	meq/100g		----	----	----	----	0.1
Exchangeable Sodium	----	0.1	meq/100g		----	----	----	----	17.5
Cation Exchange Capacity	----	0.1	meq/100g		----	----	----	----	42.8
ED093S: Soluble Major Cations									
Sodium	7440-23-5	10	mg/kg		12200	2960	5450	3260	6770
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	1	mg/kg		139	110	57	142	23
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		5470	2390	2410	2610	192
EP075A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		----	----	<3.0	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg		----	----	<3.0	----	----
2-Methylphenol	95-48-7	0.5	mg/kg		----	----	<3.0	----	----
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg		----	----	<6.0	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg		----	----	<3.0	----	----
2,4-Dimethylphenol	105-67-9	0.5	mg/kg		----	----	<3.0	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW206_3.0	MW206_7.0	MW206_11.0	QA100	QA101
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1537731-016	ES1537731-017	ES1537731-018	ES1537731-019	ES1537731-020
				Result	Result	Result	Result	Result
EP075A: Phenolic Compounds - Continued								
2,4-Dichlorophenol	120-83-2	0.5	mg/kg	----	----	<3.0	----	----
2,6-Dichlorophenol	87-65-0	0.5	mg/kg	----	----	<3.0	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	----	<3.0	----	----
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	----	----	<3.0	----	----
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	----	----	<3.0	----	----
Pentachlorophenol	87-86-5	1	mg/kg	----	----	<6	----	----
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	8.1	----	----
2-Methylnaphthalene	91-57-6	0.5	mg/kg	----	----	31.0	----	----
2-Chloronaphthalene	91-58-7	0.5	mg/kg	----	----	<3.0	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	<3.0	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	41.7	----	----
Fluorene	86-73-7	0.5	mg/kg	----	----	25.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	212	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	105	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	508	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	449	----	----
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	----	----	<3.0	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	550	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	448	----	----
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	----	----	990	----	----
7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	----	----	<3.0	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	536	----	----
3-Methylcholanthrene	56-49-5	0.5	mg/kg	----	----	13.7	----	----
Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	270	----	----
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	----	----	78.1	----	----
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	----	----	284	----	----
^ Sum of PAHs	----	0.5	mg/kg	----	----	4500	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	802	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	802	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	802	----	----
EP075C: Phthalate Esters								
Dimethyl phthalate	131-11-3	0.5	mg/kg	----	----	<3.0	----	----
Diethyl phthalate	84-66-2	0.5	mg/kg	----	----	<3.0	----	----

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW206_3.0	MW206_7.0	MW206_11.0	QA100	QA101
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	
Compound	CAS Number	LOR	Unit	ES1537731-016	ES1537731-017	ES1537731-018	ES1537731-019	ES1537731-020	
				Result	Result	Result	Result	Result	
EP075C: Phthalate Esters - Continued									
Di-n-butyl phthalate	84-74-2	0.5	mg/kg	----	----	<3.0	----	----	
Butyl benzyl phthalate	85-68-7	0.5	mg/kg	----	----	<3.0	----	----	
bis(2-ethylhexyl) phthalate	117-81-7	5	mg/kg	----	----	<5.0	----	----	
Di-n-octylphthalate	117-84-0	0.5	mg/kg	----	----	<3.0	----	----	
EP075D: Nitrosamines									
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	----	----	<3.0	----	----	
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	----	----	<3.0	----	----	
N-Nitrosopyrrolidine	930-55-2	1	mg/kg	----	----	<3.0	----	----	
N-Nitrosomorpholine	59-89-2	0.5	mg/kg	----	----	<3.0	----	----	
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	----	----	<3.0	----	----	
N-Nitrosopiperidine	100-75-4	0.5	mg/kg	----	----	<3.0	----	----	
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	----	----	<3.0	----	----	
N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	1	mg/kg	----	----	<6.0	----	----	
Methapyrilene	91-80-5	0.5	mg/kg	----	----	<3.0	----	----	
EP075E: Nitroaromatics and Ketones									
2-Picoline	109-06-8	0.5	mg/kg	----	----	<3.0	----	----	
Acetophenone	98-86-2	0.5	mg/kg	----	----	<3.0	----	----	
Nitrobenzene	98-95-3	0.5	mg/kg	----	----	<3.0	----	----	
Isophorone	78-59-1	0.5	mg/kg	----	----	<3.0	----	----	
2,6-Dinitrotoluene	606-20-2	1	mg/kg	----	----	<3.0	----	----	
2,4-Dinitrotoluene	121-14-2	1	mg/kg	----	----	<3.0	----	----	
1-Naphthylamine	134-32-7	0.5	mg/kg	----	----	<3.0	----	----	
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	----	----	<3.0	----	----	
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	----	----	<3.0	----	----	
Azobenzene	103-33-3	1	mg/kg	----	----	<3	----	----	
1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	----	----	<3.0	----	----	
Phenacetin	62-44-2	0.5	mg/kg	----	----	<3.0	----	----	
4-Aminobiphenyl	92-67-1	0.5	mg/kg	----	----	<3.0	----	----	
Pentachloronitrobenzene	82-68-8	0.5	mg/kg	----	----	<3.0	----	----	
Pronamide	23950-58-5	0.5	mg/kg	----	----	<3.0	----	----	
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	----	----	<3.0	----	----	
Chlorobenzilate	510-15-6	0.5	mg/kg	----	----	<3.0	----	----	
EP075F: Haloethers									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW206_3.0	MW206_7.0	MW206_11.0	QA100	QA101
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1537731-016	ES1537731-017	ES1537731-018	ES1537731-019	ES1537731-020
					Result	Result	Result	Result	Result
EP075F: Haloethers - Continued									
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg		----	----	<3.0	----	----
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg		----	----	<3.0	----	----
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg		----	----	<3.0	----	----
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg		----	----	<3.0	----	----
EP075G: Chlorinated Hydrocarbons									
1,3-Dichlorobenzene	541-73-1	0.5	mg/kg		----	----	<3.0	----	----
1,4-Dichlorobenzene	106-46-7	0.5	mg/kg		----	----	<3.0	----	----
1,2-Dichlorobenzene	95-50-1	0.5	mg/kg		----	----	<3.0	----	----
Hexachloroethane	67-72-1	0.5	mg/kg		----	----	<3.0	----	----
1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg		----	----	<3.0	----	----
Hexachloropropylene	1888-71-7	0.5	mg/kg		----	----	<3.0	----	----
Hexachlorobutadiene	87-68-3	0.5	mg/kg		----	----	<3.0	----	----
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg		----	----	<3.0	----	----
Pentachlorobenzene	608-93-5	0.5	mg/kg		----	----	<3.0	----	----
Hexachlorobenzene (HCB)	118-74-1	1	mg/kg		----	----	<3.0	----	----
EP075H: Anilines and Benzidines									
Aniline	62-53-3	0.5	mg/kg		----	----	<3.0	----	----
4-Chloroaniline	106-47-8	0.5	mg/kg		----	----	<3.0	----	----
2-Nitroaniline	88-74-4	1	mg/kg		----	----	<3.0	----	----
3-Nitroaniline	99-09-2	1	mg/kg		----	----	<3.0	----	----
Dibenzofuran	132-64-9	0.5	mg/kg		----	----	44.4	----	----
4-Nitroaniline	100-01-6	0.5	mg/kg		----	----	<3.0	----	----
Carbazole	86-74-8	0.5	mg/kg		----	----	50.5	----	----
3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg		----	----	<3.0	----	----
EP075I: Organochlorine Pesticides									
alpha-BHC	319-84-6	0.5	mg/kg		----	----	<3.0	----	----
beta-BHC	319-85-7	0.5	mg/kg		----	----	<3.0	----	----
gamma-BHC	58-89-9	0.5	mg/kg		----	----	<3.0	----	----
delta-BHC	319-86-8	0.5	mg/kg		----	----	<3.0	----	----
Heptachlor	76-44-8	0.5	mg/kg		----	----	<3.0	----	----
Aldrin	309-00-2	0.5	mg/kg		----	----	<3.0	----	----
Heptachlor epoxide	1024-57-3	0.5	mg/kg		----	----	<3.0	----	----
alpha-Endosulfan	959-98-8	0.5	mg/kg		----	----	<3.0	----	----
4,4'-DDE	72-55-9	0.5	mg/kg		----	----	<3.0	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW206_3.0	MW206_7.0	MW206_11.0	QA100	QA101
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1537731-016	ES1537731-017	ES1537731-018	ES1537731-019	ES1537731-020
				Result	Result	Result	Result	Result
EP075I: Organochlorine Pesticides - Continued								
Dieldrin	60-57-1	0.5	mg/kg	----	----	<3.0	----	----
Endrin	72-20-8	0.5	mg/kg	----	----	<3.0	----	----
beta-Endosulfan	33213-65-9	0.5	mg/kg	----	----	<3.0	----	----
4,4`-DDD	72-54-8	0.5	mg/kg	----	----	<3.0	----	----
Endosulfan sulfate	1031-07-8	0.5	mg/kg	----	----	<3.0	----	----
4,4`-DDT	50-29-3	1	mg/kg	----	----	<3.0	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.5	mg/kg	----	----	<2.4	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	mg/kg	----	----	<2.4	----	----
EP075J: Organophosphorus Pesticides								
Dichlorvos	62-73-7	0.5	mg/kg	----	----	<3.0	----	----
Dimethoate	60-51-5	0.5	mg/kg	----	----	<3.0	----	----
Diazinon	333-41-5	0.5	mg/kg	----	----	<3.0	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	----	----	<3.0	----	----
Malathion	121-75-5	0.5	mg/kg	----	----	<3.0	----	----
Fenthion	55-38-9	0.5	mg/kg	----	----	<3.0	----	----
Chlorpyrifos	2921-88-2	0.5	mg/kg	----	----	<3.0	----	----
Pirimphos-ethyl	23505-41-1	0.5	mg/kg	----	----	<3.0	----	----
Chlorfenvinphos	470-90-6	0.5	mg/kg	----	----	<3.0	----	----
Prothiofos	34643-46-4	0.5	mg/kg	----	----	<3.0	----	----
Ethion	563-12-2	0.5	mg/kg	----	----	<3.0	----	----
EP075S: Acid Extractable Surrogates								
2-Fluorophenol	367-12-4	0.5	%	----	----	95.6	----	----
Phenol-d6	13127-88-3	0.5	%	----	----	83.1	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	85.9	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%	----	----	49.2	----	----
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	0.5	%	----	----	74.5	----	----
1,2-Dichlorobenzene-D4	2199-69-1	0.5	%	----	----	84.5	----	----
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	91.9	----	----
Anthracene-d10	1719-06-8	0.5	%	----	----	95.0	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	91.1	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	REFRACTORY COMPOSITE	----	----	----	----
Client sampling date / time					[02-Dec-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1537731-021	Result	Result	Result	Result	Result
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit	6.6	----	----	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%	<1.0	----	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g	----	----	----	----	----	----
Exchangeable Magnesium	----	0.2	meq/100g	----	----	----	----	----	----
Exchangeable Potassium	----	0.2	meq/100g	----	----	----	----	----	----
Exchangeable Sodium	----	0.2	meq/100g	----	----	----	----	----	----
Cation Exchange Capacity	----	0.2	meq/100g	----	----	----	----	----	----
Exchangeable Calcium Percent	----	0.2	%	----	----	----	----	----	----
Exchangeable Magnesium Percent	----	0.2	%	----	----	----	----	----	----
Exchangeable Potassium Percent	----	0.2	%	----	----	----	----	----	----
Exchangeable Sodium Percent	----	0.2	%	----	----	----	----	----	----
Magnesium/Potassium Ratio	----	0.2	-	----	----	----	----	----	----
Magnesium/Potassium Ratio	----	0.2	-	----	----	----	----	----	----
ED008: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g	0.8	----	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	<0.1	----	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	<0.1	----	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	0.1	----	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	1.0	----	----	----	----	----
ED093S: Soluble Major Cations									
Sodium	7440-23-5	10	mg/kg	40	----	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	1	mg/kg	<1	----	----	----	----	----
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg	7	----	----	----	----	----
EP075A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg	----	----	----	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	----	----	----	----	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	----	----	----	----	----	----
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	----	----	----	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	----	----	----	----	----	----
2,4-Dimethylphenol	105-67-9	0.5	mg/kg	----	----	----	----	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				REFRACTORY COMPOSITE	----	----	----	----
Client sampling date / time				[02-Dec-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1537731-021	-----	-----	-----	-----
				Result	Result	Result	Result	Result
EP075A: Phenolic Compounds - Continued								
2,4-Dichlorophenol	120-83-2	0.5	mg/kg	----	----	----	----	----
2,6-Dichlorophenol	87-65-0	0.5	mg/kg	----	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	----	----	----	----	----
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	----	----	----	----	----
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	----	----	----	----	----
Pentachlorophenol	87-86-5	1	mg/kg	----	----	----	----	----
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	----	----
2-Methylnaphthalene	91-57-6	0.5	mg/kg	----	----	----	----	----
2-Chloronaphthalene	91-58-7	0.5	mg/kg	----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	----
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	----
Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	----	----	----	----	----
7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	----
3-Methylcholanthrene	56-49-5	0.5	mg/kg	----	----	----	----	----
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	----
^ Sum of PAHs	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	----	----
EP075C: Phthalate Esters								
Dimethyl phthalate	131-11-3	0.5	mg/kg	----	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	REFRACTORY COMPOSITE	----	----	----	----
Client sampling date / time					[02-Dec-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1537731-021	-----	-----	-----	-----
				Result	Result	Result	Result	Result	Result
EP075C: Phthalate Esters - Continued									
Diethyl phthalate	84-66-2	0.5	mg/kg		----	----	----	----	----
Di-n-butyl phthalate	84-74-2	0.5	mg/kg		----	----	----	----	----
Butyl benzyl phthalate	85-68-7	0.5	mg/kg		----	----	----	----	----
bis(2-ethylhexyl) phthalate	117-81-7	5	mg/kg		----	----	----	----	----
Di-n-octylphthalate	117-84-0	0.5	mg/kg		----	----	----	----	----
EP075D: Nitrosamines									
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg		----	----	----	----	----
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg		----	----	----	----	----
N-Nitrosopyrrolidine	930-55-2	1	mg/kg		----	----	----	----	----
N-Nitrosomorpholine	59-89-2	0.5	mg/kg		----	----	----	----	----
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg		----	----	----	----	----
N-Nitrosopiperidine	100-75-4	0.5	mg/kg		----	----	----	----	----
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg		----	----	----	----	----
N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	1	mg/kg		----	----	----	----	----
Methapyrilene	91-80-5	0.5	mg/kg		----	----	----	----	----
EP075E: Nitroaromatics and Ketones									
2-Picoline	109-06-8	0.5	mg/kg		----	----	----	----	----
Acetophenone	98-86-2	0.5	mg/kg		----	----	----	----	----
Nitrobenzene	98-95-3	0.5	mg/kg		----	----	----	----	----
Isophorone	78-59-1	0.5	mg/kg		----	----	----	----	----
2,6-Dinitrotoluene	606-20-2	1	mg/kg		----	----	----	----	----
2,4-Dinitrotoluene	121-14-2	1	mg/kg		----	----	----	----	----
1-Naphthylamine	134-32-7	0.5	mg/kg		----	----	----	----	----
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg		----	----	----	----	----
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg		----	----	----	----	----
Azobenzene	103-33-3	1	mg/kg		----	----	----	----	----
1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg		----	----	----	----	----
Phenacetin	62-44-2	0.5	mg/kg		----	----	----	----	----
4-Aminobiphenyl	92-67-1	0.5	mg/kg		----	----	----	----	----
Pentachloronitrobenzene	82-68-8	0.5	mg/kg		----	----	----	----	----
Pronamide	23950-58-5	0.5	mg/kg		----	----	----	----	----
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg		----	----	----	----	----
Chlorobenzilate	510-15-6	0.5	mg/kg		----	----	----	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				REFRACTORY COMPOSITE	----	----	----	----
Client sampling date / time				[02-Dec-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1537731-021	-----	-----	-----	-----
				Result	Result	Result	Result	Result
EP075F: Haloethers								
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	----	----	----	----	----
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	----	----	----	----	----
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	----	----	----	----	----
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	----	----	----	----	----
EP075G: Chlorinated Hydrocarbons								
1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	----	----	----	----	----
1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	----	----	----	----	----
1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	----	----	----	----	----
Hexachloroethane	67-72-1	0.5	mg/kg	----	----	----	----	----
1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	----	----	----	----	----
Hexachloropropylene	1888-71-7	0.5	mg/kg	----	----	----	----	----
Hexachlorobutadiene	87-68-3	0.5	mg/kg	----	----	----	----	----
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	----	----	----	----	----
Pentachlorobenzene	608-93-5	0.5	mg/kg	----	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	1	mg/kg	----	----	----	----	----
EP075H: Anilines and Benzidines								
Aniline	62-53-3	0.5	mg/kg	----	----	----	----	----
4-Chloroaniline	106-47-8	0.5	mg/kg	----	----	----	----	----
2-Nitroaniline	88-74-4	1	mg/kg	----	----	----	----	----
3-Nitroaniline	99-09-2	1	mg/kg	----	----	----	----	----
Dibenzofuran	132-64-9	0.5	mg/kg	----	----	----	----	----
4-Nitroaniline	100-01-6	0.5	mg/kg	----	----	----	----	----
Carbazole	86-74-8	0.5	mg/kg	----	----	----	----	----
3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg	----	----	----	----	----
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	mg/kg	----	----	----	----	----
beta-BHC	319-85-7	0.5	mg/kg	----	----	----	----	----
gamma-BHC	58-89-9	0.5	mg/kg	----	----	----	----	----
delta-BHC	319-86-8	0.5	mg/kg	----	----	----	----	----
Heptachlor	76-44-8	0.5	mg/kg	----	----	----	----	----
Aldrin	309-00-2	0.5	mg/kg	----	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	mg/kg	----	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	mg/kg	----	----	----	----	----
4,4'-DDE	72-55-9	0.5	mg/kg	----	----	----	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				REFRACTORY COMPOSITE	----	----	----	----
Client sampling date / time				[02-Dec-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1537731-021	-----	-----	-----	-----
				Result	Result	Result	Result	Result
EP075I: Organochlorine Pesticides - Continued								
Dieldrin	60-57-1	0.5	mg/kg	----	----	----	----	----
Endrin	72-20-8	0.5	mg/kg	----	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	mg/kg	----	----	----	----	----
4,4'-DDD	72-54-8	0.5	mg/kg	----	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	mg/kg	----	----	----	----	----
4,4'-DDT	50-29-3	1	mg/kg	----	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	mg/kg	----	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	mg/kg	----	----	----	----	----
EP075J: Organophosphorus Pesticides								
Dichlorvos	62-73-7	0.5	mg/kg	----	----	----	----	----
Dimethoate	60-51-5	0.5	mg/kg	----	----	----	----	----
Diazinon	333-41-5	0.5	mg/kg	----	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	----	----	----	----	----
Malathion	121-75-5	0.5	mg/kg	----	----	----	----	----
Fenthion	55-38-9	0.5	mg/kg	----	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	mg/kg	----	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	mg/kg	----	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	mg/kg	----	----	----	----	----
Prothiofos	34643-46-4	0.5	mg/kg	----	----	----	----	----
Ethion	563-12-2	0.5	mg/kg	----	----	----	----	----
EP075S: Acid Extractable Surrogates								
2-Fluorophenol	367-12-4	0.5	%	----	----	----	----	----
Phenol-d6	13127-88-3	0.5	%	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%	----	----	----	----	----
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	0.5	%	----	----	----	----	----
1,2-Dichlorobenzene-D4	2199-69-1	0.5	%	----	----	----	----	----
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: ES1537731	Page	: 1 of 13
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: PO BOX 560	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	: NORTH SYDNEY NSW, AUSTRALIA 2060		
E-mail	: mtiedeman@ramboll.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: A5130456 CWS	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 04-Dec-2015
C-O-C number	: ----	Date Analysis Commenced	: 07-Dec-2015
Sampler	: MARK TIEDEMAN	Issue Date	: 15-Dec-2015
Site	: ----	No. of samples received	: 21
Quote number	: ----	No. of samples analysed	: 21

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

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



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW
Shobhna Chandra	Metals Coordinator	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

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

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002 : pH (Soils) (QC Lot: 302525)									
ES1537731-001	MW201_3.0	EA002: pH Value	----	0.1	pH Unit	9.1	9.2	1.31	0% - 20%
ES1537731-014	MW205_9.0	EA002: pH Value	----	0.1	pH Unit	10.7	10.6	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 302528)									
ES1537950-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.6	8.7	0.00	0% - 20%
ES1538052-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.1	8.1	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 304861)									
ES1537731-021	REFRACTORY COMPOSITE	EA002: pH Value	----	0.1	pH Unit	6.6	7.1	7.59	0% - 20%
EA055: Moisture Content (QC Lot: 301340)									
EB1536495-044	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	28.5	28.8	0.972	0% - 20%
ES1537731-009	MW203_9.0	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	13.6	13.1	3.66	0% - 50%
EA055: Moisture Content (QC Lot: 301341)									
ES1537731-018	MW206_11.0	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	20.9	21.7	3.74	0% - 20%
ES1537855-008	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	6.6	7.8	15.9	No Limit
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 307234)									
ES1537731-001	MW201_3.0	ED006: Magnesium/Potassium Ratio	----	0.1	-	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Calcium Percent	----	0.1	%	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Magnesium Percent	----	0.1	%	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Potassium Percent	----	0.1	%	2.1	2.0	0.00	0% - 50%
		ED006: Exchangeable Sodium Percent	----	0.1	%	97.9	98.0	0.00	0% - 20%
		ED006: Cation Exchange Capacity	----	0.1	meq/100g	30.8	32.4	4.88	0% - 20%
		ED006: Exchangeable Calcium	----	0.1	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Magnesium	----	0.1	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Potassium	----	0.1	meq/100g	0.6	0.6	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.1	meq/100g	30.1	31.6	4.90	0% - 20%
ES1537731-010	MW204_2.5	ED006: Magnesium/Potassium Ratio	----	0.1	-	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Calcium Percent	----	0.1	%	10.7	10.4	2.97	0% - 20%
		ED006: Exchangeable Magnesium Percent	----	0.1	%	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Potassium Percent	----	0.1	%	0.7	1.3	64.0	No Limit
		ED006: Exchangeable Sodium Percent	----	0.1	%	88.6	88.2	0.376	0% - 20%
		ED006: Cation Exchange Capacity	----	0.1	meq/100g	18.6	19.2	3.01	0% - 20%
		ED006: Exchangeable Calcium	----	0.1	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Magnesium	----	0.1	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Potassium	----	0.1	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.1	meq/100g	16.5	17.0	2.88	0% - 20%
ED008: Exchangeable Cations (QC Lot: 305983)									

Page : 4 of 13
 Work Order : ES1537731
 Client : RAMBOLL ENVIRON
 Project : A5130456 CWS



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED008: Exchangeable Cations (QC Lot: 305983) - continued									
ES1537696-001	Anonymous	ED008: Cation Exchange Capacity	----	0.1	meq/100g	11.7	11.9	1.67	0% - 20%
		ED008: Exchangeable Calcium	----	0.1	meq/100g	9.6	9.8	1.89	0% - 20%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	1.5	1.5	0.00	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	0.5	0.5	0.00	0% - 20%
		ED008: Exchangeable Sodium	----	0.1	meq/100g	0.2	0.2	0.00	0% - 20%
ED008: Exchangeable Cations (QC Lot: 305984)									
ES1537731-001	MW201_3.0	ED008: Cation Exchange Capacity	----	0.1	meq/100g	<0.2	<0.2	0.00	0% - 20%
		ED008: Exchangeable Calcium	----	0.1	meq/100g	<0.2	<0.2	0.00	0% - 20%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	<0.2	<0.2	0.00	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	<0.2	<0.2	0.00	0% - 20%
		ED008: Exchangeable Sodium	----	0.1	meq/100g	<0.2	<0.2	0.00	0% - 20%
ES1537731-010	MW204_2.5	ED008: Cation Exchange Capacity	----	0.1	meq/100g	<0.2	<0.2	0.00	0% - 20%
		ED008: Exchangeable Calcium	----	0.1	meq/100g	<0.2	<0.2	0.00	0% - 20%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	<0.2	<0.2	0.00	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	<0.2	<0.2	0.00	0% - 20%
		ED008: Exchangeable Sodium	----	0.1	meq/100g	<0.2	<0.2	0.00	0% - 20%
ED008: Exchangeable Cations (QC Lot: 305990)									
ES1537731-020	QA101	ED008: Cation Exchange Capacity	----	0.1	meq/100g	42.8	42.3	1.21	0% - 20%
		ED008: Exchangeable Calcium	----	0.1	meq/100g	22.8	22.5	1.59	0% - 20%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	0.2	0.2	0.00	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	0.1	0.1	0.00	0% - 20%
		ED008: Exchangeable Sodium	----	0.1	meq/100g	17.5	17.3	1.10	0% - 20%
ED093S: Soluble Major Cations (QC Lot: 302527)									
ES1537731-014	MW205_9.0	ED093S: Sodium	7440-23-5	10	mg/kg	7250	8340	14.0	0% - 20%
ES1537731-001	MW201_3.0	ED093S: Sodium	7440-23-5	10	mg/kg	3300	3600	8.85	0% - 20%
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 304337)									
ES1536568-005	Anonymous	EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.00	No Limit
ES1537731-006	MW202_9.8	EK026SF: Total Cyanide	57-12-5	1	mg/kg	49	48	0.00	0% - 20%
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 304338)									
ES1537731-017	MW206_7.0	EK026SF: Total Cyanide	57-12-5	1	mg/kg	110	109	0.00	0% - 20%
EK040S: Fluoride Soluble (QC Lot: 302526)									
ES1537731-001	MW201_3.0	EK040S: Fluoride	16984-48-8	1	mg/kg	2440	2330	4.40	0% - 20%
ES1537731-014	MW205_9.0	EK040S: Fluoride	16984-48-8	1	mg/kg	12700	11500	10.1	0% - 20%
EK040S: Fluoride Soluble (QC Lot: 304862)									
ES1537731-021	REFRACTORY COMPOSITE	EK040S: Fluoride	16984-48-8	1	mg/kg	7	7	0.00	No Limit
EP075A: Phenolic Compounds (QC Lot: 300876)									
ES1537731-009	MW203_9.0	EP075: 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075A: Phenolic Compounds (QC Lot: 300876) - continued									
ES1537731-009	MW203_9.0	EP075: 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.6	<0.6	0.00	No Limit
		EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
	EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	<1	0.00	No Limit	
EP075B: Polynuclear Aromatic Hydrocarbons (QC Lot: 300876)									
ES1537731-009	MW203_9.0	EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dibenzo(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Fluoranthene	206-44-0	0.5	mg/kg	0.5	0.5	0.00	No Limit
		EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	0.00
EP075C: Phthalate Esters (QC Lot: 300876)									
ES1537731-009	MW203_9.0	EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075D: Nitrosamines (QC Lot: 300876)									
ES1537731-009	MW203_9.0	EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075D: Nitrosamines (QC Lot: 300876) - continued									
ES1537731-009	MW203_9.0	EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
EP075E: Nitroaromatics and Ketones (QC Lot: 300876)									
ES1537731-009	MW203_9.0	EP075: 1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 2,4-Dinitrotoluene	121-14-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 2,6-Dinitrotoluene	606-20-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Azobenzene	103-33-3	1	mg/kg	<1	<1	0.00	No Limit
EP075F: Haloethers (QC Lot: 300876)									
ES1537731-009	MW203_9.0	EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075G: Chlorinated Hydrocarbons (QC Lot: 300876)									
ES1537731-009	MW203_9.0	EP075: 1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Hexachlorocyclopentadiene	77-47-4	0.5	mg/kg	<2.5	<2.5	0.00	No Limit
		EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075G: Chlorinated Hydrocarbons (QC Lot: 300876) - continued									
ES1537731-009	MW203_9.0	EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075H: Anilines and Benzidines (QC Lot: 300876)									
ES1537731-009	MW203_9.0	EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 3,3`-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Carbazole	86-74-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075I: Organochlorine Pesticides (QC Lot: 300876)									
ES1537731-009	MW203_9.0	EP075: 4,4`-DDD	72-54-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4,4`-DDE	72-55-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: 4,4`-DDT	50-29-3	0.5	mg/kg	<1.0	<1.0	0.00	No Limit
		EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Endrin	72-20-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: gamma-BHC	58-89-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Heptachlor	76-44-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075J: Organophosphorus Pesticides (QC Lot: 300876)									
ES1537731-009	MW203_9.0	EP075: Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Diazinon	333-41-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dichlorvos	62-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Dimethoate	60-51-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Ethion	563-12-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Fenthion	55-38-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Malathion	121-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075: Prothiofos	34643-46-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (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.

[illegible]



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 304337) - continued								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	20 mg/kg	106	81	129
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 304338)								
EK026SF: Total Cyanide	57-12-5	1	mg/kg	<1	20 mg/kg	104	81	129
EK040S: Fluoride Soluble (QCLot: 302526)								
EK040S: Fluoride	16984-48-8	1	mg/kg	<1	25 mg/kg	105	69	117
EK040S: Fluoride Soluble (QCLot: 304862)								
EK040S: Fluoride	16984-48-8	1	mg/kg	<1	25 mg/kg	110	69	117
EP075A: Phenolic Compounds (QCLot: 300876)								
EP075: 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	1.5 mg/kg	88.8	49	107
EP075: 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	1.5 mg/kg	82.8	49	109
EP075: 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	1.5 mg/kg	98.1	47	105
EP075: 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	1.5 mg/kg	90.7	14	108
EP075: 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	1.5 mg/kg	77.2	48	110
EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	1.5 mg/kg	100	57	115
EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	1.5 mg/kg	107	55	117
EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	1.5 mg/kg	92.3	47	117
EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.6	3 mg/kg	54.3	46	122
EP075: 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	1.5 mg/kg	104	57	113
EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	3 mg/kg	15.0	12	76
EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	1.5 mg/kg	101	64	114
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 300876)								
EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	1.5 mg/kg	93.1	54	112
EP075: 2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	1.5 mg/kg	108	58	116
EP075: 3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	1.5 mg/kg	66.2	50	116
EP075: 7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	1.5 mg/kg	82.6	48	106
EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	91.4	62	112
EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	91.9	56	114
EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	93.8	57	111
EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	102	59	115
EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	106	56	116
EP075: Benzo(b+j) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	3 mg/kg	107	57	119
EP075: Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	114	56	120
EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	92.3	61	117
EP075: Dibenzo(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	101	53	119
EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	91.6	58	114
EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	92.2	59	115
EP075: Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	117	55	117



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 300876) - continued								
EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	1.5 mg/kg	97.9	58	114
EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	103	62	118
EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	94.9	63	113
EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	88.3	57	117
EP075C: Phthalate Esters (QCLot: 300876)								
EP075: bis(2-ethylhexyl) phthalate	117-81-7	----	mg/kg	----	1.5 mg/kg	85.4	69	133
EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	1.5 mg/kg	88.5	62	116
EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	1.5 mg/kg	84.4	65	115
EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	1.5 mg/kg	108	60	118
EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	1.5 mg/kg	86.5	65	121
EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	1.5 mg/kg	88.0	62	124
EP075D: Nitrosamines (QCLot: 300876)								
EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	1.5 mg/kg	39.9	16	123
EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	1.5 mg/kg	115	57	119
EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	1.5 mg/kg	86.6	59	117
EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	1.5 mg/kg	92.1	59	123
EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<0.6	3 mg/kg	83.6	42	112
EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	1.5 mg/kg	110	39	124
EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	1.5 mg/kg	93.7	65	121
EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	1.5 mg/kg	96.2	57	115
EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<0.5	1.5 mg/kg	102	53	125
EP075E: Nitroaromatics and Ketones (QCLot: 300876)								
EP075: 1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	1.5 mg/kg	70.7	36	114
EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	1.5 mg/kg	32.0	18	112
EP075: 2,4-Dinitrotoluene	121-14-2	0.5	mg/kg	<0.5	1.5 mg/kg	87.2	59	115
EP075: 2,6-Dinitrotoluene	606-20-2	0.5	mg/kg	<0.5	1.5 mg/kg	102	58	118
EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	1.5 mg/kg	107	27	129
EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	1.5 mg/kg	91.1	36	102
EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	1.5 mg/kg	77.4	10	87
EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	1.5 mg/kg	86.5	48	99
EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	1.5 mg/kg	92.9	60	116
EP075: Azobenzene	103-33-3	1	mg/kg	<1	1.5 mg/kg	84.4	62	118
EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	1.5 mg/kg	91.1	57	112
EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	1.5 mg/kg	94.6	48	108
EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	1.5 mg/kg	88.3	62	116
EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	1.5 mg/kg	94.9	65	119
EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	1.5 mg/kg	77.3	56	110



Sub-Matrix: **SOIL**

Method: Compound				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
CAS Number	LOR	Unit						
EP075E: Nitroaromatics and Ketones (QCLot: 300876) - continued								
EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	1.5 mg/kg	97.4	62	114
EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	1.5 mg/kg	# 115	54	110
EP075F: Haloethers (QCLot: 300876)								
EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	88.5	58	110
EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	1.5 mg/kg	86.3	58	112
EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	1.5 mg/kg	111	59	115
EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	1.5 mg/kg	87.3	63	121
EP075G: Chlorinated Hydrocarbons (QCLot: 300876)								
EP075: 1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1.5 mg/kg	94.5	63	108
EP075: 1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1.5 mg/kg	96.7	57	115
EP075: 1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	1.5 mg/kg	95.7	58	112
EP075: 1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1.5 mg/kg	93.4	58	116
EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<0.5	1.5 mg/kg	92.6	59	111
EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	1.5 mg/kg	96.4	59	117
EP075: Hexachlorocyclopentadiene	77-47-4	0.5	mg/kg	<0.5	1.5 mg/kg	65.6	24	108
EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	1.5 mg/kg	98.1	54	116
EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	1.5 mg/kg	101	39	110
EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	1.5 mg/kg	82.1	57	109
EP075H: Anilines and Benzidines (QCLot: 300876)								
EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	<0.5	1.5 mg/kg	99.5	52	112
EP075: 3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	1.5 mg/kg	84.9	23	113
EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	<0.5	1.5 mg/kg	84.3	32	94
EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	1.5 mg/kg	72.0	21	99
EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	1.5 mg/kg	92.7	42	112
EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	1.5 mg/kg	86.7	13	108
EP075: Carbazole	86-74-8	0.5	mg/kg	<0.5	1.5 mg/kg	86.3	59	111
EP075: Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	1.5 mg/kg	86.3	60	110
EP075I: Organochlorine Pesticides (QCLot: 300876)								
EP075: 4,4'-DDD	72-54-8	0.5	mg/kg	<0.5	1.5 mg/kg	87.0	62	118
EP075: 4,4'-DDE	72-55-9	0.5	mg/kg	<0.5	1.5 mg/kg	88.8	60	116
EP075: 4,4'-DDT	50-29-3	0.5	mg/kg	<0.5	1.5 mg/kg	84.6	46	122
EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	1.5 mg/kg	86.9	61	115
EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	1.5 mg/kg	83.1	63	113
EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	1.5 mg/kg	82.4	65	125
EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	1.5 mg/kg	82.6	57	113
EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	1.5 mg/kg	88.2	65	115
EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	1.5 mg/kg	92.5	64	118
EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	1.5 mg/kg	91.5	64	118

Matrix Spike (MS) Report

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 304337)							
ES1536568-005	Anonymous	EK026SF: Total Cyanide	57-12-5	20 mg/kg	99.0	70	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 304338)							
ES1537731-017	MW206_7.0	EK026SF: Total Cyanide	57-12-5	20 mg/kg	# Not Determined	70	130
EK040S: Fluoride Soluble (QCLot: 302526)							
ES1537731-001	MW201_3.0	EK040S: Fluoride	16984-48-8	25 mg/kg	# Not Determined	70	130
EK040S: Fluoride Soluble (QCLot: 304862)							

Page : 13 of 13
 Work Order : ES1537731
 Client : RAMBOLL ENVIRON
 Project : A5130456 CWS



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK040S: Fluoride Soluble (QCLot: 304862) - continued							
ES1537731-021	REFRACTORY COMPOSITE	EK040S: Fluoride	16984-48-8	25 mg/kg	114	70	130
EP075A: Phenolic Compounds (QCLot: 300876)							
ES1537731-009	MW203_9.0	EP075: 2-Chlorophenol	95-57-8	10 mg/kg	90.4	60	130
		EP075: 2-Nitrophenol	88-75-5	10 mg/kg	81.9	50	130
		EP075: 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	95.9	50	130
		EP075: Pentachlorophenol	87-86-5	20 mg/kg	28.4	10	130
		EP075: Phenol	108-95-2	10 mg/kg	106	60	130
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 300876)							
ES1537731-009	MW203_9.0	EP075: Acenaphthene	83-32-9	10 mg/kg	99.2	50	130
		EP075: Pyrene	129-00-0	10 mg/kg	54.2	50	130
EP075D: Nitrosamines (QCLot: 300876)							
ES1537731-009	MW203_9.0	EP075: N-Nitrosodi-n-propylamine	621-64-7	10 mg/kg	96.6	50	130
EP075E: Nitroaromatics and Ketones (QCLot: 300876)							
ES1537731-009	MW203_9.0	EP075: 2,4-Dinitrotoluene	121-14-2	10 mg/kg	87.2	40	130
EP075G: Chlorinated Hydrocarbons (QCLot: 300876)							
ES1537731-009	MW203_9.0	EP075: 1,2,4-Trichlorobenzene	120-82-1	10 mg/kg	107	50	130
		EP075: 1,4-Dichlorobenzene	106-46-7	10 mg/kg	102	60	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1537731	Page	: 1 of 7
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Telephone	: +61-2-8784 8555
Project	: A5130456 CWS	Date Samples Received	: 04-Dec-2015
Site	: ----	Issue Date	: 15-Dec-2015
Sampler	: MARK TIEDEMAN	No. of samples received	: 21
Order number	: ----	No. of samples analysed	: 21

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
ED008: Exchangeable Cations	QC-305984-002	----	Exchangeable Calcium	----	0.00 %	82-128%	Recovery less than lower control limit
ED008: Exchangeable Cations	QC-305984-002	----	Exchangeable Magnesium	----	0.00 %	82-120%	Recovery less than lower control limit
ED008: Exchangeable Cations	QC-305984-002	----	Exchangeable Potassium	----	0.00 %	70-140%	Recovery less than lower control limit
ED008: Exchangeable Cations	QC-305984-002	----	Exchangeable Sodium	----	0.00 %	78-136%	Recovery less than lower control limit
EP075E: Nitroaromatics and Ketones	QC-300876-002	----	Pronamide	23950-58-5	115 %	54-110%	Recovery greater than upper control limit
Matrix Spike (MS) Recoveries							
EK026SF: Total CN by Segmented Flow Analyser	ES1537731--017	MW206_7.0	Total Cyanide	57-12-5	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK040S: Fluoride Soluble	ES1537731--001	MW201_3.0	Fluoride	16984-48-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)						
Snap Lock Bag REFRACTORY COMPOSITE	10-Dec-2015	09-Dec-2015	1	----	----	----
EK040S: Fluoride Soluble						
Snap Lock Bag REFRACTORY COMPOSITE	10-Dec-2015	09-Dec-2015	1	----	----	----

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: **SOIL**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)								
Snap Lock Bag (EA002) REFRACTORY COMPOSITE		02-Dec-2015	10-Dec-2015	09-Dec-2015	✖	10-Dec-2015	10-Dec-2015	✓
Soil Glass Jar - Unpreserved (EA002) MW201_3.0, MW201_9.0, MW202_6.5, MW203_2.5, MW203_9.0, MW204_6.0 - MW204_, MW205_5.5, MW205_11.3, MW206_7.0, QA100, MW201_6.0, MW202_2.0, MW202_9.8, MW203_7.0, MW204_2.5, MW204_9.0 - MW204_11.0, MW205_9.0, MW206_3.0, MW206_11.0, QA101		02-Dec-2015	09-Dec-2015	09-Dec-2015	✓	09-Dec-2015	09-Dec-2015	✓
EA055: Moisture Content								
Snap Lock Bag (EA055-103) REFRACTORY COMPOSITE		02-Dec-2015	----	----	----	07-Dec-2015	16-Dec-2015	✓
Soil Glass Jar - Unpreserved (EA055-103) MW201_3.0, MW201_9.0, MW202_6.5, MW203_2.5, MW203_9.0, MW204_6.0 - MW204_, MW205_5.5, MW205_11.3, MW206_7.0, QA100, MW201_6.0, MW202_2.0, MW202_9.8, MW203_7.0, MW204_2.5, MW204_9.0 - MW204_11.0, MW205_9.0, MW206_3.0, MW206_11.0, QA101		02-Dec-2015	----	----	----	07-Dec-2015	16-Dec-2015	✓
ED006: Exchangeable Cations on Alkaline Soils								
Soil Glass Jar - Unpreserved (ED006) MW201_3.0, MW201_9.0, MW202_6.5, MW203_2.5, MW203_9.0, MW204_6.0 - MW204_, MW205_5.5, MW205_11.3, MW206_7.0, QA100, MW201_6.0, MW202_2.0, MW202_9.8, MW203_7.0, MW204_2.5, MW204_9.0 - MW204_11.0, MW205_9.0, MW206_3.0, MW206_11.0		02-Dec-2015	11-Dec-2015	30-Dec-2015	✓	11-Dec-2015	30-Dec-2015	✓

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

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED008: Exchangeable Cations									
Snap Lock Bag (ED008) REFRACTORY COMPOSITE		02-Dec-2015	11-Dec-2015	30-Dec-2015	✓	11-Dec-2015	30-Dec-2015	✓	
Soil Glass Jar - Unpreserved (ED008) QA101		02-Dec-2015	10-Dec-2015	30-Dec-2015	✓	10-Dec-2015	30-Dec-2015	✓	
ED093S: Soluble Major Cations									
Snap Lock Bag (ED093S) REFRACTORY COMPOSITE		02-Dec-2015	10-Dec-2015	30-May-2016	✓	10-Dec-2015	30-May-2016	✓	
Soil Glass Jar - Unpreserved (ED093S) MW201_3.0, MW201_9.0, MW202_6.5, MW203_2.5, MW203_9.0, MW204_6.0 - MW204_, MW205_5.5, MW205_11.3, MW206_7.0, QA100,		MW201_6.0, MW202_2.0, MW202_9.8, MW203_7.0, MW204_2.5, MW204_9.0 - MW204_11.0, MW205_9.0, MW206_3.0, MW206_11.0, QA101	02-Dec-2015	09-Dec-2015	30-May-2016	✓	09-Dec-2015	30-May-2016	✓
EK026SF: Total CN by Segmented Flow Analyser									
Snap Lock Bag (EK026SF) REFRACTORY COMPOSITE		02-Dec-2015	12-Dec-2015	16-Dec-2015	✓	12-Dec-2015	26-Dec-2015	✓	
Soil Glass Jar - Unpreserved (EK026SF) MW201_3.0, MW201_9.0, MW202_6.5, MW203_2.5, MW203_9.0, MW204_6.0 - MW204_, MW205_5.5, MW205_11.3, MW206_7.0, QA100,		MW201_6.0, MW202_2.0, MW202_9.8, MW203_7.0, MW204_2.5, MW204_9.0 - MW204_11.0, MW205_9.0, MW206_3.0, MW206_11.0, QA101	02-Dec-2015	12-Dec-2015	16-Dec-2015	✓	12-Dec-2015	26-Dec-2015	✓

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK040S: Fluoride Soluble								
Snap Lock Bag (EK040S) REFRACTORY COMPOSITE		02-Dec-2015	10-Dec-2015	09-Dec-2015	✖	10-Dec-2015	07-Jan-2016	✓
Soil Glass Jar - Unpreserved (EK040S)		02-Dec-2015	09-Dec-2015	09-Dec-2015	✓	10-Dec-2015	06-Jan-2016	✓
MW201_3.0,	MW201_6.0,							
MW201_9.0,	MW202_2.0,							
MW202_6.5,	MW202_9.8,							
MW203_2.5,	MW203_7.0,							
MW203_9.0,	MW204_2.5,							
MW204_6.0 - MW204_	MW204_9.0 - MW204_11.0,							
MW205_5.5,	MW205_9.0,							
MW205_11.3,	MW206_3.0,							
MW206_7.0,	MW206_11.0,							
QA100,	QA101							
EP075A: Phenolic Compounds								
Soil Glass Jar - Unpreserved (EP075)		02-Dec-2015	07-Dec-2015	16-Dec-2015	✓	07-Dec-2015	16-Jan-2016	✓
MW201_3.0,	MW202_6.5,							
MW203_9.0,	MW204_2.5,							
MW205_11.3,	MW206_11.0							



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Semivolatile Organic Compounds	EP075	20	68	29.41	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Semivolatile Organic Compounds	EP075	13	68	19.12	4.06	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Semivolatile Organic Compounds	EP075	9	68	13.24	3.44	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Semivolatile Organic Compounds	EP075	5	68	7.35	1.56	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Moisture Content	EA055-103	SOIL	In-house. A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Exchangeable Cations on Alkaline Soils	ED006	SOIL	In house: Referenced to Rayment & Lyons (2011) Method 15C1. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with alcoholic ammonium chloride at pH 8.5. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil.
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Higginson (2011) Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Cations - soluble by ICP-AES	ED093S	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010 (ICPAES) Water extracts of the soil are analyzed for major cations by ICPAES. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	In house: Referenced to APHA 4500-CN-O. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
Fluoride - Soluble	EK040S	SOIL	In house: Referenced to APHA 4500 F--C Soluble Fluoride is determined after a 1:5 soil/water extract using an ion selective electrode.
Semivolatile Organic Compounds	EP075	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 502)
Preparation Methods	Method	Matrix	Method Descriptions
Tumbler Extraction of Solids	ORG17	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.



CHAIN OF CUSTODY

ALS Laboratory, please tick ->

GADELADE 21 Burns Road, Portside SA 5000
Ph: 08 8589 0500 E: als@als.com.au
DARE: 5AVE 2 Bm Street, Stirling QLD 4053
Ph: 07 3245 7222 E: samples@als.com.au
LIDLOSTONE 48 Callingham Drive, Cheltenham QLD 4560
Ph: 07 7471 5000 E: goldcoast@als.com.au

CHICKEN 78 Harbour Road, Mackay QLD 4740
Ph: 07 4944 0177 E: melb@als.com.au
CHICKEN 241 Woodland Road, Sunbury VIC 3171
Ph: 03 8549 9000 E: samples@als.com.au
CHICKEN 123 Sydney Road, Macquarie NSW 2155
Ph: 02 6072 0700 E: melb@als.com.au

DUNEDIN 5636 Mainland Road, Mayfield NSW 2204
Ph: 02 4014 2500 E: samples@als.com.au
DUNEDIN 4713 Greyfriars Place, North Sydney NSW 2051
Ph: 02 4053 5000 E: melb@als.com.au
DUNEDIN 10 Wood Way, Macquarie NSW 2155
Ph: 02 6072 0700 E: melb@als.com.au

DUNEDIN 277-288 Woodpark Road, Smithfield NSW 2154
Ph: 02 8794 8156 E: samples@als.com.au
DUNEDIN 14-15 Darnley Court, Portside SA 5000
Ph: 07 4795 0500 E: samples@als.com.au
DUNEDIN 99 Kippax Street, Wollongong NSW 2500
Ph: 02 4225 3125 E: wollongong@als.com.au

CLIENT: Ramboll EnvironOFFICE: BansteadPROJECT: CUSPROJECT NUMBER: 8330456PROJECT MANAGER: Mark TiedemanAMPLIFIER: Mark TiedemanOC: Mark TiedemanMAIL REPORTS TO: (will default to PM if no other addresses are listed)MAIL INVOICE TO: (will default to PM if no other addresses are listed)

COMMENT/SPECIAL HANDLING/STORAGE OR DISPOSAL:

PROJECT NO.: 8330456PURCHASE ORDER NO.: ALS QUOTE NO.:

COUNTRY OF ORIGIN:

CONTACT PH:

SAMPLER MOBILE: 0410892410

EDD FORMAT (or default):

Eg: Ultra Trace Organics)

☒ Standard TAT (last due date)☐ Non Standard or urgent TAT (last due date)RELINQUISHED BY: Mark TiedemanDATE/TIME: 2/12/15 14:00RECEIVED BY: Karl MSDATE/TIME: 4/12/15 11:00

RELINQUISHED BY:

DATE/TIME:

FOR LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No

Free Ice / frozen Ice bricks present upon receipt? Yes No

Random Sample Temperature on Receipt: °C

Other comment:

RECEIVED BY:

DATE/TIME:

SAMPLE DETAILS

MATRIX: Solid(S) Water(W)

CONTAINER INFORMATION

ANALYSIS REQUIRED INCLUDING SUITES (NB: Suite Codes must be listed to attract suite price)

Additional Information

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

TOTAL BOTTLES

SOLUBLE FLUORIDE

CYANIDE

SODIUM

PH

1 MW201-3.0 2/12/15 S

1

X

X

X

X

2 MW201-6.0

1

X

X

X

X

3 MW201-9.0

1

X

X

X

X

4 MW202-2.0

1

X

X

X

X

5 MW202-6.5

1

X

X

X

X

6 MW202-9.8

1

X

X

X

X

7 MW203-2.5

1

X

X

X

X

8 MW203-7.0

1

X

X

X

X

9 MW203-9.0

1

X

X

X

X

10 MW204-2.5

1

X

X

X

X

11 MW204-6.0

1

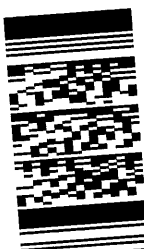
X

X

X

X

TOTAL 12 12 12 12 12 12

Environmental Division
Sydney
Work Order Reference
ES1537731

Telephone: +61-2-8784 8555

Fadi Soro

From: Kirsty Greenfield <kgreenfield@ramboll.com>
Sent: Friday, 4 December 2015 8:49 AM
To: Loren Schiavon
Cc: Samples Newcastle; Samples Sydney; Mark Tiedeman
Subject: FW: Message from KMBT_C220
Attachments: SKMBT_C22015120408490.pdf

Hi Loren,

Please find attached the chain of custody for the samples Mark dropped off for your job ES1537731. FYI, I would expected that these samples will be high in the analytes requested, particularly soluble fluoride, cyanide and sodium.

As Mark is on leave, please let me know if you have any questions regarding this job.

Yours sincerely

Kirsty Greenfield

Senior Environmental Consultant

D +61 2 4962 5444
M +61 4 07149176
kgreenfield@ramboll.com

Ramboll Environ
Level 2, Suite 19B
50 Glebe Road
PO Box 435
The Junction
NSW 2291
Australia
www.ramboll-environ.com

RAMBOLL ENVIRON

Ramboll Environ Australia Pty Ltd
ACN 095 437 442
ABN 49 095 437 442

From: c353@environcorp.com [mailto:c353@environcorp.com]
Sent: Friday, 4 December 2015 9:50 AM
To: Kirsty Greenfield
Subject: Message from KMBT_C220

This message contains information that may be confidential, privileged or otherwise protected by law from disclosure. It is intended for the exclusive use of the Addressee(s). Unless you are the addressee or authorized agent of the addressee, you may not review, copy, distribute or disclose to anyone the message or any information contained within. If you have received this message in error, please contact the sender by electronic reply to email@ramboll.com and immediately delete all copies of the message.

ALS Group: Click [here](#) to report this email as spam.

CERTIFICATE OF ANALYSIS

Work Order	: ES1600309	Page	: 1 of 17
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: PO BOX 560	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	NORTH SYDNEY NSW, AUSTRALIA 2060		
E-mail	: mtiedeman@ramboll.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: A5130456 CWS	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 06-Jan-2016 09:00
C-O-C number	: ----	Date Analysis Commenced	: 08-Jan-2016
Sampler	: ----	Issue Date	: 15-Jan-2016 14:23
Site	: ----		
Quote number	: ----	No. of samples received	: 21
		No. of samples analysed	: 21

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Hoa Nguyen	Senior Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW
Shobhna Chandra	Metals Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- EK026SF: Poor spike recovery for (Total Cyanide) due to matrix interferences (confirmed by re-analysis).
- **EA200: As only one sample container was submitted for multiple tests, sub sampling was conducted prior to Asbestos analysis. As this has the potential to understate detection, results should be scrutinised accordingly and NATA accreditation does not apply to analysis on these samples.**
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW201_3.0	MW201_6.0	MW201_9.0	MW202_2.0	MW202_6.5
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1600309-001	ES1600309-002	ES1600309-003	ES1600309-004	ES1600309-005
				Result	Result	Result	Result	Result	Result
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg	No	Yes	Yes + Trace	No	Yes	
Asbestos Type	1332-21-4	-	--	-	Am	Am	-	Am	
Sample weight (dry)	----	0.01	g	60.3	58.2	47.7	74.0	60.5	
APPROVED IDENTIFIER:	----	-	--	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER	G.MORGAN	
EN33: TCLP Leach									
Initial pH	----	0.1	pH Unit	7.9	8.7	9.4	9.4	9.0	
After HCl pH	----	0.1	pH Unit	4.4	4.3	4.0	4.6	4.4	
Extraction Fluid Number	----	1	-	1	1	1	1	1	
Final pH	----	0.1	pH Unit	5.6	5.6	5.5	5.8	5.4	
EN33Z: ZHE TCLP Leach									
Extraction Fluid Number	----	0.1	pH Unit	1.0	1.0	1.0	1.0	1.0	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW202_9.8	MW203_2.5	MW203_7.0	MW203_9.0	MW204_2.5
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1600309-006	ES1600309-007	ES1600309-008	ES1600309-009	ES1600309-010
					Result	Result	Result	Result	Result
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		Yes	No	Yes	Yes	No
Asbestos Type	1332-21-4	-	--		Am	-	Ch + Am	Am	-
Sample weight (dry)	----	0.01	g		37.4	16.2	70.8	72.4	42.9
APPROVED IDENTIFIER:	----	-	--		G.MORGAN	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER
EN33: TCLP Leach									
Initial pH	----	0.1	pH Unit		10.3	8.8	9.0	10.4	6.5
After HCl pH	----	0.1	pH Unit		2.7	4.2	5.1	6.1	2.6
Extraction Fluid Number	----	1	-		1	1	2	2	1
Final pH	----	0.1	pH Unit		5.2	5.7	5.1	5.1	5.1
EN33Z: ZHE TCLP Leach									
Extraction Fluid Number	----	0.1	pH Unit		1.0	1.0	1.0	1.0	1.0



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW204_6.0	MW204_9.0	MM205_5.5	MM205_9.0	MM205_11.3
Client sampling date / time					[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit		ES1600309-011	ES1600309-012	ES1600309-013	ES1600309-014	ES1600309-015
					Result	Result	Result	Result	Result
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		No	No	No	No	No
Asbestos Type	1332-21-4	-	--		-	-	-	-	-
Sample weight (dry)	----	0.01	g		36.4	51.8	60.9	60.2	55.8
APPROVED IDENTIFIER:	----	-	--		S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER
EN33: TCLP Leach									
Initial pH	----	0.1	pH Unit		9.7	10.1	7.0	9.7	8.6
After HCl pH	----	0.1	pH Unit		5.8	6.6	2.0	2.7	3.6
Extraction Fluid Number	----	1	-		2	2	1	1	1
Final pH	----	0.1	pH Unit		5.0	5.6	5.2	6.5	5.4
EN33Z: ZHE TCLP Leach									
Extraction Fluid Number	----	0.1	pH Unit		1.0	1.0	1.0	1.0	1.0



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				MW206_3.0	MW206_7.0	MW206_11.0	QA100	QA101
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1600309-016	ES1600309-017	ES1600309-018	ES1600309-019	ES1600309-020
				Result	Result	Result	Result	Result
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	-	-	-	-	-
Sample weight (dry)	----	0.01	g	57.6	49.0	48.0	39.2	43.9
APPROVED IDENTIFIER:	----	-	--	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	10.2	9.8	9.9	8.9	6.6
After HCl pH	----	0.1	pH Unit	5.8	5.1	2.6	4.5	2.1
Extraction Fluid Number	----	1	-	2	2	1	1	1
Final pH	----	0.1	pH Unit	5.2	5.1	5.4	5.7	5.1
EN33Z: ZHE TCLP Leach								
Extraction Fluid Number	----	0.1	pH Unit	1.0	1.0	1.0	1.0	1.0



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				REFRACTORY COMPOSITE	----	----	----	----
Client sampling date / time				[02-Dec-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1600309-021	-----	-----	-----	-----
				Result	Result	Result	Result	Result
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	----	----	----	----
Asbestos Type	1332-21-4	-	--	-	----	----	----	----
Sample weight (dry)	----	0.01	g	69.9	----	----	----	----
APPROVED IDENTIFIER:	----	-	--	S.SPOONER	----	----	----	----
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	6.1	----	----	----	----
After HCl pH	----	0.1	pH Unit	1.3	----	----	----	----
Extraction Fluid Number	----	1	-	1	----	----	----	----
Final pH	----	0.1	pH Unit	5.0	----	----	----	----
EN33Z: ZHE TCLP Leach								
Extraction Fluid Number	----	0.1	pH Unit	1.0	----	----	----	----



Analytical Results

Sub-Matrix: TCLP LEACHATE
 (Matrix: WATER)

Client sample ID

				MW201_3.0	MW201_6.0	MW201_9.0	MW202_2.0	MW202_6.5
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1600309-001	ES1600309-002	ES1600309-003	ES1600309-004	ES1600309-005
				Result	Result	Result	Result	Result
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	311	307	228	68.9	159
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	5.8	2.0	<1.0	318	1.6
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	15.0	<1.0	<1.0	10.3	2.7
Fluorene	86-73-7	1	µg/L	4.7	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	11.3	<1.0	5.6	<1.0	1.6
Anthracene	120-12-7	1	µg/L	2.3	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	5.4	<1.0	5.1	<1.0	1.8
Pyrene	129-00-0	1	µg/L	4.2	<1.0	3.8	<1.0	1.5
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	48.7	2.0	14.5	328	9.2
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	31.7	24.9	27.6	23.9	26.0
2-Chlorophenol-D4	93951-73-6	1	%	62.7	49.1	53.9	52.4	46.2
2,4,6-Tribromophenol	118-79-6	1	%	75.1	59.4	67.8	76.2	59.0
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	80.6	67.2	76.9	66.7	65.6
Anthracene-d10	1719-06-8	1	%	82.2	74.8	74.1	88.1	69.4
4-Terphenyl-d14	1718-51-0	1	%	74.9	64.1	64.7	76.9	59.1



Analytical Results

Sub-Matrix: TCLP LEACHATE
 (Matrix: WATER)

Client sample ID

				MW202_9.8	MW203_2.5	MW203_7.0	MW203_9.0	MW204_2.5
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1600309-006	ES1600309-007	ES1600309-008	ES1600309-009	ES1600309-010
				Result	Result	Result	Result	Result
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	78.2	267	909	608	217
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	14.6	32.8	<1.0	<1.0	1.2
Acenaphthylene	208-96-8	1	µg/L	1.2	1.1	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	216	157	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	90.6	27.7	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	137	28.8	<1.0	<1.0	3.5
Anthracene	120-12-7	1	µg/L	17.1	12.8	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	21.9	14.4	<1.0	<1.0	7.9
Pyrene	129-00-0	1	µg/L	17.6	9.9	<1.0	<1.0	3.7
Benz(a)anthracene	56-55-3	1	µg/L	2.7	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	1.8	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	1.1	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	0.7	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	522	284	<0.5	<0.5	16.3
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	1.1	<0.5	<0.5	<0.5	<0.5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	26.8	32.7	30.6	28.4	34.0
2-Chlorophenol-D4	93951-73-6	1	%	53.3	64.6	59.1	56.4	65.2
2,4,6-Tribromophenol	118-79-6	1	%	64.1	71.8	68.4	65.6	84.9
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	73.9	80.0	81.0	76.5	86.5
Anthracene-d10	1719-06-8	1	%	67.8	77.6	84.1	82.8	94.4
4-Terphenyl-d14	1718-51-0	1	%	77.5	76.1	71.7	65.1	81.6



Analytical Results

Sub-Matrix: TCLP LEACHATE
 (Matrix: WATER)

Client sample ID

				MW204_6.0	MW204_9.0	MM205_5.5	MM205_9.0	MM205_11.3
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1600309-011	ES1600309-012	ES1600309-013	ES1600309-014	ES1600309-015
				Result	Result	Result	Result	Result
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	795	762	271	144	292
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	11.4	3.3	<1.0	21.2	5.5
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	10.9	10.6	3.4	7.6	11.0
Fluorene	86-73-7	1	µg/L	2.5	1.1	1.4	3.6	4.6
Phenanthrene	85-01-8	1	µg/L	12.4	10.6	6.6	19.3	12.8
Anthracene	120-12-7	1	µg/L	1.8	<1.0	1.3	3.1	2.9
Fluoranthene	206-44-0	1	µg/L	3.6	2.7	4.6	6.8	9.3
Pyrene	129-00-0	1	µg/L	3.0	2.1	4.0	5.6	8.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	1.4
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	1.1
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	45.6	30.4	21.3	67.2	56.6
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	34.4	22.0	29.1	28.2	26.1
2-Chlorophenol-D4	93951-73-6	1	%	64.7	45.1	56.7	56.3	50.3
2,4,6-Tribromophenol	118-79-6	1	%	81.4	57.0	69.0	58.5	65.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	81.3	64.7	80.0	69.9	68.6
Anthracene-d10	1719-06-8	1	%	85.1	58.8	77.6	66.1	68.6
4-Terphenyl-d14	1718-51-0	1	%	77.6	56.5	69.5	66.5	70.0



Analytical Results

Sub-Matrix: TCLP LEACHATE
 (Matrix: WATER)

Client sample ID

				MW206_3.0	MW206_7.0	MW206_11.0	QA100	QA101
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1600309-016	ES1600309-017	ES1600309-018	ES1600309-019	ES1600309-020
				Result	Result	Result	Result	Result
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	496	747	154	274	267
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	1.2	2.5	3.5	19.1	<1.0
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	2.7	10.3	66.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	10.2	11.6	<1.0
Phenanthrene	85-01-8	1	µg/L	2.3	3.0	13.1	10.7	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	11.8	4.6	<1.0
Fluoranthene	206-44-0	1	µg/L	1.8	1.2	6.3	5.7	1.7
Pyrene	129-00-0	1	µg/L	1.2	1.0	5.3	3.6	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	6.5	10.4	60.5	121	1.7
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	33.4	27.8	27.8	28.6	26.5
2-Chlorophenol-D4	93951-73-6	1	%	62.7	53.4	55.0	56.5	52.6
2,4,6-Tribromophenol	118-79-6	1	%	82.0	67.7	63.4	65.3	64.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	82.7	75.3	69.9	69.7	74.1
Anthracene-d10	1719-06-8	1	%	92.4	79.0	70.6	71.0	80.0
4-Terphenyl-d14	1718-51-0	1	%	78.1	62.9	66.3	66.8	66.7



Analytical Results

Sub-Matrix: TCLP LEACHATE
 (Matrix: WATER)

Client sample ID

				REFRACTORY COMPOSITE	----	----	----	----
Client sampling date / time				[02-Dec-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1600309-021	-----	-----	-----	-----
				Result	Result	Result	Result	Result
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	----	----	----	----
Acenaphthylene	208-96-8	1	µg/L	<1.0	----	----	----	----
Acenaphthene	83-32-9	1	µg/L	<1.0	----	----	----	----
Fluorene	86-73-7	1	µg/L	<1.0	----	----	----	----
Phenanthrene	85-01-8	1	µg/L	<1.0	----	----	----	----
Anthracene	120-12-7	1	µg/L	<1.0	----	----	----	----
Fluoranthene	206-44-0	1	µg/L	<1.0	----	----	----	----
Pyrene	129-00-0	1	µg/L	<1.0	----	----	----	----
Benzo(a)anthracene	56-55-3	1	µg/L	<1.0	----	----	----	----
Chrysene	218-01-9	1	µg/L	<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	30.5	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%	60.8	----	----	----	----
2,4,6-Tribromophenol	118-79-6	1	%	67.1	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	76.0	----	----	----	----
Anthracene-d10	1719-06-8	1	%	84.6	----	----	----	----
4-Terphenyl-d14	1718-51-0	1	%	69.4	----	----	----	----

Page : 13 of 17
 Work Order : ES1600309
 Client : RAMBOLL ENVIRON
 Project : A5130456 CWS



Analytical Results

Sub-Matrix: ZHE LEACHATE
 (Matrix: WATER)

Client sample ID

				MW201_3.0	MW201_6.0	MW201_9.0	MW202_2.0	MW202_6.5
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1600309-001	ES1600309-002	ES1600309-003	ES1600309-004	ES1600309-005
				Result	Result	Result	Result	Result
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	0.004	mg/L	0.624	4.12	4.67	0.388	3.31



Analytical Results

Sub-Matrix: ZHE LEACHATE
 (Matrix: WATER)

Client sample ID

				MW202_9.8	MW203_2.5	MW203_7.0	MW203_9.0	MW204_2.5
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1600309-006	ES1600309-007	ES1600309-008	ES1600309-009	ES1600309-010
				Result	Result	Result	Result	Result
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	0.004	mg/L	2.71	1.48	1.97	8.54	<0.004

Page : 15 of 17
Work Order : ES1600309
Client : RAMBOLL ENVIRON
Project : A5130456 CWS



Analytical Results

Sub-Matrix: ZHE LEACHATE
(Matrix: WATER)

Client sample ID

				MW204_6.0	MW204_9.0	MM205_5.5	MM205_9.0	MM205_11.3
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1600309-011	ES1600309-012	ES1600309-013	ES1600309-014	ES1600309-015
				Result	Result	Result	Result	Result
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	0.004	mg/L	6.07	5.16	1.19	3.49	0.198

Page : 16 of 17
 Work Order : ES1600309
 Client : RAMBOLL ENVIRON
 Project : A5130456 CWS



Analytical Results

Sub-Matrix: ZHE LEACHATE
 (Matrix: WATER)

Client sample ID

				MW206_3.0	MW206_7.0	MW206_11.0	QA100	QA101
Client sampling date / time				[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]	[02-Dec-2015]
Compound	CAS Number	LOR	Unit	ES1600309-016	ES1600309-017	ES1600309-018	ES1600309-019	ES1600309-020
				Result	Result	Result	Result	Result
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	0.004	mg/L	7.08	8.01	0.870	1.93	<0.004



Analytical Results

Sub-Matrix: **ZHE LEACHATE**
 (Matrix: **WATER**)

Client sample ID

				REFRACTORY COMPOSITE	----	----	----	----
Client sampling date / time				[02-Dec-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1600309-021	-----	-----	-----	-----
				Result	Result	Result	Result	Result
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	0.004	mg/L	0.062	----	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	MW201_3.0 - [02-Dec-2015]	Mid red - brown clay soil with slag debris.
EA200: Description	MW201_6.0 - [02-Dec-2015]	Dark grey soil with several loose bundles of friable asbestos fibres approx 2 x 1 x 0.5 mm.
EA200: Description	MW201_9.0 - [02-Dec-2015]	Mid grey sandy soil with slag debris and several loose bundles of friable asbestos fibres approx 2 x 1 x 0.5 mm.
EA200: Description	MW202_2.0 - [02-Dec-2015]	Dark grey soil with soil debris.
EA200: Description	MW202_6.5 - [02-Dec-2015]	Mid grey - brown clay soil with several bundles of friable asbestos fibres approx 2 x 1 x 1 mm.
EA200: Description	MW202_9.8 - [02-Dec-2015]	Mid grey - brown clay soil with several bundles of friable asbestos fibres approx 2 x 1 x 1 mm.
EA200: Description	MW203_2.5 - [02-Dec-2015]	Mid brown clay soil with grey rocks.
EA200: Description	MW203_7.0 - [02-Dec-2015]	Dark grey soil with several loose bundles of friable asbestos fibres approx 3 x 1 x 0.5 mm.
EA200: Description	MW203_9.0 - [02-Dec-2015]	Dark grey soil with several loose bundles of friable asbestos fibres approx 3 x 1 x 0.5 mm.
EA200: Description	MW204_2.5 - [02-Dec-2015]	Dark grey soil with slag debris.
EA200: Description	MW204_6.0 - [02-Dec-2015]	Dark grey soil with slag debris.
EA200: Description	MW204_9.0 - [02-Dec-2015]	Dark grey soil with slag debris.
EA200: Description	MM205_5.5 - [02-Dec-2015]	Dark grey soil with slag debris.
EA200: Description	MM205_9.0 - [02-Dec-2015]	Dark grey soil with slag debris.
EA200: Description	MM205_11.3 - [02-Dec-2015]	Dark grey soil with slag debris.
EA200: Description	MW206_3.0 - [02-Dec-2015]	Dark grey soil with slag debris.
EA200: Description	MW206_7.0 - [02-Dec-2015]	Mid grey clay soil with slag debris.
EA200: Description	MW206_11.0 - [02-Dec-2015]	Dark grey soil with slag debris.
EA200: Description	QA100 - [02-Dec-2015]	Mid brown clay soil with grey rocks.
EA200: Description	QA101 - [02-Dec-2015]	Mid grey clay soil with grey rocks.
EA200: Description	REFRACTORY COMPOSITE - [02-Dec-2015]	Mid grey soil with grey rocks.

QUALITY CONTROL REPORT

Work Order	: ES1600309	Page	: 1 of 6
Client	: RAMBOLL ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MR MARK TIEDEMAN	Contact	:
Address	: PO BOX 560	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	NORTH SYDNEY NSW, AUSTRALIA 2060		
E-mail	: mtiedeman@ramboll.com	E-mail	:
Telephone	: 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: A5130456 CWS	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 06-Jan-2016
C-O-C number	: ----	Date Analysis Commenced	: 08-Jan-2016
Sampler	: ----	Issue Date	: 15-Jan-2016
Site	: ----	No. of samples received	: 21
Quote number	: ----	No. of samples analysed	: 21

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

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



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Hoa Nguyen	Senior Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW
Shobhna Chandra	Metals Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

Page : 3 of 6
 Work Order : ES1600309
 Client : RAMBOLL ENVIRON
 Project : A5130456 CWS



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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 328987)									
ES1600309-001	MW201_3.0	EK026SF: Total Cyanide	57-12-5	0.004	mg/L	0.624	0.623	0.160	0% - 20%
ES1600309-011	MW204_6.0	EK026SF: Total Cyanide	57-12-5	0.004	mg/L	6.07	6.60	8.33	0% - 20%
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 328988)									
ES1600508-001	Anonymous	EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	<0.004	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 329160)									
ES1600309-001	MW201_3.0	EK040P: Fluoride	16984-48-8	0.1	mg/L	311	319	2.54	0% - 20%
ES1600309-010	MW204_2.5	EK040P: Fluoride	16984-48-8	0.1	mg/L	217	221	1.83	0% - 20%
EK040P: Fluoride by PC Titrator (QC Lot: 329161)									
ES1600309-021	REFRACTORY COMPOSITE	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit



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

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit			Result	LCS	Low
EN33: TCLP Leach (QCLot: 327300)								
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33: TCLP Leach (QCLot: 327301)								
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33: TCLP Leach (QCLot: 327302)								
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low	High
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 328987)									
EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	0.2 mg/L	100	73	133	
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 328988)									
EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	0.2 mg/L	108	73	133	
EK040P: Fluoride by PC Titrator (QCLot: 329160)									
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	102	82	116	
EK040P: Fluoride by PC Titrator (QCLot: 329161)									
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	99.0	82	116	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 328883)									
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	94.0	62	113	
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	97.0	64	114	
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	100	64	116	
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	106	64	117	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	112	63	117	
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	106	62	119	
	205-82-3								
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	109	59	118	
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	110	63	115	
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	106	63	116	

Method Blank (MB) Report

Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
	LCS	Low	High

Matrix Spike (MS) Report

Sub-Matrix: **WATER**

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

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike recovery (%) MS	Recovery Limits (%) Low	High
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 328987)							
ES1600309-001	MW201_3.0	EK026SF: Total Cyanide	57-12-5	0.2 mg/L	87.7	70	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 328988)							
ES1600508-001	Anonymous	EK026SF: Total Cyanide	57-12-5	0.2 mg/L	# 56.2	70	130
EK040P: Fluoride by PC Titrator (QCLot: 329160)							



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK040P: Fluoride by PC Titrator (QCLot: 329160) - continued							
ES1600309-001	MW201_3.0	EK040P: Fluoride	16984-48-8	5 mg/L	# Not Determined	70	130
EK040P: Fluoride by PC Titrator (QCLot: 329161)							
ES1600309-021	REFRACTORY COMPOSITE	EK040P: Fluoride	16984-48-8	5 mg/L	107	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order : **ES1600309**

Page : 1 of 6

Client : **RAMBOLL ENVIRON**
Contact : **MR MARK TIEDEMAN**
Project : **A5130456 CWS**
Site : ----
Sampler : ----
Order number : ----

Laboratory : Environmental Division Sydney
Telephone : +61-2-8784 8555
Date Samples Received : 06-Jan-2016
Issue Date : 15-Jan-2016
No. of samples received : 21
No. of samples analysed : 21

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- Matrix Spike outliers exist - please see following pages for full details.
- 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

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

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK026SF: Total CN by Segmented Flow Analyser	ES1600508--001	Anonymous	Total Cyanide	57-12-5	56.2 %	70-130%	Recovery less than lower data quality objective
EK040P: Fluoride by PC Titrator	ES1600309--001	MW201_3.0	Fluoride	16984-48-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Method Blanks (MB)					
TCLP for Non & Semivolatile Analytes	0	33	0.00	9.09	NEPM 2013 B3 & ALS QC Standard

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	34	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	34	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation

Page : 3 of 6
 Work Order : ES1600309
 Client : RAMBOLL ENVIRON
 Project : A5130456 CWS



Matrix: **SOIL**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Snap Lock Bag - Subsampled by ALS (EA200)		02-Dec-2015	----	----	----	13-Jan-2016	30-May-2016	
MW201_3.0,	MW201_6.0,							
MW201_9.0,	MW202_2.0,							
MW202_6.5,	MW202_9.8,							
MW203_2.5,	MW203_7.0,							
MW203_9.0,	MW204_2.5,							
MW204_6.0,	MW204_9.0,							
MM205_5.5,	MM205_9.0,							
MM205_11.3,	MW206_3.0,							
MW206_7.0,	MW206_11.0,							
QA100,	QA101,							
REFACTORY COMPOSITE								

Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK026SF: Total CN by Segmented Flow Analyser							
White Plastic Bottle-NaOH (EK026SF)	08-Jan-2016	----	----	----	12-Jan-2016	22-Jan-2016	✔
MW201_3.0, MW201_9.0, MW202_6.5, MW203_2.5, MW203_9.0, MW204_6.0, MM205_5.5, MM205_11.3, MW206_7.0, QA100, REFACTORY COMPOSITE							
MW201_6.0, MW202_2.0, MW202_9.8, MW203_7.0, MW204_2.5, MW204_9.0, MM205_9.0, MW206_3.0, MW206_11.0, QA101,							
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)	11-Jan-2016	----	----	----	12-Jan-2016	08-Feb-2016	✔
MW201_3.0, MW201_9.0, MW202_6.5, MW203_2.5, MW203_9.0, MW204_6.0, MM205_5.5, MM205_11.3, MW206_7.0, QA100, REFACTORY COMPOSITE							
MW201_6.0, MW202_2.0, MW202_9.8, MW203_7.0, MW204_2.5, MW204_9.0, MM205_9.0, MW206_3.0, MW206_11.0, QA101,							



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))		11-Jan-2016	13-Jan-2016	18-Jan-2016	✔	13-Jan-2016	22-Feb-2016	✔
MW201_3.0,	MW201_6.0,							
MW201_9.0,	MW202_2.0,							
MW202_6.5,	MW202_9.8,							
MW203_2.5,	MW203_7.0,							
MW203_9.0,	MW204_2.5,							
MW204_6.0,	MW204_9.0,							
MM205_5.5,	MM205_9.0,							
MM205_11.3,	MW206_3.0,							
MW206_7.0,	MW206_11.0,							
QA100,	QA101,							
REFRACTORY COMPOSITE								



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB)							
TCLP for Non & Semivolatile Analytes	EN33a	0	33	0.00	9.09	✖	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Fluoride by PC Titrator	EK040P	3	29	10.34	10.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	34	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	3	23	13.04	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Fluoride by PC Titrator	EK040P	2	29	6.90	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	4	23	17.39	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Fluoride by PC Titrator	EK040P	2	29	6.90	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	23	8.70	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Fluoride by PC Titrator	EK040P	2	29	6.90	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	34	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	23	8.70	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	In house: Referenced to APHA 4500-CN O. Sodium hydroxide preserved samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (2013) Schedule B(3)
Fluoride by PC Titrator	EK040P	SOIL	In house: Referenced to APHA 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	SOIL	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.
TCLP for Volatile Analytes (Zero Headspace Extraction)	EN33Za	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: ZHE (Toxicity Characteristic Leach Procedure - Zero Headspace Extraction) An extraction procedure to determine the mobility of volatile organic and inorganic analytes under specific conditions. This technique is compliant with NEPM (2013) Schedule B(3) (Method 101)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES1600309

Client : RAMBOLL ENVIRON Contact : MR MARK TIEDEMAN Address : PO BOX 560 NORTH SYDNEY NSW, AUSTRALIA 2060 E-mail : mtiedeman@ramboll.com Telephone : 02 4962 5444 Facsimile : 02 4962 5888 Project : A5130456 CWS Order number : ---- C-O-C number : ---- Site : ---- Sampler :	Laboratory : Environmental Division Sydney Contact : Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 E-mail : Telephone : +61-2-8784 8555 Facsimile : +61-2-8784 8500 Page : 1 of 4 Quote number : ES2015ENVIAUS0373 (EN/072/15) QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 06-Jan-2016 9:00 AM	Issue Date : 07-Jan-2016
Client Requested Due Date : 13-Jan-2016	Scheduled Reporting Date : 13-Jan-2016

Delivery Details

Mode of Delivery : Undefined	Security Seal : Not Available
No. of coolers/boxes : ----	Temperature : 4.1' C
Receipt Detail :	No. of samples received / analysed : 21 / 21

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **This is a rebatch of ES1537731.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Asbestos analysis will be conducted by ALS Newcastle.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

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

Method Client sample ID	Sample Container Received	Preferred Sample Container for Analysis
Asbestos Identification in Soils : EA200		
MW201_3.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW201_6.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW201_9.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW202_2.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW202_6.5	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW202_9.8	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW203_2.5	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW203_7.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW203_9.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW204_2.5	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW204_6.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW204_9.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MM205_5.5	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MM205_9.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MM205_11.3	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW206_3.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW206_7.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
MW206_11.0	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
QA100	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
QA101	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
REFRACTORY COMPOSITE	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag

Summary of Sample(s) and Requested Analysis

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



Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EK026SF Total Cyanide by Segmented Flow Analyser	SOIL - EK040-P Fluoride(PC)	SOIL - EP075 SIM PAH only SIM - PAH only
ES1600309-001	[02-Dec-2015]	MW201_3.0	✓	✓	✓	✓
ES1600309-002	[02-Dec-2015]	MW201_6.0	✓	✓	✓	✓
ES1600309-003	[02-Dec-2015]	MW201_9.0	✓	✓	✓	✓
ES1600309-004	[02-Dec-2015]	MW202_2.0	✓	✓	✓	✓
ES1600309-005	[02-Dec-2015]	MW202_6.5	✓	✓	✓	✓
ES1600309-006	[02-Dec-2015]	MW202_9.8	✓	✓	✓	✓
ES1600309-007	[02-Dec-2015]	MW203_2.5	✓	✓	✓	✓
ES1600309-008	[02-Dec-2015]	MW203_7.0	✓	✓	✓	✓
ES1600309-009	[02-Dec-2015]	MW203_9.0	✓	✓	✓	✓
ES1600309-010	[02-Dec-2015]	MW204_2.5	✓	✓	✓	✓
ES1600309-011	[02-Dec-2015]	MW204_6.0	✓	✓	✓	✓
ES1600309-012	[02-Dec-2015]	MW204_9.0	✓	✓	✓	✓
ES1600309-013	[02-Dec-2015]	MM205_5.5	✓	✓	✓	✓
ES1600309-014	[02-Dec-2015]	MM205_9.0	✓	✓	✓	✓
ES1600309-015	[02-Dec-2015]	MM205_11.3	✓	✓	✓	✓
ES1600309-016	[02-Dec-2015]	MW206_3.0	✓	✓	✓	✓
ES1600309-017	[02-Dec-2015]	MW206_7.0	✓	✓	✓	✓
ES1600309-018	[02-Dec-2015]	MW206_11.0	✓	✓	✓	✓
ES1600309-019	[02-Dec-2015]	QA100	✓	✓	✓	✓
ES1600309-020	[02-Dec-2015]	QA101	✓	✓	✓	✓
ES1600309-021	[02-Dec-2015]	REFRACTORY COMPOSITE	✓	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Cindy Suen

- Email cindy.suen@alsglobal.com
Email cindy.suen@alsglobal.com

[illegible][illegible]

Fadi Soro

5601-802 185 1

6/1/16 90m

From: Fiona Robinson <frobinson@ramboll.com>
Sent: Tuesday, 5 January 2016 4:53 PM
To: Samples Sydney
Subject: Further analysis for ES1537731
Attachments: ES1537731_COC.pdf; ES1537731_0_COA.pdf

Hi

Can you please arrange for additional analysis of the attached as follows:

1. Presence of asbestos as free fibres presence/absence.
2. TCLP Leachable fluoride, TCLP PAHs and TCLP Cyanide.

Can you please also confirm that the analysis reported in the attached COA as 'Fluoride' was for soluble Fluoride.

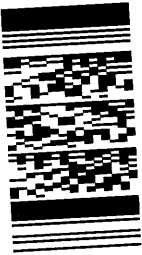
Many thanks,

Yours sincerely
Fiona Robinson

MEng
Principal, Hunter Manager
NSW EPA Accredited Site Auditor
D +61 2 4962 5444
M +61 4 21311066
VOIP 4030017
frobinson@ramboll.com

Ramboll Environ Australia Pty Ltd
Level 2, Suite 19B
50 Glebe Road
PO Box 435
The Junction
NSW 2291
Australia
www.ramboll-environ.com

Environmental Division
Sydney
Work Order Reference
ES1600309



Telephone : + 61-2-8784 8565

① MW201 - 3.0
② " - 6.0
③ " - 4.0
④ MW202 - 2.0
⑤ " - 6.5
⑥ " - 4.8
⑦ MW203 - 2.5
⑧ " - 2.0
⑨ " - 4.0
⑩ MW204 - 2.5
⑪ " - 6.0
⑫ " - 4.0

⑬ MW205 - 5.5
⑭ " - 4.0
⑮ " - 11.3
⑯ MW206 - 3.0
⑰ " - 2.0
⑱ " - 11.0
⑲ QA100
⑳ QA101
㉑ Reluctory composite

Subcon/Forward Lab / Split WO
Lab/ Analysis: NEWCASTLE
Organised By / Date: Asbestos - 21
Relinquished By / Date: _____
Connote / Courier: _____
WO No: ES1600309
Attach By PO / Internal Sheet: _____

Ramboll Environ Australia Pty Ltd
ACN 095 437 442
ABN 49 095 437 442

From 10 October 2015, the @environcorp.com email domain will change to @ramboll.com,
as part of the ongoing post-merger integration of Ramboll and Ramboll Environ.
Please make a note of this in your contact records.

This message contains information that may be confidential, privileged or otherwise protected by law from disclosure. It is intended for the exclusive use of the Addressee(s). Unless you are the addressee or authorized agent of the addressee, you may not review, copy, distribute or disclose to anyone the message or any information contained within. If you have received this message in error, please contact the sender by electronic reply to email@ramboll.com and immediately delete all copies of the message.

ALS Group: [Click here](#) to report this email as spam.

APPENDIX G

RESULTS

Table 1 - Soil Results

Sample Identification		LOR		NEPM 2013 ML Q ²	ELC Q ²	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand				NEPM 2013 Table 1B(7) Management Limits for Comm/Ind, Coarse Soil		NEPM 2013 Table 1B(8) E54 for Comm/Ind, Coarse Soil	Chemical Control Order NORIPA 1986	MW201 3.0	MW201 6.0	MW201 9.0	MW201 11.5	MW201 14	MW201 2.0	MW201 6.5	MW201 9.8	MW201 12	MW201 13.5	QA101	MW201 2.5	QA100	MW201 7.0														
Site		0-2m		2-4m		4-6m		6-8m						Waste	Waste	Waste	Sandy Clay	Sandy Clay	Waste	Waste	White Clay	White Clay	Clay	Waste	Waste	Waste	Waste	Waste													
Depth	1	1	1	1	1	1	1	1	1	1	1	1	1	3	6	9	11.5	14	2	6.5	9.8	12	13.5	5	2.5	7	7														
Strata	%	%	%	%	%	%	%	%	%	%	%	%	%	14.3	10.3	12.1	20.1	16.5	9	10	31	30.3	31	13.3	20.3	21.6	13.8														
Moisture Content (Strat @ 103°C)	gH ₂ O/g	gH ₂ O/g	gH ₂ O/g	gH ₂ O/g	gH ₂ O/g	gH ₂ O/g	gH ₂ O/g	gH ₂ O/g	gH ₂ O/g	gH ₂ O/g	gH ₂ O/g	gH ₂ O/g	gH ₂ O/g	9.1	9.6	9.9	9.7	10.1	11.4	10.2	10.1	10.5	9.9	9.8	9.4	9.8	9.8														
pH Value	pH Unit	pH Unit	pH Unit	pH Unit	pH Unit	pH Unit	pH Unit	pH Unit	pH Unit	pH Unit	pH Unit	pH Unit	pH Unit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-													
Electrical Conductivity @ 25°C	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-													
Asbestos	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes													
Asbestos	Type	Type	Type	Type	Type	Type	Type	Type	Type	Type	Type	Type	Type	Am	Am	Am	Am	Am	Am	Am	Am	Am	Am	Am	Am	Am	Am	Am													
Exchangeable Cations on Alkaline Soils																																									
Exchangeable Calcium	mg/100g	0.2												<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	-	-	-	<0.2	<0.2	<0.2	<0.2													
Exchangeable Magnesium	mg/100g	0.2												<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	-	-	-	<0.2	<0.2	<0.2	<0.2													
Exchangeable Potassium	mg/100g	0.2												0.6	0.3	0.6	-	-	<0.2	0.4	1	-	-	-	1	1.2	0.6	0.6													
Cation Exchange Capacity	mg/100g	0.2												30.8	25.5	30.3	-	-	53.4	68.8	29.3	-	-	-	33.3	34.4	34.3	34.3													
Exchangeable Calcium Percent	%	0.2												<0.2	<0.2	<0.2	-	-	0.5	<0.2	0.8	-	-	-	<0.2	1.4	0.4	0.4													
Exchangeable Magnesium Percent	%	0.2												<0.2	<0.2	<0.2	-	-	<0.3	<0.2	<0.2	-	-	-	<0.2	1.0	<0.2	<0.2													
Exchangeable Potassium Percent	%	0.2												2.1	1.5	1.6	-	-	0.2	0.8	3.3	-	-	-	3.1	3.2	3.2	3.2													
Exchangeable Sodium Percent	%	0.2												97.9	98.5	98.4	-	-	99.3	99.2	95.8	-	-	-	96.9	95.4	98.4	98.4													
Magnesium/Potassium Ratio	0.2													<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	-	-	-	<0.2	<0.2	<0.2	<0.2													
Acidity																																									
Total Acidity as CaCO ₃	mg/kg	1												-	-	-	788	2100	-	-	-	-	5580	5120	5840	-	-	-	-												
Bicarbonate Acidity as CaCO ₃	mg/kg	1												-	-	-	894	1100	-	-	-	-	<9	2760	2950	-	-	-	-												
Carbonate Acidity as CaCO ₃	mg/kg	1												-	-	-	285	988	-	-	-	-	5510	2860	2880	-	-	-	-												
Sulfate	mg/kg	10												-	-	-	880	950	-	-	-	-	2210	1920	2180	-	-	-	-												
Sulfate as SO ₄ 2-	mg/kg	10												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-												
Chloride	mg/kg	10												-	-	-	550	<100	-	-	-	-	210	290	530	-	-	-	-												
Sodium	mg/kg	10												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-												
Cadmium	mg/kg	10												3100	8810	7240	2900	5630	14500	14800	2990	3750	3760	4650	5960	3260	4660	4660													
Potassium	mg/kg	10												-	-	-	1310	3600	-	-	-	-	40	60	40	-	-	-	-												
Potassium	mg/kg	10												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-												
Metals	mg/kg	50	NL*	-	-	-	-	-	-	-	-	-	-	-	-	-	10400	16100	-	-	-	-	7050	12300	16800	-	-	-	-												
Antimony	mg/kg	0.1	730	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-												
Mercury	mg/kg	0.1	730	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-												
Cyanide	mg/kg	1	1,500	-	-	-	-	-	-	-	-	-	-	-	-	-	14	86	78	734	53	33	50	49	26	44	53	158	142	35											
Total Cyanide	mg/L	0.004	-	-	-	-	-	-	-	-	-	-	-	0.624	4.12	4.87	10	0.388	0.388	3.31	2.91	-	-	-	1.48	1.93	1.93	1.97													
Fluoride	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-												
Fluoride (total)	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-												
Fluoride (soluble)	mg/kg	1	17000	-	-	-	-	-	-	-	-	-	-	2440	2220	3030	-	-	21100	3220	1500	-	-	-	3560	2610	3120	3120													
Fluoride (TCP leachate)	mg/L	0.1	-	-	-	-	-	-	-	-	-	-	-	150	311	307	228	-	-	68.9	159	78.2	-	-	-	267	274	809	809												
Polychlorinated Biphenyls																																									
Total Polychlorinated biphenyls	mg/kg	0.1	7	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	<0.1	<0.1	<0.1	-	-	-	-												
Polynuclear Aromatic Hydrocarbons																																									
Naphthalene	mg/kg	0.5	-	370	-	-	-	-	-	-	-	-	-	<1.0	-	-	<0.5	<0.5	-	-	-	-	<0.5	<0.5	<0.5	-	-	-	-												
Acenaphthylene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	<1.0	-	-	<0.5	<0.5	-	-	-	-	<0.5	<0.5	<0.5	-	-	-	-												
Acenaphthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	15.3	-	-	<0.5	<0.5	-	-	-	-	2.2	-	0.6	<0.5	<0.5	-	-												
Fluorene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	-	0.5	<0.5	<0.5	-	-	-												
Phenanthrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	27.9	-	-	<0.5	<0.5	-	-	-	-	4.3	-	<0.5	<0.5	-	-	-												
Anthracene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	12.3	-	-	<0.5	<0.5	-	-	-	-	2.2	-	0.9	<0.5	<0.5	-	-												
Fluoranthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	148	-	-	<0.5	0.6	-	-	-	27.3	-	-	10.2	<0.5	<0.5	-	-												
Pyrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	126	-	-	<0.5	0.6	-	-	-	24.1	-	-	10.4	<0.5	<0.5	-	-												
Benz[a]anthracene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	132	-	-	<0.5	<0.5	-	-	-	21.7	-	-	4.9	<0.5	<0.5	-	-												
Chrysene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	116	-	-	<0.5	0.6	-	-	-	19.9	-	-	8.8	<0.5	<0.5	-	-												
Benzo[b]fluoranthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	79	-	-	<0.5	0.5	-	-	-	7.4	-	-	4.8	<0.5	<0.5	-	-												
Benzo[k]fluoranthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	72**	-	-	<0.5	<0.5	-	-	-	2.7	-	-	<0.5	<0.5	-	-	-												
Benzo[a]pyrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	134	-	-	<0.5	<0.5	-	-	-	22.9	-	-	6.4	<0.5	<0.5	-	-												
Indeno[1,2,3-cd]pyrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	56.3	-	-	<0.5	<0.5	-	-	-	9	-	-	3.4	<0.5	<0.5	-	-												
Benzo[e]fluoranthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	17	-	-	<0.5	<0.5	-	-	-	3.4	-	-	0.7	<0.5	<0.5	-	-												
Benzofluoranthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	59	-	-	<0.5	<0.5	-	-	-	3.4	-	-	4.8	<0.5	<0.5	-	-												
Sum of polycyclic aromatic hydrocarbons	mg/kg	0.5	4,000	-	-	-	-	-	-	-	-	-	-	1110	-	-	<0.5	<0.5	-	-	-	196	-	-	81.5	<0.5	<0.5	-	-												
Benzo[a]pyrene TEG (half LOR)	mg/kg	0.5	40	-	-	-	-	-	-	-	-	-	-	185	-	-	0.6	0.6	-	-	-	13.9	-	-	9	0.6	0.6	-	-												
Polycyclic Aromatic Hydrocarbons - TCP Leachate																																									
Naphthalene	µg/L	1	370	-	-	-	-	-	-	-	-	-	-	5.8	2	<1.0	-	-	318	1.6	14.6	-	-	-	-	32.8	19.1	<1.0	-												
Acenaphthylene	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	<1.0	<1.0	<1.0	-	-	<1.0	<1.0	1.1	-	-	-	1.1	<1.0	<1.0	-	-												
Acenaphthene	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	15	<1.0	<1.0	-	-	10.3	2.7	216	-	-	-	-	157	66	<1.0	-												
Fluorene	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	4.7	<1.0	<1.0	-	-	<1.0	<1.0	90.6	-	-	-	27.7	11.6	<1.0	-	-												
Phenanthrene	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	11.3	<1.0	5.6	-	-	<1.0	1.6	137	-	-	-	28.8	10.7	<1.0	-	-												
Anthracene	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	2.3	<1.0	<1.0	-	-	<1.0	0.10	17.1	-	-	-	12.8	4.6	<1.0	-	-												
Fluoranthene	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	5.4	<1.0	5.1	-	-	<1.0	1.8	21.9	-	-	-	14.8	5.7	<1.0	-	-												
Pyrene	µg/L	1	-	-	-	-	-	-	-</																																

Table 1 - Soil Results

Sample Identification			NEPM 2013 HIL D*	ELC†	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand	NEPM 2013 Table 1 B(7) Management Limits for Comm/Ind, Coarse Soil	NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil	Chemical Control Order NSWIEPA 2986	MW201 3.0 2/12/2015	MW201 6.0 2/12/2015	MW201 9.0 2/12/2015	MW201 11.5 27/10/2015	MW201 14 28/10/2015	MW202 2.0 2/12/2015	MW202 6.5 2/12/2015	MW202 8.8 2/12/2015	MW202-12 5/11/2015	MW202-13.5 5/11/2015	QA101	MW203 2.5 2/12/2015	QA100	MW203 7.0 2/12/2015
Date	mg/kg	LOR			0-1m	1-2m	2-4m	>4m														
Halogenated Aliphatic Compounds																						
1,2-Dibromomethane (EDB)	mg/kg	0.5																				
Ochlorodifluoromethane	mg/kg	5																				
Chloromethane	mg/kg	5																				
Vinyl chloride	mg/kg	5	0.1																			
Bromomethane	mg/kg	5																				
Chloroethane	mg/kg	5																				
Trichlorofluoromethane	mg/kg	5																				
1,1-Dichloroethene	mg/kg	0.5																				
Isomethane	mg/kg	0.5																				
trans-1,2-Dichloroethene	mg/kg	0.5																				
1,1-Dichloroethane	mg/kg	0.5	0.3																			
cis-1,2-Dichloroethene	mg/kg	0.5	230																			
1,1,1-Trichloroethane	mg/kg	0.5																				
1,1-Dichloropropane	mg/kg	0.5																				
Carbon Tetrachloride	mg/kg	0.5																				
1,2-Dichloroethane	mg/kg	0.5	0.08																			
Trichloroethene	mg/kg	0.5																				
Dibromomethane	mg/kg	0.5																				
1,1,2-Trichloroethane	mg/kg	0.5																				
1,3-Dichloropropane	mg/kg	0.5	8																			
Tetrachloroethene	mg/kg	0.5																				
1,1,1,2-Tetrachloroethane	mg/kg	0.5																				
trans-1,4-Dichloro-2-butene	mg/kg	0.5																				
cis-1,4-Dichloro-2-butene	mg/kg	0.5																				
1,1,2,3-Tetrachloroethane	mg/kg	0.5																				
1,2,3-Trichloropropane	mg/kg	0.5																				
Pentachloroethane	mg/kg	0.5																				
1,2-Dibromo-3-chloropropane	mg/kg	0.5																				
Halogenated Aromatic Compounds																						
Chlorobenzene	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Bromobenzene	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
2-Chlorotoluene	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
4-Chlorotoluene	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
1,2,3-Trichlorobenzene	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Trihalomethanes																						
Chloroform	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Bromodichloromethane	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Dibromochloromethane	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Bromoform	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Phenolic Compounds																						
Phenol	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
2-Chlorophenol	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
2-Methylphenol	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
2,4,6-Trimethylphenol	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
2-Nitrophenol	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
2,4-Dimethylphenol	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
2,4-Dichlorophenol	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
2,6-Dichlorophenol	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
4-Chloro-3-methylphenol	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
2,4,6-Trichlorophenol	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
2,4,5-Trichlorophenol	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Pentachlorophenol	mg/kg	1							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Phthalate Esters																						
Dimethyl phthalate	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Diethyl phthalate	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Di-n-butyl phthalate	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Butyl benzyl phthalate	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Di(2-ethylhexyl) phthalate	mg/kg	5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Di-n-octylphthalate	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Nitroamines																						
N-Nitrosodimethylethylamine	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
N-Nitrosodimethylamine	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
N-Nitrosodipropylamine	mg/kg	1							<0.0	-	-	-	-	-	<1.0	-	-	-	-	-	-	
N-Nitrosodipropylamine	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
N-Nitrosodipropylamine	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
N-Nitrosodipropylamine	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
N-Nitrosodipropylamine	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
N-Nitrosodipropylamine	mg/kg	1							<0.0	-	-	-	-	-	<1.0	-	-	-	-	-	-	
N-Nitrosodipropylamine	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Nitroaromatics and Ketones																						
2-Picoline	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Acetophenone	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Nitrobenzene	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Isoophenone	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
2,6-Dinitrotoluene	mg/kg	1							<0.0	-	-	-	-	-	<1.0	-	-	-	-	-	-	
2,4-Dinitrotoluene	mg/kg	1							<0.0	-	-	-	-	-	<1.0	-	-	-	-	-	-	
1-Naphthylamine	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
4-Nitrosodiphenylamine	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
5-Nitro-2-toluidine	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Azobenzene	mg/kg	1							<3	-	-	-	-	-	<1	-	-	-	-	-	-	
1,3,5-Trinitrobenzene	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Phenacetin	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
4-Aminodiphenyl	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Pentachloronitrobenzene	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Proximate	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Dimethylaminoazobenzene	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Chlorobenzonate	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Halofethers																						
Di(2-chloroethyl) ether	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
Di(2-chloroethoxy) methane	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
4-Chlorophenyl phenyl ether	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5	-	-	-	-	-	-	
4-Bromophenyl phenyl ether	mg/kg	0.5							<0.0	-	-	-	-	-	<0.5							

Table 1 - Soil Results

Sample Identification		LOR	NEPM 2013 HL G ²	ELC ³	NEPM 2013 Table 1A(3) Comm/Ind Soil HSI for Vapour Intrusion, Sand 0-1m 1-2m 2-4m >4m	NEPM 2013 Table 1B(7) Management Limits for Comm/Ind, Coarse Soil	NEPM 2013 Table 1B(6) ESRs for Comm/Ind, Coarse Soil	Chemical Control Order NSW EPA 1986	MW203 9.0 2/12/2015	MW203 12.5 29/10/2015	MW203 14.5 29/10/2015	MW204 2.5 2/12/2015	QA101 3/12/2015	QA201 2/12/2015	MW204 4 6/12/2015	MW204 6.0 2/12/2015	MW204 9.0 2/12/2015	MW204 12.2 6/12/2015	MW204 14.0 6/12/2015	MW205 5.5 2/12/2015	MW205 9.0 2/12/2015	MW205 11.3 2/12/2015	MW205 12.2 30/12/2015	MW205 14.5 30/12/2015	MW206 1.0 2/12/2015	MW206 7.0 2/12/2015	MW206 11.0 2/12/2015	MW206 12 3/12/2015	MW206 13 3/12/2015	MW206 13.5 3/12/2015	MW206 14 3/12/2015	MW206 15.0 3/12/2015		
Date	Strata	mbgs							Waste	Sandy Clay	Sandy Clay	Waste	Waste	Waste	Waste	Waste	Waste	Sandy clay	Sandy clay	Waste	Waste	Waste	Sand	Sandy clay	Waste	Waste	Waste	Sand	Sand	Sand	Sand	Sand		
Depth	%								9	12.5	14.5	2.5	2.5	2.5	4	6	9	12.2	14	5.5	8	11.3	12.2	14.5	3	7	11	12	13	13.5	14	15		
Moisture Content (dried @ 103°C)	pH Unit	0.1							11.6	16.9	18.7	16.8	21.8	19	-	15.6	11.8	20	11	11.1	8.6	11.4	11.6	21.5	16.6	20.0	21.1	-	-	-	-	20		
Electrical Conductivity @ 25°C	µS/cm	1							79.7	10.5	10	6.3	10.2	6.3	-	30.7	11.3	10.2	9.6	8.3	10.7	9.4	10.3	9.2	10.4	9.6	9.8	9.9	9.9	9.9	10.5	-		
Asbestos	Y/N								2210	1080	-	-	-	7900	-	-	-	5250	547	-	-	-	3490	100	-	-	-	4840	-	-	-	-	4030	
Asbestos	Type								Yes	-	-	No	No	-	No	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Exchangeable Cations on Alkaline Soils																																		
Exchangeable Calcium	mg/100g	0.2							0.4	-	-	<0.2	22.8	-	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	-	-	-	-	-	-	
Exchangeable Magnesium	mg/100g	0.2							<0.2	-	-	<0.2	0.2	-	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	-	-	-	-	-	-	
Exchangeable Potassium	mg/100g	0.2							0.9	-	-	<0.2	0.1	-	-	0.6	0.6	-	-	<0.2	<0.2	0.5	-	-	1.6	1	1.9	-	-	-	-	-	-	
Exchangeable Sodium	mg/100g	0.2							79.3	-	-	16.5	17.5	-	-	63.2	76.4	-	-	4.6	17.5	21	-	-	68.8	38.5	53.4	-	-	-	-	-	-	
Cation Exchange Capacity	mg/100g	0.2							79.7	-	-	18.6	42.8	70	-	63.9	77.5	-	-	5	17.9	23.5	-	-	70.7	39.6	55.8	-	-	-	-	-	-	
Exchangeable Calcium Percent	%	0.2							0.6	-	-	10.7	-	-	-	<0.2	0.3	-	-	5	1.4	<0.2	-	-	0.4	<0.2	0.4	-	-	-	-	-	-	
Exchangeable Magnesium Percent	%	0.2							<0.2	-	-	<0.2	-	-	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	-	-	-	-	-	-	
Exchangeable Potassium Percent	%	0.2							1.1	-	-	0.7	-	-	-	1	0.8	-	-	2.6	0.7	2.2	-	-	2.4	2.6	3.4	-	-	-	-	-	-	
Exchangeable Sodium Percent	%	0.2							98.2	-	-	88.6	-	-	-	99	88.8	-	-	92.3	97.9	97.8	-	-	97.3	97.4	96.1	-	-	-	-	-	-	
Magnesium/Potassium Ratio		0.2							<0.2	-	-	<0.2	-	-	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	-	-	-	-	-	-	
Alkalinity																																		
Total Alkalinity as CaCO ₃	mg/kg	1							-	1320	341	-	-	-	-	-	-	853	2420	-	-	-	-	1100	39	-	-	-	3280	-	-	-	-	1340
Bicarbonate Alkalinity as CaCO ₃	mg/kg	1							-	726	131	-	-	-	-	-	-	591	5320	-	-	-	-	420	39	-	-	-	2230	-	-	-	-	499
Carbonate Alkalinity as CaCO ₃	mg/kg	1							-	594	210	-	-	-	-	-	-	262	2100	-	-	-	-	682	<5	-	-	-	1050	-	-	-	-	840
Sulfate	mg/kg	10							-	2140	460	-	-	-	-	-	-	-	-	-	-	-	-	1890	100	-	-	-	2480	-	-	-	-	2400
Sulfate as SO ₄ 2-	mg/kg	10							-	2140	460	-	-	-	-	-	-	-	-	-	-	-	-	1890	100	-	-	-	2480	-	-	-	-	2400
Chloride	mg/kg	10							-	660	780	-	-	-	-	-	-	1180	710	-	-	-	-	130	40	-	-	-	150	-	-	-	-	130
Sodium	mg/kg	10							-	16400	3450	1860	8040	6770	40000	-	16400	18000	6940	970	1510	7250	3870	3880	170	12200	2960	5450	6730	-	-	-	-	5170
Potassium	mg/kg	10							-	770	760	-	-	-	-	-	-	1210	780	-	-	-	-	20	100	-	-	-	60	-	-	-	-	40
Metals																																		
Aluminium	mg/kg	50		N/A					-	15100	4460	-	-	-	-	-	-	14800	5080	-	-	-	-	3330	4530	-	-	-	103000	-	-	-	-	8890
Mercury	mg/kg	0.1		780					-	<0.1	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<0.1
Cyanide	mg/kg	1		1500					-	70	532	4	20	23	<5	-	72	45	114	<1	77	56	71	58	<1	139	110	57	100	-	-	-	-	60
Total Cyanide	mg/kg	1		1500					-	70	532	4	20	23	<5	-	72	45	114	<1	77	56	71	58	<1	139	110	57	100	-	-	-	-	60
Total Cyanide (Zinc Leachate)	mg/L	0.004							-	8.54	-	<0.004	<0.004	-	-	6.07	5.16	-	-	1.19	1.49	0.198	-	-	7.08	8.01	0.87	-	-	-	-	-	-	-
Fluoride																																		
Fluoride (total)	mg/kg	40							-	17000	90	184	192	110	-	10500	18400	2290	110	-	-	-	830	200	-	-	-	69000	-	-	-	-	-	1510
Fluoride (leachate)	mg/kg	1		17000					-	21000	90	184	192	110	-	10500	18400	2290	110	-	-	-	830	200	-	-	-	69000	-	-	-	-	-	-
Fluoride (TCP Leachate)	mg/L	0.1							-	608	-	217	267	-	-	795	762	-	-	25	144	292	-	-	996	747	-	154	-	-	-	-	-	-
Polychlorinated Biphenyls																																		
Total Polychlorinated Biphenyls	mg/kg	0.1		7					-	<0.1	<0.1	-	-	-	-	-	-	0.1	<0.1	-	-	-	-	<0.1	<0.1	-	-	<0.1	-	-	-	-	<0.1	
Polynuclear Aromatic Hydrocarbons																																		
Naphthalene	mg/kg	0.5		370					<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-	-	-	3.8	<0.5	<0.5	-	-	8.1	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	mg/kg	0.5							<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-	-	-	<1.0	<0.5	<0.5	-	-	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	mg/kg	0.5							<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	0.8	<0.5	-	-	-	27	<0.5	<0.5	-	-	41.7	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	mg/kg	0.5							<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-	-	-	8.9	<0.5	<0.5	-	-	25.5	1.8	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	mg/kg	0.5							<0.5	2.6	<0.5	8.3	-	-	-	-	-	4.2	<0.5	-	-	-	186	<0.5	<0.5	-	-	212	13.4	<0.5	<0.5	<0.5	<0.5	
Anthracene	mg/kg	0.5							<0.5	0.5	<0.5	0.5	-	-	-	-	-	0.8	<0.5	-	-	-	44.8	<0.5	<0.5	-	-	105	1.2	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	mg/kg	0.5							<0.5	6.6	<0.5	47	-	-	-	-	-	8.4	<0.5	-	-	-	739	1.6	<0.5	-	-	508	42.2	<0.5	<0.5	<0.5	<0.5	
Pyrene	mg/kg	0.5							<0.5	6.4	<0.5	22.9	-	-	-	-	-	8.5	<0.5	-	-	-	706	1.6	<0.5	-	-	449	45.3	<0.5	<0.5	<0.5		

Table 2 - Groundwater Results

Sample ID:			NEPM 2013 Table 1A(4) Comm/Ind D Groundwater r HSL for Vapour Intrusion, >8m sand	95% Protection for Aquatic Ecosystems	Recreational Use	Irrigation (long-term trigger value)	Stock Watering	MW202_20151111	MW203_20151111	MW204_20151111	MW206_20151111*	QA101
Date:	LOR							11/11/2015	11/11/2015	11/11/2015	11/11/2015	
Alkalinity												
Hydroxide Alkalinity as CaCO3	mg/L	1						<1	-	-	<1	<1
Carbonate Alkalinity as CaCO3	mg/L	1						26700	-	-	24700	26200
Bicarbonate Alkalinity as CaCO3	mg/L	1						727	-	-	242	727
Total Alkalinity as CaCO3	mg/L	1						27400	-	-	25000	26900
Sulfate												
Sulfate as SO4 - Turbidimetric	mg/L	1						1250	-	-	9000	9460
Chloride												
Chloride	mg/L	1						568	-	-	522	553
Sodium												
Sodium	mg/L	1						8300	-	-	16700	17400
Potassium												
Potassium	mg/L	1						13	-	-	68	73
Metals (dissolved)												
Aluminium	µg/L	10		55	9,000	5,000	5,000	200	-	790	2410	2860
Mercury	µg/L	0.1		0.6	10	2	2	<0.1	-	-	<0.1	<0.1
Cyanide												
Total Cyanide	mg/L	0.004		-	-	-	-	7.81	-	227	223	207
Free Cyanide	mg/L	0.004		0.007	0.8	-	-	<0.040	<0.400	<0.400	<0.400	
Fluoride												
Fluoride	mg/L	0.1		-	1.5	1	2	1880	0.2	1380	1640	1720
PCBs												
Total Polychlorinated biphenyls	µg/L	1						<1	-	-	<1	<1
Polynuclear Aromatic Hydrocarbons												
Naphthalene	µg/L	1		16	-	-	-	1.4	-	-	30.2	38.8
Acenaphthylene	µg/L	1						<1.0	-	-	<1.0	<1.0
Acenaphthene	µg/L	1						<1.0	-	-	3.5	3.5
Fluorene	µg/L	1						<1.0	-	-	2.1	1.8
Phenanthrene	µg/L	1		2	-	-	-	<1.0	-	-	6	4.3
Anthracene	µg/L	1						<1.0	-	-	2.7	2.2
Fluoranthene	µg/L	1		1	-	-	-	<1.0	-	-	8.8	5.3
Pyrene	µg/L	1						1	-	-	8.7	5.2
Benz(a)anthracene	µg/L	1						<1.0	-	-	9.2	4.4
Chrysene	µg/L	1						<1.0	-	-	8.4	3.9
Benzo(b)fluoranthene	µg/L	1						<1.0	-	-	12.3	5.4
Benzo(k)fluoranthene	µg/L	1						<1.0	-	-	3.9	2
Benzo(a)pyrene	µg/L	0.5						<0.5	-	-	9.6	4.1
Indeno(1,2,3-cd)pyrene	µg/L	1						<1.0	-	-	7	2.8
Dibenz(a,h)anthracene	µg/L	1						<1.0	-	-	1.7	<1
Benzo(g,h,i)perylene	µg/L	1						<1.0	-	-	8.2	3.2
Sum of polycyclic aromatic hydroc	µg/L	0.5						2.4	-	-	122	86.9
Benzo(a)pyrene TEQ (zero)	µg/L	0.5						<0.5	-	-	14.7	5.6
Total Petroleum Hydrocarbons												
C6 - C9 Fraction	µg/L	20						110	-	-	330	310
C10 - C14 Fraction	µg/L	50						<50	-	-	200	200
C15 - C28 Fraction	µg/L	100						<100	-	-	540	530
C29 - C36 Fraction	µg/L	50						120	-	-	100	90
C10 - C36 Fraction (sum)	µg/L	50						120	-	-	840	820
C6-C36 Fraction (sum)	µg/L	220		LOR	-	LOR	LOR	350	-	-	2010	1950
Total Recoverable Hydrocarbons												
C6 - C10 Fraction	µg/L	20						120	-	-	330	310
C6 - C10 Fraction minus BTEX (F1)	µg/L	20		7000				90	-	-	320	300
>C10 - C16 Fraction	µg/L	100						<100	-	-	330	310
>C16 - C34 Fraction	µg/L	100						460	-	-	540	460
>C34 - C40 Fraction	µg/L	100						140	-	-	<100	<100
>C10 - C40 Fraction (sum)	µg/L	100						600	-	-	870	770
>C10 - C16 Fraction minus Naphth	µg/L	100						<100	-	-	280	250
BTEXN												
Benzene	µg/L	1		5000	950	10	-	23	-	-	3	3
Toluene	µg/L	2			180 (L _R)	250	-	800 (25)	-	-	4	5
Ethylbenzene	µg/L	2			80 (L _R)	0.1	-	9.01	-	-	<2	<2
meta- & para-Xylene	µg/L	2						<2	-	-	3	4
ortho-Xylene	µg/L	2						<2	-	-	<2	<2
Total Xylenes	µg/L	2		200	200		-	600 (20)	<2	-	3	4
Sum of BTEX	µg/L	1						29	-	-	10	12
Naphthalene	µg/L	5		16				<5	-	-	48	58

Shaded results exceeds adopted site criteria, or most sensitive adopted site criteria if multiple criteria exceeded

LOR = Limit of Reporting

<value = Less than the laboratory Limit of Reporting (LOR)

BTEX = benzene, toluene, ethylbenzene, xylene. MAH = monocyclic aromatic hydrocarbons. TPH / TRH = total petroleum / recoverable hydrocarbons. PAH = Polycyclic Aromatic Hydrocarbons.

Blank cell indicates no criterion available

Table 3 - Soil Quality Assurance

			Intralaboratory Duplicate			Intralaboratory Duplicate			Intralaboratory Duplicate			Interlaboratory Duplicate	
			MW202-13.5	QA101	RPD %	MW203_2.5	QA100	RPD %	MW204_2.5	QA101	RPD %	QA201	RPD %
LOR			5/11/2015			2/12/2015			2/12/2016				
Moisture Content (dried @ 103°C)	%	1	12	13.3	10.3	29.2	21.6	29.9	16.8	21.8	25.9	19	12.3
pH Value	pH Unit	0.1	9.9	9.8	1.0	9.7	9.4	3.1	6.3	6.4	1.6	6.3	0.0
Electrical Conductivity @ 25°C	µS/cm	1	3850	4630	18.4	-	-	-	-	-	-	7900	-
Total Alkalinity as CaCO ₃	mg/kg	1	5120	5840	13.1	-	-	-	-	-	-	-	-
Bicarbonate Alkalinity as CaCO ₃	mg/kg	1	2760	2950	6.8	-	-	-	-	-	-	-	-
Carbonate Alkalinity as CaCO ₃	mg/kg	1	2360	2890	20.2	-	-	-	-	-	-	-	-
Sulfate as SO ₄ 2-	mg/kg	10	1920	2180	12.7	-	-	-	-	-	-	-	-
Chloride	mg/kg	10	290	530	58.5	-	-	-	-	-	-	-	-
Sodium	mg/kg	10	3760	4650	12.2	5960	3260	58.6	8040	6770	17.2	40000	133.1
Potassium	mg/kg	10	60	40	40.0	-	-	-	-	-	-	-	-
Heavy Metals													
Aluminium	mg/kg	50	12300	16800	30.9	-	-	-	-	-	-	-	-
Mercury	mg/kg	0.1	<0.1	<0.1	0.0	-	-	-	-	-	-	-	-
Cyanide													
Total Cyanide	mg/kg	1	44	51	14.7	158	142	10.7	20	23	14.0	<5	120.0
Total Cyanide (ZHE Leachate)	mg/L	0.004				1.48	1.93	26.4	<0.004	<0.004	0.0	-	-
Fluoride													
Fluoride (total)	mg/kg	40	2140	3740	54.4	-	-	-	-	-	-	-	-
Fluoride (soluble)	mg/kg					3560	2610	30.8	184	192	4.3	110	50.3
Fluoride (TCLP Leachate)	mg/L					267	274	2.6	217	267	20.7	-	-
Total Polychlorinated biphenyls													
Total Polychlorinated biphenyls	mg/kg	0.1	<0.1	<0.1	0.0	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons													
Naphthalene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	<0.5	-	-	-	-
Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	<0.5	-	-	-	-
Acenaphthene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	<0.5	-	-	-	-
Fluorene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	<0.5	-	-	-	-
Phenanthrene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	8.3	-	-	-	-
Anthracene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	1	-	-	-	-
Fluoranthene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	47	-	-	-	-
Pyrene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	22.9	-	-	-	-
Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	19.5	-	-	-	-
Chrysene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	52.5	-	-	-	-
Benzo(b+j)fluoranthene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	55	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	5.1	-	-	-	-
Indeno(1.2.3.cd)pyrene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	5.6	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	2.6	-	-	-	-
Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	5.4	-	-	-	-
Sum of polycyclic aromatic hydrocarbons	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	225	-	-	-	-
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	16.3	-	-	-	-
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5	0.6	0.6	0.0	-	-	-	16.3	-	-	-	-
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5	1.2	1.2	0.0	-	-	-	16.3	-	-	-	-
Polycyclic Aromatic Hydrocarbons - TCLP Leachate													
Naphthalene	µg/L	1	-	-	-	32.8	19.1	52.8	1.2	<1	18.2	-	-
Acenaphthylene	µg/L	1	-	-	-	1.1	<1	9.5	<1.0	<1.0	0.0	-	-
Acenaphthene	µg/L	1	-	-	-	157	66	81.6	<1.0	<1.0	0.0	-	-
Fluorene	µg/L	1	-	-	-	27.7	11.6	81.9	<1.0	<1.0	0.0	-	-
Phenanthrene	µg/L	1	-	-	-	28.8	10.7	91.6	3.5	<1	111.1	-	-
Anthracene	µg/L	1	-	-	-	12.8	4.6	94.3	<1.0	<1.0	0.0	-	-
Fluoranthene	µg/L	1	-	-	-	14.4	5.7	86.6	7.9	1.7	129.2	-	-
Pyrene	µg/L	1	-	-	-	9.9	3.6	93.3	3.7	<1.0	114.9	-	-
Benz(a)anthracene	µg/L	1	-	-	-	<1.0	<1.0	-	<1.0	<1.0	0.0	-	-
Chrysene	µg/L	1	-	-	-	<1.0	<1.0	-	<1.0	<1.0	0.0	-	-
Benzo(b+j)fluoranthene	µg/L	1	-	-	-	<1.0	<1.0	-	<1.0	<1.0	0.0	-	-
Benzo(k)fluoranthene	µg/L	1	-	-	-	<1.0	<1.0	-	<1.0	<1.0	0.0	-	-
Benzo(a)pyrene	µg/L	0.5	-	-	-	<0.5	<0.5	-	<0.5	<0.5	0.0	-	-
Indeno(1.2.3.cd)pyrene	µg/L	1	-	-	-	<1.0	<1.0	-	<1.0	<1.0	0.0	-	-
Dibenz(a,h)anthracene	µg/L	1	-	-	-	<1.0	<1.0	-	<1.0	<1.0	0.0	-	-
Benzo(g,h,i)perylene	µg/L	1	-	-	-	<1.0	<1.0	-	<1.0	<1.0	0.0	-	-
Sum of polycyclic aromatic hydrocarbons	µg/L	0.5	-	-	-	284	121	80.5	16.3	1.7	162.2	-	-
Benzo(a)pyrene TEQ (zero)	µg/L	0.5	-	-	-	<0.5	<0.5	-	<0.5	<0.5	0.0	-	-
Total Petroleum Hydrocarbons													
C6 - C9 Fraction	mg/kg	10	<10	<10	0.0	-	-	-	-	-	-	-	-
C10 - C14 Fraction	mg/kg	50	<50	<50	0.0	-	-	-	-	-	-	-	-
C15 - C28 Fraction	mg/kg	100	<100	<100	0.0	-	-	-	-	-	-	-	-
C29 - C36 Fraction	mg/kg	100	<100	<100	0.0	-	-	-	-	-	-	-	-
C10 - C36 Fraction (sum)	mg/kg	50	<50	<50	0.0	-	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons													
C6 - C10 Fraction	mg/kg	10	<10	<10	0.0	-	-	-	-	-	-	-	-
C6 - C10 Fraction minus BTEX (F1)	mg/kg	10	<10	<10	0.0	-	-	-	-	-	-	-	-
>C10 - C16 Fraction	mg/kg	50	<50	<50	0.0	-	-	-	-	-	-	-	-
>C16 - C34 Fraction	mg/kg	100	<100	<100	0.0	-	-	-	-	-	-	-	-
>C34 - C40 Fraction	mg/kg	100	<100	<100	0.0	-	-	-	-	-	-	-	-
>C10 - C40 Fraction (sum)	mg/kg	50	<50	<50	0.0	-	-	-	-	-	-	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50	<50	<50	0.0	-	-	-	-	-	-	-	-
BTEXN													
Benzene	mg/kg	0.2	<0.2	<0.2	0.0	-	-	-	-	-	-	-	-
Toluene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	-	-	-	-	-
meta- & para-Xylene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	-	-	-	-	-
ortho-Xylene	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	-	-	-	-	-
Total Xylenes	mg/kg	0.5	<0.5	<0.5	0.0	-	-	-	-	-	-	-	-
Sum of BTEX	mg/kg	0.2	<0.2	<0.2	0.0	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	1	<1	<1	0.0	-	-	-	-	-	-	-	-

<value = Less than the laboratory Limit of Reporting (LOR)

ND = Not Detected

LOR = Limit of Reporting

Bold results indicate exceedance of relative percentage difference standards

Table 4 - Groundwater Quality Assurance

			Intralaboratory Duplicate			Rinsate Blank
Sample ID:			MW206_20151111	QA101	RPD	QA201
Date:	LOR		11/11/2015	11/11/2015	%	11/11/2015
Alkalinity						
Hydroxide Alkalinity as CaCO ₃	mg/L	1	<1	<1	0.0	<1
Carbonate Alkalinity as CaCO ₃	mg/L	1	24700	26200	5.9	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	1	242	727	100.1	<1
Total Alkalinity as CaCO ₃	mg/L	1	25000	26900	7.3	<1
Sulfate						
Sulfate as SO ₄ - Turbidimetric	mg/L	1	9000	9460	5.0	<1
Chloride						
Chloride	mg/L	1	522	553	5.8	<1
Sodium						
Sodium	mg/L	1	16700	17400	4.1	<1
Potassium						
Potassium	mg/L	1	68	73	7.1	<1
Heavy Metals						
Aluminium	µg/L	10	2410	2860	17.1	40
Mercury	µg/L	0.1	<0.1	<0.1	0.0	<0.0001
Cyanide						
Total Cyanide	mg/L	0.004	223	207	7.4	<0.004
Fluoride						
Fluoride	mg/L	0.1	1640	1720	4.8	<0.1
Polychlorinated biphenyls						
Total Polychlorinated biphenyls	µg/L	1	<1	<1	0.0	<1
Polycyclic Aromatic Hydrocarbons						
Naphthalene	µg/L	1	30.2	38.8	24.9	<1.0
Acenaphthylene	µg/L	1	<1.0	<1.0	0.0	<1.0
Acenaphthene	µg/L	1	3.5	3.5	0.0	<1.0
Fluorene	µg/L	1	2.1	1.8	15.4	<1.0
Phenanthrene	µg/L	1	6	4.3	33.0	<1.0
Anthracene	µg/L	1	2.7	2.2	20.4	<1.0
Fluoranthene	µg/L	1	8.8	5.3	49.6	<1.0
Pyrene	µg/L	1	8.7	5.2	50.4	<1.0
Benz(a)anthracene	µg/L	1	9.2	4.4	70.6	<1.0
Chrysene	µg/L	1	8.4	3.9	73.2	<1.0
Benzo(b+j)fluoranthene	µg/L	1	12.3	5.4	78.0	<1.0
Benzo(k)fluoranthene	µg/L	1	3.9	2	64.4	<1.0
Benzo(a)pyrene	µg/L	0.5	9.6	4.1	80.3	<0.5
Indeno(1.2.3.cd)pyrene	µg/L	1	7	2.8	85.7	<1.0
Dibenz(a,h)anthracene	µg/L	1	1.7	<1	51.9	<1.0
Benzo(g,h,i)perylene	µg/L	1	8.2	3.2	87.7	<1.0
Sum of polycyclic aromatic hydrocarbons	µg/L	0.5	122	86.9	33.6	<0.5
Benzo(a)pyrene TEQ (zero)	µg/L	0.5	14.7	5.6	89.7	<0.5
Total Petroleum Hydrocarbons						
C6 - C9 Fraction	µg/L	20	330	310	6.3	<20
C10 - C14 Fraction	µg/L	50	200	200	0.0	<50
C15 - C28 Fraction	µg/L	100	540	530	1.9	<100
C29 - C36 Fraction	µg/L	50	100	90	10.5	<50
C10 - C36 Fraction (sum)	µg/L	50	840	820	2.4	<50
C6-C36 Fraction (sum)	µg/L	220	2010	1950	3.0	<70
Total Recoverable Hydrocarbons						
C6 - C10 Fraction	µg/L	20	330	310	6.3	<20
C6 - C10 Fraction minus BTEX (F1)	µg/L	20	320	300	6.5	<20
>C10 - C16 Fraction	µg/L	100	330	310	6.3	<100
>C16 - C34 Fraction	µg/L	100	540	460	16.0	<100
>C34 - C40 Fraction	µg/L	100	<100	<100	0.0	<100
>C10 - C40 Fraction (sum)	µg/L	100	870	770	12.2	<100
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100	280	250	11.3	<100
BTEXN						
Benzene	µg/L	1	3	3	0.0	<1
Toluene	µg/L	2	4	5	22.2	<2
Ethylbenzene	µg/L	2	<2	<2	0.0	<2
meta- & para-Xylene	µg/L	2	3	4	28.6	<2
ortho-Xylene	µg/L	2	<2	<2	0.0	<2
Total Xylenes	µg/L	2	3	4	28.6	<2
Sum of BTEX	µg/L	1	10	12	18.2	<1
Naphthalene	µg/L	5	48	58	18.9	<5

<value = Less than the laboratory Limit of Reporting (LOR)

ND = Not Detected

LOR = Limit of Reporting

Bold results indicate exceedance of relative percentage difference standards

Table 5 - Waste Classification

[illegible]

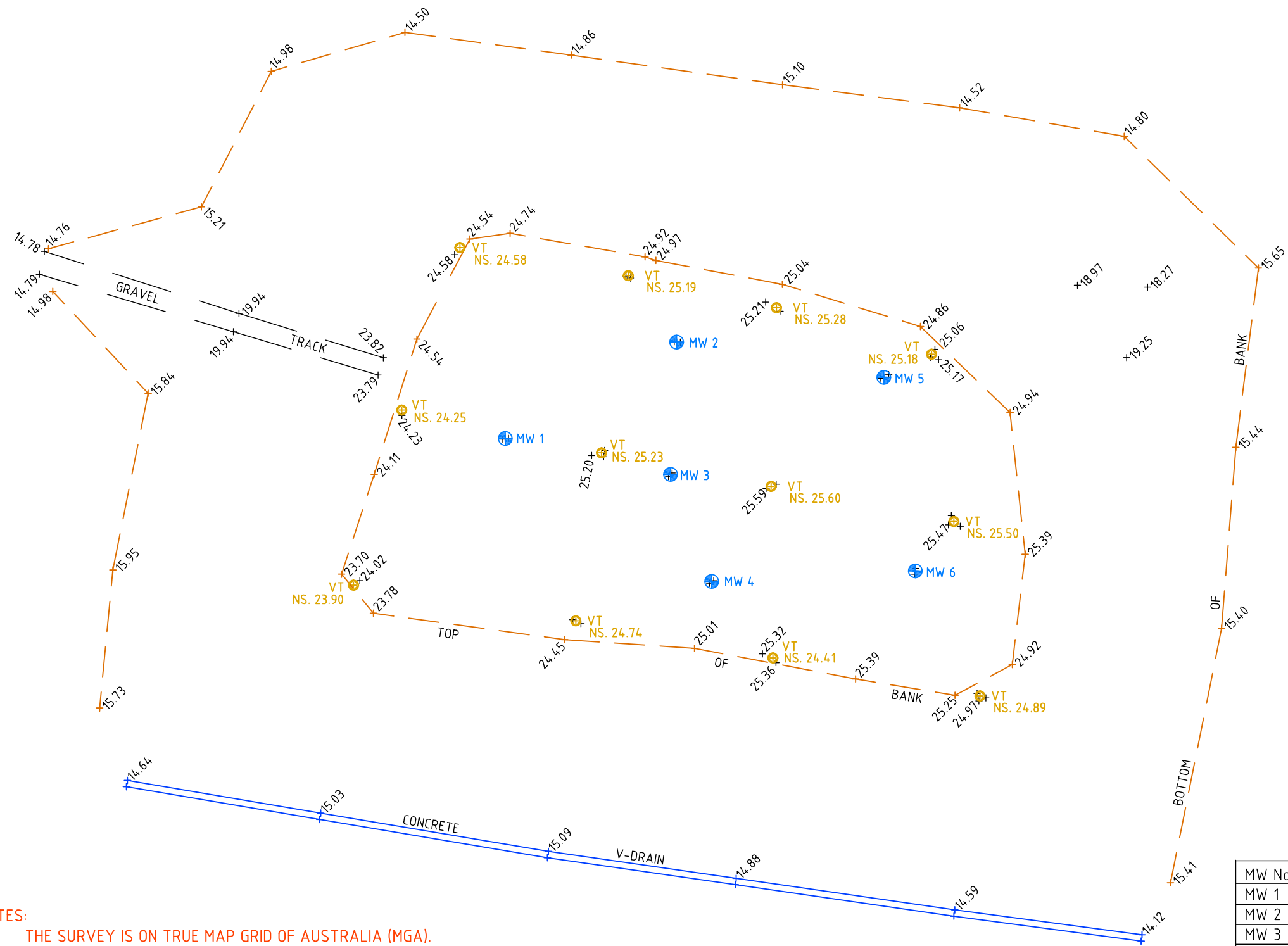
Table 5 - Waste Classification

[illegible]

ND = Not Detected
 LOR = Limit of Reporting
 BTX = benzene, toluene, ethylbenzene, xylene. MAH = monocyclic aromatic hydrocarbons. TPH / TRH = total petroleum / recoverable hydrocarbons. PAH = Polycyclic Aromatic Hydrocarbons.
 Blank cell indicates no criterion available

APPENDIX H

1996 AND 2016 STOCKPILE SURFACE SURVEYS



- NOTES:
1. THE SURVEY IS ON TRUE MAP GRID OF AUSTRALIA (MGA).
 2. ALL REDUCED LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD).
 3. ORIGIN OF LEVELS FROM P.M.37964 R.L.19.455.
 4. ALL MONITORING WELLS REDUCED LEVELS HAVE BEEN TAKEN FROM THE TOP OF THE PVC PIPE.

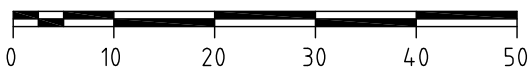
LEGEND

---	TOP & TOE OF BANKS
VT	VENT
MW	MONITORING WELL
NS	NATURAL SURFACE

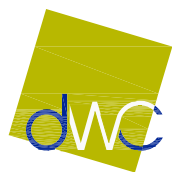
MONITORING WELL CO-ORDINATES (M.G.A)

MW No.	EASTING	NORTHING	TOP PIPE RL.	NS
MW 1	358079.60	6371095.88	25.60	24.97
MW 2	358106.45	6371110.98	26.02	25.48
MW 3	358105.50	6371090.25	26.03	25.40
MW 4	358111.95	6371073.48	25.86	25.35
MW 5	358138.92	6371105.46	26.27	25.55
MW 6	358143.85	6371075.13	26.07	25.42

Bar Scale 1: 750 (A3)



THIS PLAN IS COPYRIGHT AND SHALL REMAIN THE PROPERTY OF DE WITT CONSULTING. THE CLIENT NAMED ON THE PLAN IS GRANTED A LICENCE TO USE THE INFORMATION. USING THE INFORMATION CONTAINED IN THIS PLAN IS PROHIBITED UNLESS WRITTEN APPROVAL IS GRANTED BY DE WITT CONSULTING. THE PLAN AND INFORMATION MAY ONLY BE USED FOR THE PURPOSE FOR WHICH THE PLAN WAS DESIGNED.



de Witt Consulting
planning ■ surveying ■ project management

HUNTER REGION
7 Canberra Street Charlestown NSW 2290
PO Box 850 Charlestown NSW 2290
P 02 4942 5441 F 02 4942 5301
E admin@de Witt Consulting.com.au

WESTERN REGION
87 Herbert Street Gulgong
PO Box 232 Gulgong NSW 2852
P 02 6374 2911 F 02 6374 2922
ABN 23 104 067 405

TITLE

PLAN SHOWING
LOCATION OF MONITORING WELLS AND LEVELS

H		
G		
F		
E		
D		
C		
B		
A	22.02.2016	INITIAL ISSUE
Ed.	Date	Amendment

JOB ADDRESS: HYDRO ELECTRICITY SMELTER, KURRI KURRI		PLAN No	JOB REF:
CLIENT: RAMBOLL ENVIRON		001	6455
SCALE: 1:750 (A3)	ORIGIN OF LEVELS P.M.37964	DRAWN JG	SHEET No
SURVEY DATE: 17.02.2016	RL.19.455 (AHD)	SURVEYOR CM	1/1
PLAN DATE: 19.02.2016		CHECKED CM / WS	
DATUM: AHD		APPROVED WS	
CAD REF: 6455-DE-160217.mjo		DRAWING REF: 6455-DET-19.02.2016.DWG	